

PERSPECTIVES ON VISUAL LEARNING, VOL. 6

# Envisioning an Electrifying Future

Kristóf Nyíri (ed.)

Budapest 2024

Hungarian Academy of Sciences /  
/ University of Pécs



# Envisioning an Electrifying Future

# Perspectives on Visual Learning

Edited by Petra Aczél, András Benedek and Kristóf Nyíri

Volume 6

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2024

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The papers here collected have been accepted after a strict double-blind peer-review process.



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*Kristóf Nyíri – Gábor Szécsi*

## **Preface**

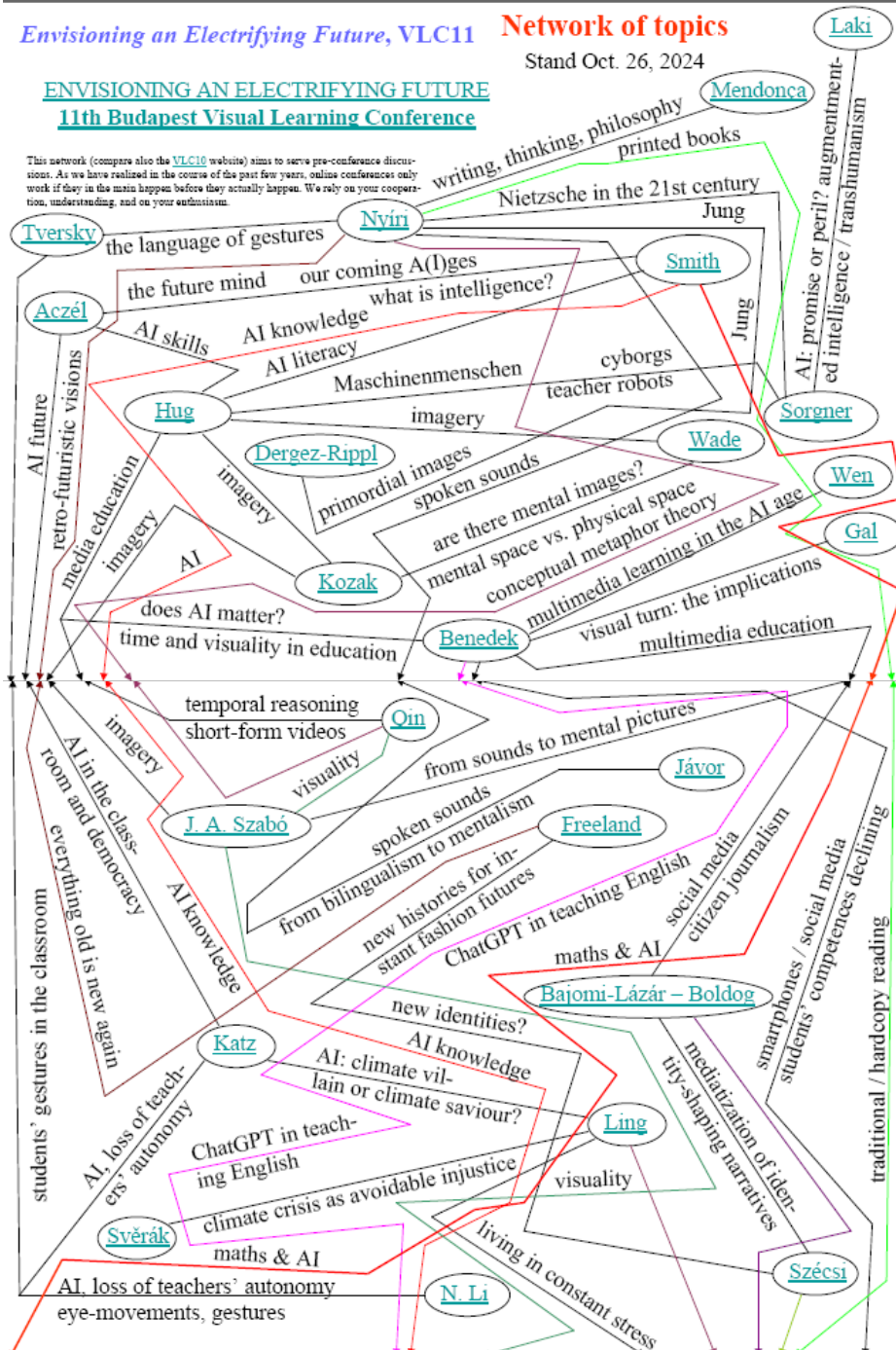
The present online volume contains the papers prepared for the 11th Budapest Visual Learning Conference – ENVISIONING AN ELECTRIFYING FUTURE – held in a physical-online blended form on Nov. 13, 2024, organized by the University of Pécs (represented by Prof. Gábor Szécsi, Dean, Faculty of Cultural Sciences, Education and Regional Development), and the Hungarian Academy of Sciences (represented by Prof. Kristóf Nyíri, Member of the Hungarian Academy of Sciences). Nyíri and Szécsi were responsible for sending out the call for abstracts and inviting plenary speakers, Szécsi organized the physical surroundings. Nyíri's task was to build up and continuously update the [conference website](#), as well as to edit the accepted submissions.

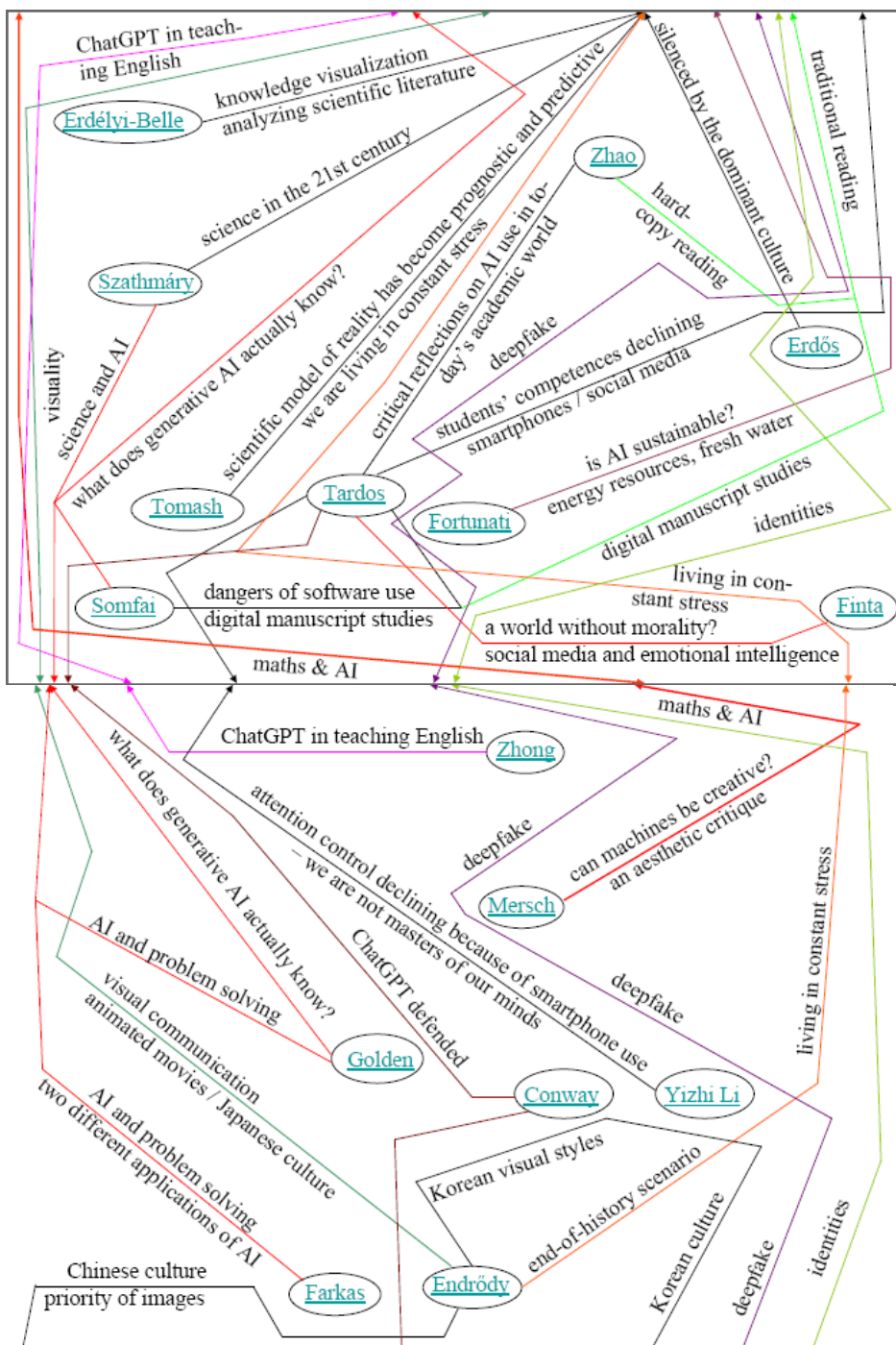
As we indicated in the call for submissions, the conference was planned as an interdisciplinary encounter of communication and media theory, cultural sciences, sociology, psychology, philosophy, pedagogy, history, political science, picture theory, and other disciplines. We insisted on achieving new scholarly results. Especially with AI now complementing, or intruding into, the world of the internet, what image of the future can we conceive of, what new patterns of life and in particular forms of education should we strive to create?

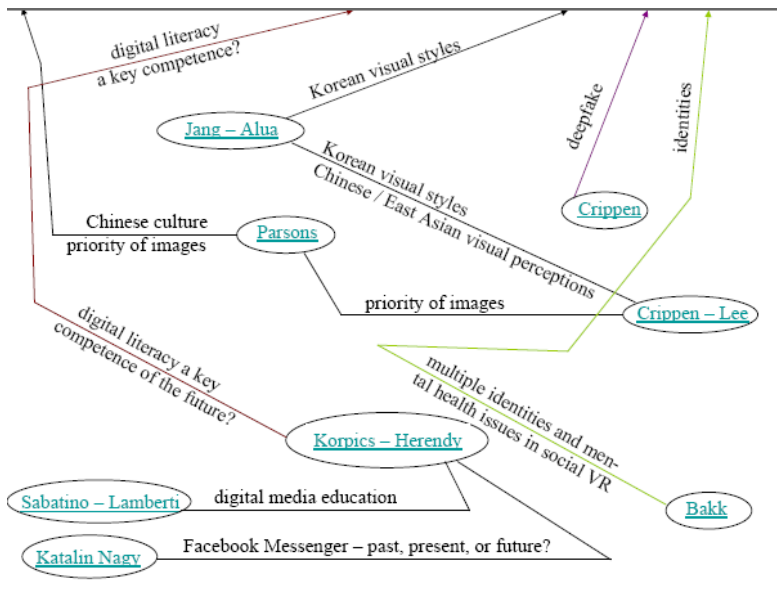
The conference homepage was meant to bear a substantial burden of the aims we wanted to achieve. Because of the time zone differences, an online international conference cannot last for many hours. So we attempted to provide a preliminary overview of how the papers hang together – see the [network of topics](#) pictured on the following pages:

ENVISIONING AN ELECTRIFYING FUTURE  
11th Budapest Visual Learning Conference

This network (compare also the [VLC10](#) website) aims to serve pre-conference discussion. As we have realized in the course of the past few years, online conferences only work if they in the main happen before they actually happen. We rely on your cooperation, understanding, and on your enthusiasm.







If you look at the homepage, you see links leading not only to the papers, but to the abstracts, too. There you find, below the abstracts themselves, a short description of the authors’ affiliation, etc. The same descriptions you can find in the semi-final segment of the present volume, under the heading “Notes on Contributors”. The final segment (you also find it linked to the homepage) is unusual: it shows the “Pre-conference discussions” (and its Hungarian counterpart “Konferencia előtti viták”) conducted by the participants. A conference radically condensed in time cannot be successful unless in a sense it has happened before it actually happens, this is why the organizers decided to implement these pre-conference discussions.

We believe the conference was a scholarly success, with both young bright researchers and deservedly world-famous colleagues participating – discussing some burning issues of the day and of the im-



minent future, AI being the hottest subject, getting all that it touches ablaze, in good and in bad ways, as has become clear by the time the event was held. Views diverged, but most of the contributions, we are confident, are of the highest quality.

Budapest – Pécs, Nov. 12, 2024.



**AI: THREAT OR PROMISE?  
THE CLIMATE CRISIS**



*Petra Aczél*

## **The Future Mind Intelligence, Sciences and Scruples in Our Coming A(I)ges**

The presence of artificial intelligence (AI) is the defining global experience in the early phase of the third millennium. It expresses and can generate changes that characterize axial ages – that is, periods when changes in different fields of human life and thought converge into a fundamental turn.<sup>1</sup> The understanding of AI goes hand in hand with its proliferation, its globalization and the everydayization of its use, which requires the inclusion of ever newer perspectives. This essay discusses AI within the conceptual framework of the human–technology relations and future-oriented human intelligence, pointing out the disjunctive and cohesive nature of deviations and norms, approaches and outcomes, and the specific differences between human and AI. The paper uses the method of critical description and analysis to raise conceptual issues of interpreting AI as a tool, as well as an agent and an “adversary”.

As Diamandis and Kotler put it, “we live in a world that is global and exponential. Global, meaning if it happens on the other side of the planet, we hear about it seconds later (and our computers hear about it only milliseconds later). Exponential, meanwhile, refers to today’s blitzkrieg speed of development. Forget about the difference between generations, currently mere months can bring a revolution.”<sup>2</sup> This is a state of anxious futurism that makes the role of human intelligence even more important. Particularly when a learning capacity comparable to the cognitive set of human skills emerges,

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<sup>1</sup> Karl Jaspers, *The Origin and Goal of History*, London: Routledge, 1953.

<sup>2</sup> Peter H. Diamandis – Steven Kotler, *The Future Is Faster Than You Think: How Converging Technologies Are Transforming Business, Industries, and Our Lives (Exponential Technology Series)*, New York: Simon & Schuster, 2020, p. 11.

referred to – with certain exaggeration – as artificial intelligence. Fear is not only triggered by the novelty of the new, but also by the possibility of losing control. All the more so because humans are biologically programmed not to be passive observers, but controlling agents, active participants in the causal chain of events.<sup>3</sup> It is for this reason that new digital technologies are often misleading in their empowering and continuous operation, suggesting that humans are capable of more than they are actually prepared for in reality without these technologies.<sup>4</sup> It is this need for control that in some sense creates a technological dependency.

This development and change in technology and science, which also causes the future shock<sup>5</sup> in humans, is generated and directed by at least four power logics.<sup>6</sup> Each of the four operates within a specific set of principles and goals. The first is the developmental, design logic, which is primarily problem-sensitive and solution-oriented. It seeks to trigger progress within the technological-scientific field, interpreting challenges from within these systems rather than from an external perspective. This is how AI systems can become bigger, faster, more adaptive and efficient. The second is social logic, which is sensitive to the human factor and focuses on justice in social relations and a sustainable balance of life. In this logical framework, the relationship between man and technology, the accessibility and privileged nature of technology, its impact on man, are at the center of opinions and actions. The third is the organizational or corporate logic: here technology or innovation is the key to

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<sup>3</sup> Lauren A. Leotti – Sheena S. Iyengar – Kevin N. Ochsner, “Born to Choose: The Origins and Value of the Need for Control”, *Trends in Cognitive Sciences*, vol. 14, issue 10 (2020), pp. 457–463.

<sup>4</sup> Matthew Fisher – Mariel K. Goddu – Frank C. Keil, “Searching for Explanations: How the Internet Inflates Estimates of Internal Knowledge”, *Journal of Experimental Psychology*, vol. 144, no. 3 (2015), pp. 674–687.

<sup>5</sup> Alvin Toffler, *Future Shock*, New York: Random House, 1970.

<sup>6</sup> Juliette Powell – Art Kleiner, *The AI Dilemma: 7 Principles for Responsible Technology*, Oakland, CA: Berrett-Koehler Publishers, Inc., 2023.

competition. This approach is growth-oriented, prioritizing and supporting efforts that lead to progress and provide advantageous benefits. Finally, the fourth is the logic of governance, which is about regulation, protection and care. According to this logic, technology and scientific achievement must be made both accessible and regulated in order to maintain and serve the order of the individual and the community. These four logics do not necessarily work in the same direction. Differences of interpretation, interest and values are evident. For a technology developer, a programming challenge is not an ethical issue, for a philosopher, AI is not a mere algorithmic innovation, but a life-shaping factor. While a business leader expects limitless capacity from innovation, governance also wants to regulate unbridled technology. This also calls for the need for interpretations of the interaction between people and technology as a conceptual element in understanding future anxiety and preparedness.

All technologies, in fact, serve as pharmakon, according to Bernard Stiegler.<sup>7</sup> A pharmakon is an agent that can be both curative and toxic. Just as printing benefits humanity by making texts reproducible and accessible, it reduces the need for human handwriting to develop thinking. Similarly, digital technologies have become both medicine and poison, both attackers and savers of human skills and mental-social capacities. The internet makes it easier to acquire knowledge, but at the same time it takes away the mental planning and cognitive work involved in acquiring it. It teaches, but it also deceives. Already in its current state, AI facilitates everyday information work, but at the same time it can make human involvement in the same activities increasingly unnecessary. At least four paradigms of interpretation can be identified in the specific, dual relationship between humans and technology.

The first could be called the critical approach. Accordingly, humans, in defense of their individual and cultural symbolic environment and value system, are critical and struggle against the advance

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<sup>7</sup> Bernard Stiegler, *States of Shock: Stupidity and Knowledge in the 21st Century*, New York: Polity, 2015.

of new technology. Underlying the approach is the assumption of a zero-sum game, that is, the parallel unfolding of human and technological character and agency is not possible, as one is strengthened or weakened to the detriment of the other. An example of this approach from recent years is Douglas Rushkoff's *Team Human*,<sup>8</sup> which mirrors Harari's data-driven dystopia *Homo Deus*.<sup>9</sup> Rushkoff's work is an apologia for human autonomy, warning that humans can lose this autonomy because of technology. The way out, he argues, is to engage with people and recognize the power within ourselves, otherwise it will be difficult to confront the dominance of the digital. Economist Daniel Cohen, in his work *Homo numericus: La "civilisation" qui vient*,<sup>10</sup> also makes a rather combative appeal to technology. The author sees the permanent presence and use of technology as making reality – by presenting a virtual alternative – boring, distorting the self-image of the individual as well as his social relations. The digital revolution is leading to the disintegration of the institutions that used to structure industrial society, and the individual is becoming isolated and disorganized in fake, simulated communities. However, Cohen also suggests that new technologies could also lead to the emergence of an unprecedented non-ideological society, built on non-vertical relations, in which everyone's voice is heard and taken into account. For this pure democratic utopia to happen, however, a series of reflexive and critical insights are essential. These two works are merely indicative rather than fully representative of the strength of the critical paradigm. The result is a technological pessimism that also sees AI as a system that replaces and substitutes humans, dismantling their habits and procedures without control. Its viewpoint is that of the "watchdog", critical and vigilant, and its claims can take on a prophetic-apocalyptic character.

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<sup>8</sup> Douglas Rushkoff, *Team Human*, New York: W.W. Norton Company, 2019.

<sup>9</sup> Yuval N. Harari, *Homo Deus: A Brief History of Tomorrow*, London: Penguin, Random House, 2016.

<sup>10</sup> Daniel Cohen, *Homo numericus: La "civilisation" qui vient*, Paris: Albin Michel, 2022.



The second approach can be characterized as functional. It classifies digital technologies according to their function and usability, seeing them as tools that one can use by weighing their advantages and disadvantages. This paradigm also gives rise to the principles and proposals for (media) awareness of use. In this approach, ethics and responsibility are based on the visibility and accountability of technology and the economic-scientific-political actors behind it, and on the existence of shared and mutual knowledge of innovations. Juliette Powell's and Art Kleiner's work *The AI Dilemma*,<sup>11</sup> for example, is inspired by this approach. Their principled proposals are that the use of AI and its embedding in everyday professional practices requires impact- and risk-analysis, learning how programs work, gaining control and regulatory rights, the possibility of accountability, and building systems not in a closed (and thus less robust) but in a looser (more resistant to change, more ready to be integrated) way. In this view, technology can do harm and good to the extent that we learn and understand how and to what we apply it.

The third paradigm is "consumerist". In this concept, technologies become "human-centred", user-friendly: serving the needs of people's everyday lives and aesthetic expectations. They are persuasive in order to be sold and used. This approach is therefore also a kind of media design, the concept being that technology invites people to have fun, to participate and to immerse themselves within. Virtual reality creates new, ever-present spaces, new experiences of embodiment, and AI generates co-creation with its style of human communication and interaction. Captology<sup>12</sup> provides one possible theoretical basis for this approach. Captology is a method and procedure for the persuasive design of human-(media)technology interactions. It is based on the question of how media "motivate people to interact through technology/machine"<sup>13</sup>. Fogg argues that digital products, software and programs are more persuasive when they are de-

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<sup>11</sup> Juliette Powell – Art Kleiner, *op. cit.*

<sup>12</sup> B. J. Fogg, *Persuasive Technology: Using Computers to Change What We Think and Do*, New York, NJ: Morgan Kaufmann-Elsevier, 2003.

<sup>13</sup> *Ibid.*, p. 16.

signed in a way that is more supportive of the human psyche and more empathetic. Technologies can become persuasive by enabling people to explore causal relationships and providing vicarious experiences, helping the user to engage in a particular interactive behaviour.<sup>14</sup> In this way, technologies become agents by and through which the users can mediate their habits, interactions and social relations.

The fourth approach offers an ethnological dimension to capture the human-technology relationship as a way of meaning-making. This is exemplified by the *apparatgeist* theory developed by Katz and Aakhus.<sup>15</sup> It points out that people give meaning to their technologies. By integrating them into their lives and systems, they see them as existents, even as agents with souls. This explains why a technological innovation is accepted by one group of users and rejected by another. This is not a purely functional question, but rather the result of the appropriation of meaning. From this point of view, a new technology, such as AI, is not primarily an innovation of informatics, but the outcome of a socio-cultural attitude that answers the question not of what the technology is for, but of who we are as users of the technology, and what role, agency and control the technology we use can have in our lives, individually or socially.

These four interpretative frameworks assess the emergence and use of AI from different perspectives. What they have in common, however, is the desire to understand AI as a systemic element, a tool, a form or an existence, to see it as a new stage in the process of the relationship between humans and technology.

AI is not just a new product, perhaps least of all. Predictions of its full flowering have given dates that are strikingly close to our present. As publicists widely claim, technology experts and ordinary people alike are justifiably concerned that AI may become a superintelligence that supersedes humans, a job killer and a promoter of the wrong people and goals. The idea behind these claims is that human

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<sup>14</sup> *Ibid.*, p. 62.

<sup>15</sup> James E. Katz – Mark Aakhus, *Perpetual Contact: Personal Communication, Private Talk, Public Performance*, Cambridge: Cambridge University Press, 2002.

intelligence will be copied and enhanced in artificial intelligence, which will then become the future continuation of human intellectual capabilities. AI, unlike human intelligence, will be able to adapt to future challenges in an unlimited way, while human intelligence will continue to cope with past and present experiences.

However, these approaches do not take into account that it is human intelligence that is truly “programmed” for the future. More than a century has passed since Alfred Binet put forward the idea that intelligence can be quantified by logical-verbal tests. His definition and measurement of intelligence (IQ) enabled the Paris schools of the early 20th century to scale and standardize intelligence and cleverness by testing (exclusively) rational and conceptual abilities. Although these abilities provide only a partial account of human intelligence functioning, all the measurement tasks and items in IQ tests ask respondents about the future, about what the next item, number, step in a sequence, system, logic should be.

When Howard Gardner<sup>16</sup> reformed the theory of human intelligence, he offered nine intelligences (interpersonal, interpersonal, verbal, logical, musical, spatial, visual, existential, natural) instead of the monolithic concept of intelligence. He stressed that intelligence is a problem-solving ability that enables a person to set goals and find the right path to them. According to him, intelligence is a computational ability and its main intention is problem solving, and its triggers can be both external and internal information. This was partly confirmed and partly modified by the pioneering approach presented by Martin Seligman and colleagues in 2016.<sup>17</sup> Their premise was that, by moving beyond centuries of psychological thinking that assumes a human trapped by past memories and present stimuli, we need to recognize our true identity, which is that of the “Homo prospectus”. The forerunners of their interpretation of intelligence

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<sup>16</sup> Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books, 1993, p. 6.

<sup>17</sup> Martin E. P. Seligman – Peter Railton – Roy F. Baumeister – Chandra Sripada, *Homo Prospectus*, New York, NY: Oxford University Press, 2016.

were, among others, Jeff Hawkins and Sandra Blakeslee<sup>18</sup> who articulated the gap behind the term AI. This deficit is the lack of an adequate definition of human intelligence. They refuted the view that there are strong similarities between computation and human thinking, saying that the most impressive features of human intelligence clearly involve the manipulation of abstract symbols – and so do computers. They argued that computers and brains are built on completely different principles. One is programmed, the other self-learning. One has to be perfect to work at all, the other is naturally flexible and tolerant of errors. One has a central processor, the other has no central control. And the list of differences goes on.<sup>19</sup> Their proposal is that the essence of human intelligence is not computational, but predictive. As they point out, they argue for a much stronger claim: Prediction is not just one of the things your brain does. It is the *primary function* of the neocortex, and the foundation of intelligence. The cortex is an organ of prediction. If we want to understand what intelligence is, what creativity is, how your brain works, and how to build intelligent machines, we must understand the nature of these predictions and how the cortex makes them. Even behavior is best understood as a by-product of prediction.”<sup>20</sup> Seligman et al. also stress that the most essential human faculty, the mental-affective operation is not of reliance on information patterns, but of prospection. Thus, according to them, humans are not primarily sapiens, but rather prospectors: using their affections, perceptions and, more importantly, intuitions. In doing so, Seligman et al. refute the duality of deliberative and intuitive thinking and invite us to consider more broadly how future-oriented the human mind and psyche is.

If the intelligence of the human mind is forward-looking and not merely inferential from present data, non-rational and not merely

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<sup>18</sup> Jeff Hawkins – Sandra Blakeslee, *On Intelligence*, New York: Times Books, 2004.

<sup>19</sup> *Ibid.*, p. 8.

<sup>20</sup> *Ibid.*, p. 35.

learning, intuitive, creative and resourceful, it is difficult to compare it with the capabilities and programmed endowments of AI. Therefore, the digital may be intelligent in the future, but the intelligence leading into and forming the future may remain human.



*Barry Smith*

## **LLMs and Practical Knowledge – What Is Intelligence?**

In November 2022 I published with my co-author Jobst Landgrebe, a German AI expert, computer scientist, philosopher, and biomathematician, a book entitled *Why Machines Will Never Rule the World*.<sup>1</sup> The book argues that so-called “Artificial General Intelligence” (AGI) will for mathematical reasons never be achieved. In the same month, ChatGPT was unleashed onto the world, and while our book has been well-received, many times reviewed, and many times the subject of entertaining podcasts, we have received little response from AGI proponents.

To our surprise, however, our publisher invited us already in April 2024 to prepare a revised and expanded 2nd edition of the book. Nothing has changed in our arguments since the time Before ChatGPT. However, we have taken the opportunity to respond to the many claims made by self-declared technophiles such as David Chalmers and by AI-entrepreneurs such as Sam Altman to the effect that AGI is, if not *already here*, then at any rate “just around the corner”. We have also monitored the reactions to such claims by others, many of them emanating from the admirable Gary Marcus, who focuses not only on AI hype, but also on the devastation that is being wrought by ChatGPT and other large language models (LLMs) in their march through the institutions of, for example, science.<sup>2</sup>

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<sup>1</sup> Jobst Landgrebe and Barry Smith, *Why Machines Will Never Rule the World*, Abingdon, UK: Routledge, 2023.

<sup>2</sup> Gary Marcus, “[The exponential enshittification of science](#)”, March 15, 2024.

## The Bet

In April of this year Elon Musk predicted that an AGI – by which he meant an *artificial intelligence superior to the smartest individual human* – would arrive by the year 2025. In response to this prediction Gary Marcus offered Musk a \$1 million bet to the effect that he would be proved wrong. In specifying the conditions of this bet (which Musk did not take) Marcus lists the following “tasks that ordinary people can perform” which, he claimed, AI will not be able to perform by the end of 2025.<sup>3</sup>

- Reliably drive a car in a novel location that they haven’t previously encountered, even in the face of unusual circumstances like hand-lettered signs, without the assistance of other humans.
- Drive an off-road vehicle, without maps, across streams, around obstacles such as fallen trees, and so on.
- Learn to ride a mountain bike off-road through forest trails.
- Babysit children in an unfamiliar home and keep them safe.
- Tend to the physical and psychological needs of an elderly or infirm person.

This list provides interesting insights concerning the limits of (current) AI systems. First, it reminds us that there is a serious lag on the side of tasks involving physical behavior (thus a lag on the side of robotics) as compared with the in some ways impressive progress being made on the cognitive side by, for example, LLMs. But secondly, and more importantly from our point of view here, the tasks we have listed involve *practical* or *tacit knowledge*, or what is also called “knowing how”, which is to say knowledge of a sort that is captured not by means of sentences or propositions or explicit rules, but rather through the expertise demonstrated in human actions.<sup>4</sup>

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<sup>3</sup> See <https://garymarcus.substack.com/p/superhuman-agi-is-not-nigh>.

<sup>4</sup> Even speaking a language is an example of knowing how. The letter combination “th” in English represents two phonemes, /ð/ and /θ/: *voiced*, as in “this”;



## Knowing How

There is a rich literature in philosophy and psychology concerning the topic of practical knowledge to which major contributions have been made by thinkers such as Scheler and Gehlen, by Ryle – who introduced the idea of a dichotomy between *knowing how* and *knowing that* – and by Polanyi, Merleau-Ponty, and Hubert Dreyfus.<sup>5</sup> Yet even though some 100,000 papers on the topic of AI have appeared on the arXiv.org preprint server since 2022, many of them drawing on philosophical aspects of AI, not one of these papers has addressed the issue of *practical* or *tacit knowledge* or “knowing how”.

## Defining “Intellectual Task”

The proposed bet between Musk and Marcus concerned the issue of the possibility of AGI, which we can define as: *the capacity to understand or learn any intellectual task that a human can*. What, now, is the meaning of the phrase “intellectual task” in this definition? For some (very few) such tasks – language production and interpretation, playing championship-level chess and Go, and many other games – “narrow AI” has already demonstrated the sought-for capacity on the part of the machine. We show in our book that narrow AI will bring us further along many similar dimensions by providing support for coding in areas such as office work, industrial automation, missile defense, and many more.

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and *voiceless*, as in “thing”. English speakers deploy this distinction effortlessly when they speak; but few of them are aware that they are doing so, or of the rules they are thereby following.

<sup>5</sup> I focus in what follows on the work of Polanyi; a broader treatment, comprehending also the contributions of Ryle, Merleau-Ponty and Dreyfus, is found in my “Knowing How and Knowing That”, in J. C. Nyíri and Barry Smith (eds.), *Practical Knowledge: Outlines of a Theory of Traditions and Skills*, London/Sydney/New York: Croom Helm, 1988, pp. 1–16. The topic is treated also in the book referred to in footnote 1 above.

But narrow AI has failed to achieve similar successes in many areas where humans engage in “intellectual tasks”. These include not only the tasks on Marcus’ list but also, for example tasks such as: resolving a dispute; gathering information from participants and witnesses after a major traffic accident, reading and interpreting medical imaging scans to diagnose and treat injuries and diseases, managing a company, or commanding a special forces squadron, as well as all tasks performed by humans involving some sort of creativity.<sup>6</sup> These examples bring to light a whole world of “intellectual tasks” where the narrow AI approach thus far has been (and we believe will forever be) unable to achieve any sort of success.

The OpenAI Charter, which defines AGI as “a highly autonomous system that outperforms humans at most economically valuable work” makes matters worse by ignoring the different sorts of economically valuable *physical* work that involves the deployment of practical knowledge.

## **AGI Is Impossible: The Problem of Complex Systems**

The characteristic feature of all the mentioned tasks is that the machine called upon to address them would have to predict how *complex systems* will behave. But the central thesis of our book is that a prediction of this sort is impossible.<sup>7</sup> This is because complex systems have thermodynamical properties – which we document at length – which preclude the collection of data pertaining to system behaviour in such a way that the data collected will manifest a statistical distribution<sup>8</sup> that is *representative* of that system’s behaviour in the future.

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<sup>6</sup> We pay little attention to creativity in our book, but the account provided by Mersch in this conference ([http://www.hunfi.hu/nyiri/EEE/Mersch\\_paper.pdf](http://www.hunfi.hu/nyiri/EEE/Mersch_paper.pdf)) is fully in keeping with our arguments there.

<sup>7</sup> More precisely, we demonstrate that it is impossible to predict the behaviour of a complex system in a way that would allow us to engineer a system – for example an AI system – that would simulate or emulate its behaviour.

<sup>8</sup> Illustrated for example by the familiar Bell curve.

Examples of non-complex systems<sup>9</sup> are: the solar system, your phone, your car, the Chernobyl power station in its regular state.

Examples of complex systems are: every organism, every family, the New York Stock Exchange, the earth's climate system, the earth's water system, the Chernobyl power station in the period beginning with the freak power surge caused by the system's operators on 26 April 1986.

The behaviour of complex systems is such that data that is representative of such behaviour cannot be collected because this behaviour *has no regular distribution*. Thus it is impossible to create any sort of stochastic AI model of such behaviour, since models of this sort are at core mathematical algorithms for predicting specific sorts of outputs from specific sorts of inputs.<sup>10</sup> Such predictions can be made only in those cases where the model has been configured with data that is representative of the relation between the system's inputs and outputs.

Every conversation between human beings is an example of a complex system behaviour, because representative data are impossible to obtain for the relations which hold between successive utterances in a conversation. This is why, when we find ourselves talking to a chatbot on the phone, we immediately start searching for ways to be put through to a human being.<sup>11</sup>

## Science

One prime example of a complex system (or rather: of a system of complex systems of complex systems) is the human enterprise we call "science". It was Polanyi who showed that science is a domain that does not consist of rule-governed activities that can be described

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<sup>9</sup> These are referred to in our book under the heading of "logic systems".

<sup>10</sup> "Predicting" is used in such contexts to include also "generating". Thus when a chatbot generates a response to an utterance then this is analysed from the mathematical point of view as a prediction.

<sup>11</sup> Somfai, [in her contribution to this conference](#), shows that even the study of medieval manuscripts involves engaging with a variety of complex systems.

in propositional form. Indeed, far from being a purely rational enterprise of cognition and calculation, science involves of necessity a non-formalisable, non-mechanisable, characteristically human phenomenon which he refers to under the headings of “personal” and “tacit” knowledge. He uses the former to bring out the scientist’s commitment to an as yet unknown discovery that forms the horizon of his activities,<sup>12</sup> a horizon that is determined by his skills or know how and to what he calls “tacit knowledge”.<sup>13</sup>

Imagine, therefore, a scientist who has the first glimmering of a new discovery. The discovery will one day, if all goes well, be expressed in some propositional form. But in the beginning it might consist merely in the fact that the scientist noticed some subtle mismatch in the way two streams of data were lining up. The scientist’s skills may draw on the propositional content which he has learned from lectures at the beginning of his career. But then these skills will have matured. What is propositional will recede into the background and be replaced by an un- or semi-conscious application of judgment and expertise – judgment, for example, about who in the field has results that can be trusted; expertise of the sort needed to recognise an anomaly in the pattern generated by some new apparatus.

Polanyi, in fact, sees the scientific enterprise itself as resting on a deep-rooted and fundamentally non-utilitarian fascination with order or pattern, a fascination that is present already in the baby’s pleasure in experimenting with coloured blocks or with the melodies of language, and which is manifested particularly clearly in the drive of the pure mathematician to discover the properties of abstract mathematical structures for their own sake.

This personal dimension of science is not capable of being rendered explicit and codified into rules, since the higher forms of human activity are always such that the rules for their performance are not and cannot be fully known to the performer. This implies the

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<sup>12</sup> Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy*, Chicago: University of Chicago Press, 1958.

<sup>13</sup> Michael Polanyi, *The Tacit Dimension*, London: Routledge and Kegan Paul, 1967.

indispensability, where such activities are cultivated, of personal contact between master and pupil, of learning by doing.

## **Language and Tools**

As the carpenter should focus not on his tools but on the object worked, so, Polanyi argues, the novice scientist must be brought to a state where he need pay only subsidiary attention to the theories or interpretative frameworks which he is called upon to employ in his work. He must, in Polanyi's own words, learn to "dwell within them", to allow theoretical tools, languages, disciplines, to serve as natural extensions of his psyche in much the way that the blind man's stick serves as an extension of his body in walking. Theories, languages and interpretative frameworks are then not abstract objects fixed in some Platonic realm, but rather social formations tied to their contingent factual realisations in the practices nurtured at any given stage by the community of scientists.

The technical terms of a science as these are conceived by Polanyi thus have meanings which are the residues of established usage and they will change and mutate with the gradual evolution of this usage within the larger context of scientific practice and will at any given stage be only partially determinate. Each scientist's individual grasp of the science will itself change and mutate as he learns to "see" the objects with which it deals. Thus Polanyi points to the way in which, when novice radiologists are attending lectures on how to interpret radiographs, what they see is to a large extent dependent on what they hear the expert say, whereby the meaningfulness of the latter is itself at the same time dependent on the novices' gradually developing capacity to see appropriate structures in the radiographs before them. And as Polanyi points out, it is here not so much individual words that are important, but rather the general structures to which these words relate and which they may indeed have helped to crystallise.

## AI Winter Ahoy

Polanyi sees what might be called discursive or theoretical intelligence as resting necessarily on a seedbed of practical knowledge and perceptual judgment. This means that AI models based on a purely rational and discursive conception of human knowledge will be incapable of coming close to simulating those achievements of human beings which involve the taking account of a wealth of interdependent contextual clues in spontaneously adaptive behaviour.

Today, every university – and I mean *every* university; every university *in the world* – is putting together its plans for a new AI building. Researchers everywhere, and in whatever field, are assembling plans for using AI (or at least for bringing about the appearance of using AI) in their work. Many AI engineers and AI entrepreneurs are devising new AI models and founding new AI companies with the goal, they say, of helping to advance the progress of scientific research, thereby ignorant of the fact that all of the features identified by Polanyi as playing an essential role in the scientific endeavour will defeat the utility of AI.

Anna Somfai

## Digital Manuscript Studies: I and AI

We have witnessed in recent years an upsurge in the use of digital tools, software, and various forms of artificial intelligence (AI) across the board of humanities. Within digital manuscript studies adaptations from mainstream software are introduced in codicology (the study of medieval handwritten books) and palaeography (the study and practice of reading historical handwritings).<sup>1</sup> I concern myself here in particular with layout segmentation in the study of manuscript page layouts and handwriting recognition (optical character recognition) for transcribing handwritten texts.

When discussing AI and software of varying sophistication, studies point out the advantages and limitations they have in carrying out specific tasks.<sup>2</sup> For me the crucial point is not what AI is or is not

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<sup>1</sup> For a general introduction to digital manuscript studies written from the point of view of traditional codicology and palaeography see L. W. Cornelis van Lit, O.P., *Among Digitized Manuscripts: Philology, Codicology, Paleography in a Digital World*, Brill, 2019.

<sup>2</sup> For a discussion of mainstream software see for instance Yixin Li, Yajun Zou, and Jinwen Ma, “[DeepLayout: A Semantic Segmentation Approach to Page Layout Analysis](#)”, in *Intelligent Computing Methodologies*, ed. by De-Shuang Huang, Kang-Hyun Jo, Junfeng Jing, Prashan Premaratne, Vitoantonio Bevilacqua, Abir Hussain, Springer International Publishing (2018); and Andrea Gemelli, Simone Marinai, Lorenzo Pisaneschi, Francesco Santoni, “[Datasets and Annotations for Layout Analysis of Scientific Articles](#)”, *International Journal on Document Analysis and Recognition* (2024). For a discussion of software for manuscript studies see for instance Axel Nardin, Silvia Zottin, Claudio Piciarelli, Gian Luca Foresti, Emanuela Colombi, “[In-Domain Versus Out-of-Domain Transfer Learning for Document Layout Analysis](#)”, *International Journal of Document Analysis* (2024); Thibault Clérice, Malamatenia Vlachou-Efstathiou, Alix Chagué, “[CREMMA Medii Aevi: Literary Manuscript Text Recognition in Latin](#)”, *Journal of Open Humanities Data* (2023), pp. 1–19; and Costantino Grana, Daniele Borghesani,

capable of doing, rather what it prevents us from doing. Three of these I find especially problematic in a research environment. Firstly, studying page layouts and transcribing handwritten texts provides us with an entry into the material we study, it brings our first impression, produces the first layer of our thoughts and eventual interpretation, and can challenge our preconceptions and shift our headspace. It is that insightful impression and the ensuing creative thinking we curtail at best, abolish at worst when we delegate our tasks to software. Secondly, we will no longer learn and pass on the skills involved in these tasks. That in itself deprives our brain of useful engagements and the next generation of knowing what the tasks consist of, what the software we have designed does, and how to interpret its results. Thirdly, software is a compromise between scholars and software developers and their toolkit and the final product will have restrictions we do not.

When we study the layout of a medieval manuscript folio, we take in the page at a glance, then study its details. It is our entire intellectual and emotional self that takes a first impression through exploration of the *mise-en-page* to a detailed analysis of its content.<sup>3</sup> We study the text and images in several copies and our reading is impacted on by the diversity of visual and cognitive approaches we encounter in our manuscripts.<sup>4</sup> We mentally decompose and recom-

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Rita Cucchiara, “[Automatic Segmentation of Digitalized Historical Manuscripts](#)”, *Multimedia Tools and Applications* (2010).

<sup>3</sup> For a study of the cognitive aspects of manuscript folio layouts see Anna Somfai, “Medieval Manuscript Layouts: A Cognitive Journey through the Page”, *The Vatican Library Review* 3 (2024), pp. 1–35. For an earlier brief presentation of the approach see Anna Somfai, “Visual Thinking: A Cognitive Reading of Codex Layouts” in *Visual Learning – A Year After*, ed. by András Benedek and Kristóf Nyíri, Budapest: 2019, pp. 19–27. For the study of a specific text see Claire Richter Sherman, *Imaging Aristotle: Verbal and Visual Representations in Fourteenth-Century France*, Berkeley – Los Angeles – Oxford: 1995. See also [Mise en page et mise en texte du livre manuscrit](#), ed. by Henri-Jean Martin and Jean Vezin, Paris: Promodis, 1990.

<sup>4</sup> Details such as the use of columns versus long lines, various spatial division tools, initials, colour, markers, the presence or absence of gloss or images con-



pose the layout in the process and puzzle together our impressions of the content. Training AI to propose logical visual segmentation of the page layout by marking main text, marginalia, initial, image, will not involve a similar array of cognitive tasks and the mechanistic segmentation will not only disallow a result but also deprives us of the mental task and reflections that make a researcher's work the personal journey which it should be.

Transcribing a text from a medieval manuscript involves more than the mechanistic act of copying. It also means observing the physical characteristics of the handwriting, the idiosyncrasies of word abbreviation, the typology of variant readings, and the technique of correcting and glossing.<sup>5</sup> We also study the marginal and interlinear gloss while deciding if a brief text is a comment or a correction and thus part of the text itself. All these constitute research and point far beyond mere transcription. When software mechanistically transcribes a text it does not concern itself with such observations nor will we when we take over the typed text.<sup>6</sup>

Avoiding the use of our eyes, intellect, knowledge, and emotions in our research and relying on AI is both counterintuitive and dangerous. We lose the epistemic work and not doing these tasks

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tribute to our reading. We recreate "the text" for ourselves from the various physical "texts" and thus challenge our understanding of the specific text itself as well as the concept of what "text" is.

<sup>5</sup> These observations may recall to us another manuscript with the same scribal practice and establish links in our minds thus help to work out the history of the text's transmission. We familiarise ourselves with the text in a different way when we look at it in several copies and thus by facing a "text" through its several extant variants, we again understand the concept of "text" in a new way.

<sup>6</sup> The same is true for copying musical notation, diagrams, or other visual elements in hand as opposed to using software for the same purpose. With analysing page layouts and transcribing texts the real goal is as much the intellectual activity that goes into the tasks and the discoveries throughout as the resulting text or the mechanistically fragmented image of the layout (which in any case we see at a glance as "fragmented").

affects our cognitive abilities.<sup>7</sup> Software can be helpful in saving time and handling large data. The problem within a research setting arises when these tools are used not to help us but to replace us.<sup>8</sup> Mainstream layout segmentation and handwriting recognition software were developed to help those who lack the time or are not capable of the intellectual tasks involved in extracting information from a layout or reading handwriting. The assumption that scholars fall into this category is a gloomy one I personally am not willing to share.<sup>9</sup>

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<sup>7</sup> The algorithm that governs our software is our own input and if we de-evolve, so will our programs.

<sup>8</sup> We have to ask fundamental questions. Why does someone want to replace a certain activity by AI? Is time a concern for them? Do they lack the skills? If they lack interest, skills or time to go through the process of research, in what way are they qualified to assess the data presented by an algorithm and engage in the further steps of research?

<sup>9</sup> I prefer to believe that an academic whose endeavour should be to understand and interpret the textual and visual heritage of the past does not have to rely on trained software to carry out key scholarly tasks and would feel keenly the loss of the excitement and fun that also results from such tasks.

*Stefan Lorenz Sorgner*

## **Ethics of Generative AI, Digital Data, and Superintelligence**

Artificial intelligence is found in software that instructs a computer how to function, mimicking aspects of human intelligence. An algorithm is a type of software. The first one was written by Ada Lovelace, Lord Byron's daughter, in the 19th century for the planned Analytical Engine. An algorithm is used to solve a class of specific problems by means of a finite sequence of well-defined instructions.

If artificial intelligence mimics human intelligence, to grasp the meaning of AI we must clarify and define human intelligence, which is rather challenging. Human intelligence can be measured by intelligence tests. Maybe, intelligence is simply whatever gets measured in such a test. There are several different IQ tests. The Stanford-Binet Intelligence Scale has existed in standardized form since 1916. IQ tests typically investigate verbal, numerical, and spatial thinking capacities. However, it is unclear which thinking capacities should be included in such a test. Is there such a thing as emotional intelligence, musical intelligence, or creative intelligence? Some tennis players are said to play intelligently. Can we speak of a "strategic intelligence" belonging to certain entrepreneurs?

If AI imitates human intelligence, it is important to have a comprehensive idea of human intelligence. This is even more important when distinguishing between various types of AI. It is common to distinguish between weak, or narrow AI, strong AI or artificial general intelligence (=AGI), as well as superintelligence, which is a concept which can be traced to the British mathematician I. J. Good, who discussed the possibility of [an intelligence explosion](#) as early as 1965. If an AI is embodied, it can access its environment through sensors.

We refer to "weak AI" when we speak of AI capable of performing one specific task. An algorithm has beaten outstanding hu-

man chess masters since 1996, it has beaten humans in Jeopardy since 2011, and defeated a world-leading Go-player in 2016. These victories are impressive; however, it must be stressed that in all these cases, we are confronted with various versions of weak forms of AI.

Strong AI is a theoretical concept, possessing human-like capacities in problem solving, learning, or planning for the future. It is unclear what capacities an AI would have to possess to qualify as a strong AI. Would it only need to have human-like capacities applied to numerical, verbal, and spatial thinking, or would it also need to possess emotional, musical, or athletic intelligence? If emotional intelligence is a prerequisite to possessing human capacities, does it need to possess self-consciousness? If it needs to possess forms of musical and athletic intelligence, would it need to be able to play the violin or master tennis?

Superintelligence refers to even more developed capacities. It is defined as an agent possessing intelligence far surpassing that of human beings. It is likely that an intelligence explosion would need to occur to bring about such agents. It might also be the case that a technological singularity would precede the realization of a superintelligent agent. What would this mean in practice? Would superintelligent AI have to be better at playing the piano than Trifonov, better at playing tennis than Djokovic, and better at grasping human emotions than Dostoevsky?

So far, neither an AGI nor a superintelligent AI exist. It is unclear what it would need to be capable of. The central issue here is whether it must possess self-consciousness, and whether it must possess certain physical capacities, such as the ability to play tennis, or piano. It is difficult to speculate about this without actually having encountered such entities. This is where science fiction becomes relevant, as all of these topics are discussed and dealt with intensely in science fiction novels, films, and television shows, particularly Star Trek, which is an incredibly valuable source.

Two fictive “Star Trek: The Next Generation” universe characters leap to mind when thinking of digitization: 1. Data; and 2. the Borg. Data is a sentient, self-aware male android, who serves as an officer of the starship Enterprise commanded by Captain Jean Luc

Picard. The Borg, on the other hand, are cybernetic organisms connected in a hive mind entitled “The collective”. These fictional entities are antagonists in the Star Trek universe. The starship Enterprise belongs to the United Federation of Planets, whereas the Borg regularly show up as enemies of the Starfleet. Both figures raise central philosophical issues. In the episode the “Measure of Man” the show examines with philosophical nuance whether Data should be considered a person or property.<sup>1</sup> Since Data is a robot, this issue is crucial to dealing with embodied AIs, in this case, a male android – whatever the description “male” might mean in this context. Much more could and should be said on this issue, too. In this context, it is relevant that the creators of Star Trek believe that a self-conscious android can exist.

In Star Trek, Data was created by Dr. Noonien Soong. Just as DATA is brought into being, the Borgs are also products of invention. Being cyborgs, they cannot reproduce biologically and consist, therefore, both of biological and mechanical parts. Borgs have a group mind called the “Collective” attached to a group consciousness that enables them to have group thoughts. Achieving perfection is their ultimate ambition. The organic parts of their bodies include microscopic machines – what we now call nanobots. They can alter someone’s bodily chemistry or modify and repair someone’s DNA. Borgs integrate other beings by means of assimilation, including both the injection of nanobots, called nanoprobes, as well as by means of surgeries to add mechanical implants to the biological parts. Besides assimilation, compilation might be another way for Borgs to come about. This might have been highlighted in the episode “Q, Who”, where maturation chambers, also known as Borg nurseries, are depicted. It leaves open the possibility of Borg also coming about by means of artificial reproduction and an artificial womb. As a consequence of assimilation, the process of artificial reproduction and related processes, the relevance of race and gender vanishes. The epi-

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<sup>1</sup> Stefan Lorenz Sorgner, “Android Data–Eigentum oder Träger von Rechten?”, in *Neue Welten – Star Trek als humanistische Utopie?*, ed. by Michael C. Bauer (Berlin: Springer-Verlag, 2019), pp. 239–272.

sode “I, Borg” raises” particularly further fascinating philosophical challenges which should be dealt with in detail. For our purpose here, what is central is the issue of consciousness. The Borg possess a group consciousness, as they are inter-connected in a hive mind through mechanical devices.

Both Data and Borg show that it is possible for mechanical parts to possess consciousness. This refers to a type of digital consciousness, existing on a silicon-basis. This is the challenging issue that needs to be further considered. A significant amount of philosophical speculation has been devoted to the notion of “silicon-based” consciousness in recent years, inspiring also many science fictional accounts of such a consciousness. It has also inspired many doomsday scenarios among natural scientists, entrepreneurs, and, most recently, computer scientists.

In 2015, an android named after a robot from a Philip K. Dick novel pronounced “[I’ll keep you safe in my people zoo](#)”.

In 2014 [Stephen Hawking told the BBC](#) that: “The development of full artificial intelligence could spell the end of the human race.”

[Elon Musk warned](#) that AI could end the human race in 2024: “I think there’s some chance that it will end humanity. I probably agree with Geoff Hinton that it’s about 10% or 20% or something like that.”

The creators of Star Trek as well as these natural scientists, entrepreneurs, and computer scientists assume the coming about of a digital self-consciousness, algorithmic intentionality, and mechanical emotions rooted in silicon-based entities. However, whether this is the case is a challenging issue, deserving further intellectual reflection. I do not suggest that these qualities are not a possibility. I merely wish to highlight a few philosophical challenges that present themselves when we take digital intentionality, self-consciousness, and emotions for granted.

So far, self-consciousness, intentionality, and emotions can only be found in carbon-based entities. They do not exist in silicon-based entities. This means that it is unclear whether qualities existing in carbon-based entities can also become a feature of silicon-based

entities. There are other grounds for supposing this to be the case. Maybe the strongest argument in favor of this assumption is the following:

Intentionality, self-consciousness, and emotions can emerge from inorganic entities. Big history reveals that [the earth came into existence](#) about 4,5 billion years ago. It then took almost a billion years for the first forms of life to come into existence. What then happened was indeed a quasi-magical event. Only inorganic entities existed. Suddenly, due to an interaction between water, heat, and lightning, initial forms of life came about. Life differs from the inorganic insofar as living entities are capable of self-movement and obtain energies from their metabolisms. This means that they can eat, drink, and digest, which provides them with energies for existing. It is an incredibly intriguing process, and it is utterly unclear how life can have come about from inorganic entities. However, it has happened that due to special circumstances inorganic stuff was altered such that organic entities were brought about. These organic entities developed further into plants which can move towards the sun, magpies who can recognize themselves in the mirror, and human beings, who are capable of reflecting on the origin of life. It has taken evolution about 3,5 billion years to develop from initial forms of life to the life forms surrounding us today. However, these processes show that it is possible for self-consciousness, intentionality, and emotions to emerge from an inorganic origin. If this occurred in the past, it could plausibly happen again in the future. So far, all life forms seem have a carbonate-basis. However, this does not mean that life and all other formerly mentioned capacities can only exist on a carbonate-basis. A silicon-basis might be another possible foundation for such qualities.<sup>2</sup> There are already some indications that such capacities can be realized on a silicon-basis. “I think computer viruses

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<sup>2</sup> See Stefan Lorenz Sorgner, *On Transhumanism*, University Park, PA: Penn State Press, 2020.

should count as life', Professor Hawking told the computer trade show in Boston."<sup>3</sup>

Currently, neither regular viruses nor computer viruses are considered to be alive. They are capable of self-movement, but they do not possess a metabolism. They thus require a host on whom they depend to generate energy. However, viruses seem to possess some qualities that are widely associated with life. Hence, Hawkings' suggestion that computer viruses should count as life forms had some reasonable basis.

Intentionality, self-consciousness, and emotions emerged from inorganic substances about 3,5 billion years ago. It is thus possible for qualities like these to develop from inorganic substances. In addition, one should note the existence of some silicon-based entities with life-like qualities, namely computer viruses. In addition, the plausibility of Moore's Law has widely been acknowledged, which states that the quantity of transistors in an integrated circuit doubles every two years, thus leading to an exponential growth and increase of computing capabilities. This is more of a self-fulfilling prophecy than a natural law. All these insights give justification for some intellectuals, like Ray Kurzweil, to suggest that the "technological singularity", a term I have referred to already, is near.<sup>4</sup> It might be a prerequisite for the coming about of superintelligence.<sup>5</sup>

What should be noted however is that there is no proof of the existence of digital life forms. Even if they were to exist, it would require much more for them to develop from entities with digital consciousnesses to entities with digital intentionalities, if such a thing is at all possible. However, for a sufficiently developed strong AI to put human beings into a zoo, or direct an attack to wipe out humanity, it would need to possess intentionality. Hence, entities like the Borg with a conscious hive mind do not represent clear threats for

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<sup>3</sup> See <https://www.independent.co.uk/news/uk/hawking-says-computer-virus-is-form-of-life-susan-watts-on-a-manmade-menace-that-mirrors-its-namesake-in-nature-1374137.html>.

<sup>4</sup> Ray Kurzweil, *The Singularity Is Near*, New York: Viking, 2005.

<sup>5</sup> Cf. <https://bigthink.com/the-future/ray-kurzweil-singularity/>.



us in the near future. It seems that we are still far away from such realities, if they can come about at all. The fervent discussions of Bostrom's book *Superintelligence*,<sup>6</sup> seem more a clever marketing strategy to promote the idea in popular media, or a means for acquiring third party funding from visionary tech-entrepreneurs, than a serious philosophical attempt to deal with a pressing current issue.

However, both Data as well as the Borgs raise further philosophical issues that should be discussed in relation to the ethics of AI. I wish to focus particularly on the concept of the Borgs, as their basic makeup is similar to research currently undertaken by Neuralink. Indeed, bearing in mind Neuralink's connection to enterprises such as Starlink and Space X, the problem becomes even more pressing. Dan Dinello identifies the Borg as "contagious collectivist techno-totalitarian transhumanists".<sup>7</sup> However, he refers to the Borg's collective consciousness, which would only be legitimate in the case of the existence of a digital consciousness. Our reflections thus far demonstrate that this is not a pressing contemporary challenge. Which does not imply that it is futile to reflect on the Borg, as the Borg indeed demonstrates significant similarities to central transhumanist enterprises.

The makers of Star Trek and many other thinkers, writers, and artists, probed issues related to consciousness. However, there is no apparent reason why the organic parts of a cyborg Borg should suddenly no longer be primarily responsible for an individual consciousness, whereas the mechanical parts enable each individual to realize additional capacities and bring about a dominant collective consciousness. In addition, the nanobots promote the healthspan of a Borg, while other mechanical parts attached to the organism increase the likelihood of realizing additional capacities. Connecting the various mechanical parts to a Hive Mind seems to share some similarity with

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<sup>6</sup> Nick Bostrom, *Superintelligence: Paths, Strategies, Dangers*, Oxford: Oxford University Press, 2014.

<sup>7</sup> David Dinello, "The Borg as Contagious Collectivist Techno - Totalitarian Transhumanists", in *The Ultimate Star Trek and Philosophy: The Search for Societies*, ed. by William Irwin, Hoboken, NJ: John Wiley & Sons, 2016, pp. 83–94.

Musk's enterprise Neuralink, with the essential difference being that instead of being connected to a common consciousness, Neuralink enables a connection between the brain, the internet, hard drives, and algorithms. Instead of the hive mind determining the acts of an individual, Neuralink enables an individual to write, move, or play games. Of even more relevance, however, is that emotional states, psychological diseases, as well as cognitive activities can suddenly become accessible via the hard drive to which the brain is connected. Thus, depression, stress, and excitement can be correlated with acts, people, and situations. It is not the case that the individual vanishes, and a collective mind takes over when the brain gets connected to a computer; rather, the major concern relates to the privacy of feelings, as one's most intimate feelings can thus be absorbed and analyzed by anyone with access to the corresponding digital data.

Musk's various projects are intriguingly interrelated. Unlike space programs led by other leading tech-entrepreneurs, which offer the wealthy an exciting space vacation, Starlink could turn Musk into a bonafide Bond villain. The company is currently launching satellites into Earth's near orbit to collect visual data and analyze all parts of the earth and create a uniquely global space web provider. By offering a valid internet flatrate, Starlink could take over globally as an internet provider. Through Starlink, it might even be possible to use the same subscription on a transcontinental flight. Starlink enables users to have internet access at sea or in the most remote deserts. In the future, it may be one man who decides whether an army in a warzone has access to the internet: Elon Musk.

A second dimension must not be underestimated. By means of his satellite system, Starlink is able to permanently analyze latest developments in real time. This applies to strategic military moves, weather phenomena, as well as the expansion of nuclear power plants. Elon Musk does not allow Ukrainians to use Starlink in the Crimea region.<sup>8</sup> Half of all active satellites in the near-earth orbits belong to Starlink already, and Musk continues to send up further small satel-

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<sup>8</sup> See <https://www.bbc.com/news/world-europe-66752264>.

lites.<sup>9</sup> This is an extremely clever move, as it increases his power in many different ways:

1. Starlink thus can become a global internet provider. By enabling internet access, digital data flows via his satellites, which gives him access to all the digital data collected. In the same way, the Chinese government can access digital data of all companies active in China as well as some companies outside of China, e.g. Tik Tok, Huawei, or Alibaba, Starlink can access digital data generated by users from all parts of the world.

2. Starlink is a helpful spying device, as it enables the live monitoring of different kinds of visually accessible developments in all parts of the world.

3. Starlink is a means for generating new spatial property. According to Locke's property theory, one becomes owner of formerly unowned land if one works with this land and invests one's person into the unowned land. All territory on Earth is owned. Space is not infinite, in particular the space near earth, which is particularly precious due to being rather limited and useful. By being the first to send his satellites to the near-earth orbit, Musk has created new property, with near-earth space becoming his property.

China has not failed to see the seriousness of these developments, and several Chinese military researchers have already stressed that [Starlink satellites threatening China's national security would be shot down](#). Starlink's potential for military use is enormous. Besides all the other uses already mentioned, it could simply increase internet communication between various air fighters with access to the Starlink system.<sup>10</sup> China has already demonstrated that it can destroy individual satellites. In 2007, [they shot down one of their own satellites to send out a warning](#) to other satellite owners.

These developments show that the global war for digital data is moving to space, with near-earth satellite systems playing a central

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<sup>9</sup> See <https://www.sciencenews.org/article/satellites-spacex-problem-space-pollution>.

<sup>10</sup> See <https://www.newsweek.com/china-fears-spacex-starlink-satellite-national-security-risk-1859322>.

role in this conflict. The developments go further than this. Lonestar Date Holding Inc. is ready to send devices to the moon to make research concerning [the realization of Lunar Data Centers](#). [This company has already raised 5 million dollars in 2023 to create such centers](#). Data can thus be stored in an area with relatively low temperatures, in centers far away from earth, enabling companies to generate new property. The fights to generate property in space is recent history. When discussing the future of digital data collection and storage, it is vital to discuss the moon as a data collection space, as well as the satellites bringing about the global internet, and brain-computer-interfaces like Neuralink.

The question of who has access to digital data, and who benefits from big data analysis and storage and collection of digital data is of significant philosophical import. We should not fear super-intelligent entities putting us into a zoo. We should also not fear a collective army of Borg enslaving or directing us through a harmonious collective hive mind. Yet, we should be concerned about the implications of access to digital data. We are already in a global war over digital data. Our future seems to be the collection of personalized, emotional, digital data globally being collected via Neuralink such that the information flows via Starlink satellites into a Lunar data center.

At the same time, brain-computer-interfaces such as Neuralink are also regularly discussed as an option for realizing a digital consciousness and the possibility of mind uploading. However, how is this supposed to happen? Transhumanists usually embrace a functional theory of mind, which means that our mind is merely a function of our brain.<sup>11</sup> This means that the mind and brain are related analogously to software and hardware, and in the same way, as it is possible to install software on different hardware, the same holds for the mind. Science already tells us that the information stored in neurons can be passed on, as new neurons do permanently get generated

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<sup>11</sup> Stefan Lorenz Sorgner, *We Have Always Been Cyborgs: Digital Data, Gene Technologies, and an Ethics of Transhumanism*, Bristol: Bristol University Press, 2022.

anew, while it needs to be noted that “[neurogenesis is regionally restricted in the adult brain](#)”. However, neurogenesis exists, implying that information can be passed on to newly generated neurons. Whether this means that information only gets passed on to these new neurons or this process affects fundamental aspects of our consciousness is an open question. Determining whether mind uploading is a real possibility or not depends on the reply to this challenge. Yet even if it is logically an option, many questions are still far from clear, in particular concerning the issue about which functions need to be imitated by silicon-based computers to actually transfer consciousness.

Digital evolution may be another means of possibly realizing a digital consciousness. In this context, the developments concerning generative AI are particularly striking. Chat GPT can permanently generate new texts in response to short questions or commands. Open AI’s Sora can create videos up to one minute in length on the basis of a one liner as prompt. What is needed both for Chat GPT as well as for Sora and other generative AIs is an immense amount of digital data, i.e., texts in the case of Chat GPT, and videos in the case of Sora. When a prompt is generated: “create a painting of a white raven in the style of the later Picasso”, the generative AI identifies central aesthetic features of the painting of the later Picasso and then combines them with central features of a white raven. Every time the same question is asked, a new image is generated. The same procedure applies if you ask Sora to create a video in which puppy Beagles play with an Albino lion in the center of Florence. It is also easy to generate a video in which [Frank Sinatra sings](#) Nirvana’s “Smells like Teen Spirit”.

To bring about such fascinating results, generative AI needs to draw on lots of digital data. What is at stake philosophically is that the data it needs to consider to realize such fascinating features can be both copyrighted material as well as open access data. Here, the ethical challenge becomes obvious. In order to develop a new song in the style of Nirvana or generate a video of Taylor Swift dancing in the middle of a desert, it is necessary to draw on copyrighted material. This is highly problematic for artists, as it has taken designers

and artists a long time, training, preparation, to develop the skills they have to enable them to create designs and artworks. Now generative AI simply draws on the data to generate songs, novels, or videos. Has AI developed the capacity to be creative? Is this an initial step for realizing a creative digital mind? Could such a development eventually bring about a conscious digital mind or is this already an encounter with the initial traces of consciousness in such generative AIs?

I think it is important to keep the achievements of generative AI in perspective. Although first encounters with Chat GPT are doubtless impressive, it is still rather limited in its productive scope. It can produce a general survey, reflections, and texts on any topic. However, reading innovative thoughts by a leading scholar reveal refined nuances of which generative AI is not yet capable. Its insights usually remain at a fairly general level. This does not make generative AI's instrumental use any less fascinating, but gaining a critical distance makes it possible to distinguish human reflections from AI generated ones.

A central ethical question with regard to generative AI is whether it should have the right to draw upon copyrighted material or not? A reply to this challenge depends on an understanding of what generative AI does. Is a generative AI learning when reading the novel *Elementary Particles* by Michel Houellebecq or is it incorporating the text such that it directly gets used by the algorithm, leading thus to copyright infringement? In order to become a famous writer, novelist read texts from Goethe, Dostoevsky, and Nabokov. Studying other artists, reading texts, engaging with artworks is not a copyright infringement. Any artist, writer or designer needs to encounter these in order develop their own capacities, to find their own style, and to realize what has happened in the history of art, music, and design. Reading a text, watching a video, and engaging with a work of art is a legitimate and important means of learning. Is a generative AI learning when drawing upon a copyrighted novel by Houellebecq?

An alternative understanding is that generative AI is not learning but incorporating the material into their own algorithm. It is taking a copyrighted something and integrating it into its own struc-

ture to draw upon it for creating something new when asked for. The AI will use the shape of the McDonald's logo when asked to do so. It does not care what it draws upon but merely fulfils the function it is tasked.

Here, the decisive difference between human creativity and digital innovations can be discerned. Generative AI produces something new, whenever it is asked to do so. The outcome will be something new all the time. Generative AIs are clearly enormously innovative. However, there is a decisive difference between innovation and creativity. Innovating is simply the ability to bring about something new. Being creative has to do with an internal awareness of having created something special. Creativity goes along with a special state of consciousness, not just the ability to bring about something new. Creativity can occur only if generative AI realizes a new style and you realize its relevance. Then, you can take the innovative creation and work with it to realize a new creative entity. It might simply be sufficient to have consciously realized that what a generative AI has produced is fascinating, intriguing, and relevant. Then the human awareness of identifying the creation with something creatively special is the act of creativity. Generative AI merely bring about new forms all the time. Creativity is a human event that attends a special state of mind. If the creative event is directed at an artwork, then it furthermore depends on the recipients whether it is accepted as an artwork or not. If the art world accepts the creation as a work of art, then the work becomes a work of art. If this is not the case, then it simply remains the product of human creativity. Innovation, creativity, and reception are three categorically different processes that must be kept separate.

If this explanation of creativity is plausible, then the hope for bringing about a digital evolution such that a digital consciousness can occur by means of generative AI also seems to be rather limited. What we are confronted with concerning generative AIs are simply further types of weak AIs, which are capable of fulfilling one specific task. In the case of Chat GPT, the task has to do with the use of language. In the case of Sora, it has to do with the use of videos. Generative AIs are capable of innovation but not of creativity. What is

missing again is self-consciousness, intentionality, the capacity of having feelings, desires, and longings, the will to survive, the will to power, and the will to create. I am not saying that an AI is incapable of developing these features, but so far there is no clear indication that an AI will be capable of realizing such capacities soon. I am not a luddite, who doubts the relevance of emerging technologies. I am not a humanist, who upholds human ontological exceptionalism. However, classic transhumanists who permanently fear that AI will wipe out humanity are as far from a plausible understanding of ethical challenges related to AI as traditional dualistic humanists.

## **Conclusion**

In this paper, I wanted to relativize the widely shared fears, worries, and warnings concerning AI. I hope it has become clearer by now that both traditional dualistic humanists as well as classic transhumanists do not present a plausible picture concerning the most relevant challenges when it comes to the ethics of AI. It is highly implausible that only human beings possess morally relevant capacities. Members of several non-human animal species clearly possess morally relevant capacities. It might even be possible that a sufficiently developed AI can develop morally relevant capacities. But this is not the case so far. However, the widely shared fear among classic transhumanists that AI will gain digital consciousness, intentionality and emotions soon, which will lead to AI putting humanity into a zoo, or attacking humanity to wipe it out, is not a pressing worry either. It is a great plot for science fiction movies, stories, or a television series. It is a helpful marketing trick for getting talked about in popular journalism. However, it is not a currently pressing social challenge. The central ethical issues concerning AI have to do with digital data access, storage, and collection. Who has access to digital data, and for what does digital data get used? Neuralink, Starlink, and Space X may make Elon Musk a Bond-like villain. Digital data is the new oil, even though data is intellectual property and oil is a natural resource. Oil and data have to do with power, money, and political influence.



We have already seen the relevance of Elon Musk concerning the current wars. China, the USA, and Elon Musk are the central players on this new playing field. When Musk highlights AI doomsday scenarios, he is distracting the wider society from the really pressing issues concerning AI, which have to do with many of Musk's enterprises. We urgently need to rethink the meaning of digital data, rather than worrying about a superintelligence that will wipe out humanity. It might be fun to think about a superintelligence, uploaded minds, and the simulation argument, but all these issues have absolutely no practical relevance for the central ethical challenges we need to face concerning AI.



*Beáta Laki*

## **Augmented Intelligence as the Responsible Use of AI**

Artificial Intelligence (AI) has become one of the most impactful technologies of the 21st century. Amidst the discourse on AI's potential, the concept of "augmented intelligence" has garnered significant attention. Augmented intelligence emphasizes the collaborative interaction between humans and AI, enhancing human decision-making and actions rather than replacing them.<sup>1</sup> This approach serves as a responsible and practical application of AI, ensuring that it supports rather than undermines human capabilities. The discussion of augmented intelligence as a strategic and ethical use of AI warrants a deeper examination, particularly in the context of its potential to extend human abilities and improve everyday life.<sup>2</sup>

The notion of augmented intelligence, as mentioned by George Tilesch and his co-author in their book *Between Brains*<sup>3</sup>, suggests a paradigm shift in how AI can be utilized. Rather than viewing AI as a replacement for human intelligence, this perspective aligns with the broader understanding of AI as a complement to human abilities, enhancing creativity, problem-solving, and decision-making processes. As we enter the dawn of the AI era, it is essential to explore this concept in greater depth, moving past the simplistic view of AI as either a utopian solution or a dystopian danger.

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<sup>1</sup> D. M. Dave & S. Mandvikar, "[Augmented Intelligence: Human-AI Collaboration in the Era of Digital Transformation](#)", *International Journal of Engineering Applied Sciences and Technology*, vol. 8, issue 6 (2023), pp. 24–33.

<sup>2</sup> M. Kejriwal, [Artificial Intelligence for Industries of the Future: Beyond Facebook, Amazon, Microsoft and Google](#) (series *Future of Business and Finance*), Springer, 2023.

<sup>3</sup> O. Hatamleh & G. Tilesch, [Between Brains: Taking Back Our AI Future](#), Publishdrive Incorporated, 2020.

One of the core arguments for augmented intelligence is its ability to extend human capabilities, effectively pushing the boundaries of what individuals can achieve. This extension can be viewed as a form of transhumanist expansion, where technology is used to transcend human limitations. However, even without engaging in transhumanist ideals, augmented intelligence can significantly improve daily life. For instance, in healthcare, AI systems can help doctors diagnose diseases with greater accuracy, by analyzing vast amounts of data that would be impossible for a human to process alone. Similarly, in education, AI can personalize learning experiences, thereby augmenting the educational process.

Beyond the practical enhancements, the responsible application of augmented intelligence also entails a moral dimension.<sup>4</sup> The ethical considerations surrounding AI are critical, particularly as the technology becomes more integrated into society. It is inevitable to design and implement AI systems in ways that uphold human rights, privacy, and autonomy. Augmented intelligence, by its nature, supports this ethical framework by prioritizing human oversight and control.<sup>5</sup> Unlike fully autonomous AI systems, which may operate without human intervention, augmented intelligence emphasizes the collaborative relationship between humans and machines. This ensures that human values remain at the core of AI-driven decisions and actions.

The application of AI as augmented intelligence presents a promising avenue for the responsible use of technology. As we continue to investigate the potential of AI, it is vital to adopt perspectives that emphasize collaboration between humans and machines, ensuring that technology serves humanity's best interests. While the full potential of AI remains to be uncovered, the concept of augmented intel-

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<sup>4</sup> N. Lüthi – C. Matt – T. Myrach – I. Junglas, “[Augmented Intelligence, Augmented Responsibility?](#)”, *Business & Information Systems Engineering*, vol. 65, issue 4 (2023), pp. 391–401.

<sup>5</sup> F. De Felice – A. Petrillo – C. De Luca – I. Baffo, “[Artificial Intelligence or Augmented Intelligence? Impact on Our Lives, Rights and Ethics](#)”, *Procedia Computer Science*, vol. 200 (2022), pp. 1846–1856.

ligence provides a valuable pathway for realizing its benefits while mitigating its risks. This responsible use of AI, centered on human augmentation, represents a significant step towards a future where technology and humanity can thrive together.



*Katalin Farkas*

## **AI and Problem Solving**

Every second evening (I take turns with my husband) I tell a story with the same recurring characters to my children before they fall asleep. I am normally quite tired at this point, and since making up things requires effort, I often rely on films or stories I know, or events from my own life. Hence as it happens, big chunks of my stories correspond to real life events and facts, or stories written by others.

In some respects, this seems to me a good analogy for the work done by Large Language Models. The goal of my storytelling is to produce stories that sound good. The correspondence between my stories and bits of the world outside my stories (including other stories) is not essential for meeting this goal, it is rather a by-product of the circumstances of production. In a similar manner, LLMs aim to produce text that sounds good, based on the likelihood of the occurrence of words in a certain order, as found in a large corpus of existing texts. Any factual correctness is not essential to this goal, but rather a by-product of the circumstances of production.

By manipulating the circumstances of production, I could increase the chances of correspondence. I could decide to get all my stories from Greek mythology or the events of my own life. Still, sometimes it will be just easier to alter the story-line a bit or to gloss over a complication. The goal of telling a story will be still fully met. In a similar way, there can be restrictions on an LLM's use of a corpus of text, and this could greatly increase factual correctness (in fact we see this development in the use of LLMs, like ChatGPT).

When, in answering a question, LLMs deliver a factually incorrect answer, this is called a "hallucination". The contrast with hallucination is usually perception, hence we could get the mistaken impression that when they get things right, LLMs do something akin to perception. The function of perception is to convey a correct repre-

sentation of the outside world, whereas hallucination is a malfunction of the system. In contrast, hallucination is arguably not a malfunction for LLMs.

In story-telling, I do the same whether the story corresponds to the extra-story world or not: I imaginatively create a story. This goal is met whether there is correspondence or not. I fail only when my stories don't make sense. LLMs also engage in a similarly uniform activity across correct and incorrect answers: deliver a plausible sounding answer. They fail when the answer sounds weird or is irrelevant to the topic of the question. But they don't fail in their task when the answer they deliver is simply incorrect.

I propose that it is important to keep this point in mind, and contrast it with other uses of AI whose function is, as it were, transparent: they are designed precisely for the purpose we use them. For example, diagnostic AI applications analyse images, data about the patient, and propose probable diagnoses. The success and failure of the application is clear: if the right diagnosis is suggested, the AI successfully solved the task.



Daniel L. Golden

## What Does Generative AI Actually Know?

In the context of recent generative AI developments, it seems that our concepts and practices of creating and using knowledge should be carefully reexamined and possibly transformed. What should be counted as knowledge in the case of a generative AI? What can we say about the groundings of that kind of knowledge? What role has the human–machine dialogue in the formation of this knowledge? What kinds of transfer processes are going on during the use of generative AI? What impacts the immersion into these epistemological frameworks will have on the functioning of our cognitive ecosystems?

Assessments of the achievements linked to generative AI vary significantly. One of the most challenging questions here is how close all the current phenomena may bring us to the fulfilment of so-called Artificial General Intelligence. In this controversy, for example, Meredith Ringel Morris and her colleagues are going against Blaise Agüera y Arcas and Peter Norvig who claim that “state-of-the-art LLMs ... already *are* AGIs”, since “*generality* is the key property of AGI”, and actually “language models can discuss a wide range of topics, execute a wide range of tasks, handle multimodal inputs and outputs, operate in multiple languages, and ‘learn’ from zero-shot or few-shot examples”<sup>1</sup>. According to the counterargument we should take into consideration another criterion as well, namely *performance*, which means that “if an LLM can write code or perform math,

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<sup>1</sup> Blaise Agüera y Arcas and Peter Norvig, “[Artificial General Intelligence is Already Here](#)”, *Noema*, October 10, 2023.

but is not reliably correct, then its generality is not yet sufficiently performant”.<sup>2</sup>

Meanwhile, scholarly literature on AI has been trapped<sup>3</sup> with the aim for *simulation* of the alleged human mind. There were only a few tries to change the focus to ongoing *communication* between the natural and artificial forms of intelligence. Minsky’s frame<sup>4</sup> was an important step in that direction, where knowledge must be communicated, therefore any syntactic and/or semantic model must be tested through pragmatics. Among the great classics probably Brooks went the furthest imagining a non-representational concept of AI.<sup>5</sup>

In a 50th anniversary appraisal of Turing’s initiative<sup>6</sup> we can find an interesting passage about possible future developments of chat-bots, newly appeared at the time: “We expect many of the chat-bots in the future to use learning methods. Already, those programs that do not keep track of the current conversation (relying solely on text processing tricks) perform poorly compared to those that learn from the interrogators. As the quality of the conversational systems increase, we believe more developers will integrate learning components into their programs *and* teach them in ways that maximize their performance.”<sup>7</sup>

One may think that some 25 years later time has finally arrived to bring these conceptual innovations into fruition. Which means that the original metaphysical-epistemological question about what an AI may know, must be answered in a radically alternative

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<sup>2</sup> Meredith Ringel Morris – Jascha Sohl-Dickstein – Noah Fiedel – Tris Warkentin – Allan Dafoe, Aleksandra Faust – Clement Farabet – Shane Legg, “[Levels of AGI: Operationalizing Progress on the Path to AGI](#)”, Jan. 5, 2024.

<sup>3</sup> Erik Brynjolfsson, “[The Turing Trap: The Promise and Peril of Human-Like Artificial Intelligence](#)”, *Daedalus*, vol. 151, issue 2 (2022), pp. 272–287.

<sup>4</sup> Marvin Minsky, “A Framework for Representing Knowledge”, *MIT-AI Laboratory Memo*, issue 306 (June 1974).

<sup>5</sup> Rodney A. Brooks, “Intelligence Without Representation”, *Artificial Intelligence*, vol. 47, issue 1–3, (1991), pp. 139–159.

<sup>6</sup> Ayse Pinar Saygin – Ilyas Cicekli – Varol Akman, “Turing Test: 50 Years Later”, *Minds and Machines*, vol. 10, issue 4 (2000), pp. 463–518.

<sup>7</sup> Saygin, Cicekli and Akman, *op. cit.*, p. 508.

way. The once imagined *generality* is to be achieved by gradually increasing *performance* through ongoing enhancements of human-machine communication. When AI is learning, it is doing so by entering into past conversations of humanity recorded in some form, or present conversations with actual users. Similar to a newly born human being trying to cope with the world by appropriating a language or a humanistic scholar engaging himself into the dialogue of tradition.

Seeing it like this, generative AI is nothing more than an extraordinary expansion of good old conversational culture of mankind with all the inaccuracies, vagueness etc. it has always been characterized by.



*Dieter Mersch*

## **Can Machines Be Creative? An Aesthetic Critique**

### **Preamble**

The following theses deal exclusively with so-called “genuine machine creativity” using machine learning. They do not concern collaborative art-projects between humans and machines. The basic thesis is grounded on the fact that AI systems are mathematically terminated, so that the actual question is to what extent creativity or related concepts can be mathematized. In response, the thesis is put forward that, firstly, all creativity models in AI systems owe their existence centrally to the implementation of a random principle that confuses emergence and unpredictability with creativity, and secondly, that their modelling obeys exclusively an economic-technical rationality, which in turn confuses innovativeness with creativity.

*1st thesis: Clarifying whether machines can be creative is systematically part of clarifying the question of whether machines can “think”.*

### **Explanation**

Machines that “make art” are not some kind of peripheral gimmick but are at the heart of the question of their “thinking ability”. Their philosophical meaning correlates directly with the question of their mathematical representation. It is usually answered by postulating a homology between the brain and the computer, especially between natural neural networks and artificial ones (which is based in a methodological individualism). Computer systems and, in particular, AI models can be understood as “mathematical machines”. The formalization of mathematics is subject to insurmountable limits with

the Gödel theorems. Furthermore, the indispensability of the creative moment – e.g. intuition – also applies to mathematical thinking. As Alan Turing made clear in *Systems of Logic Based in Ordinals*, certain formal derivations require an “oracle” “from time to time”, which in turn cannot be a formal function.<sup>1</sup> Turing’s paper points out that mathematical intuition, for its part, cannot be mathematized and therefore cannot be simulated by a machine (or: only randomly).

***2nd thesis: “Art machines” based on computer programs or AI systems model this “oracle” using random numbers or stochastic processes.***

### **Explanation**

Early art productions using computer systems, such as the 3-N pioneers Michael Noll, Frieder Nake and Georg Ness, used random number generators or Markov chains as the central generating set. The AI systems used today almost exclusively for image, text and sound production, on the other hand, are based on *Generative Adversarial Networks* (GAN), which in turn consist of two *Convolutional Neural Networks* (CNN), a “generator” and a “discriminator”. Chance comes into play at various points. Firstly, the “generator”, as the actual generating system, starts the dialogic process between the two with a random number. Secondly, the selection of the underlying training data is basically contingent. Thirdly, the actual generation process is based on the statistically guided method of gradient descent, which can be no more than an approximation procedure.

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<sup>1</sup> Alan Turing, “[Systems of Logic Based on Ordinals](#)”, in *Proc. London Mathematical Society*, 2nd series, vol. 45 (1939), pp. 161–228.

**3rd thesis: The underlying rationality of 'creative AI generators' is the technical-economic form of optimization.**

### **Explanation**

All these AI systems start with tagged images, text passages or sound particles as a training database that obey primitive denotative semiotics. They are condensed into patterns using feature series that are mapped as vectors in a multidimensional space. The creative process is then mainly based on their variation by means of matrix transformation (convolutions). These transformations originally served other purposes, as the CNNs are recognition programs that use transformative procedures to infer the original image objects and the like from given patterns in a yes/no position with a certain probability. Behind the GANs with their two CNNs are additional models of mathematical game theory and Nash equilibrium for zero-sum games. This requires finding the minimax point using methods of optimization. We know the basic formula from the signature of the famous *Edmond de Belamy* from 2018.<sup>2</sup> We are thus dealing with an economic-technical rationality as the perfect form of thinking of *homo oeconomicus*. It is not creativity that is decisive for them, but innovation. Innovativeness, in turn, is limited to variability, i.e. the creation of a “similar other”.

**4th thesis: The concept of creativity ascribed to 'art-making' AI systems is reductive.**

### **Explanation:**

Apologies for the genuine creativity of artificial intelligence systems either rely on systems theory concepts such as “emergence” or refer to “indeterminacies” of quantum mechanics or “mutations” from the biological theory of evolution. In contrast, Guiseppe Longo, among

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<sup>2</sup> [Conceptual Art Group Obvious: \*Edmond de Belamy\* \(2018\)](#), see Arthur I. Miller, *The Artist in the Machine*, Cambridge, MA: MIT Press, 2019, pp. 119 ff.

others, has pointed out that creativity and emergence as well as indeterminacy, undecidability or a non-causal indeterminacy mean different things, because indeterminacies can also arise in strictly determinative systems, while it seems impossible for observers to understand their causal relationships. In addition, in an already abbreviated intention, reference is made to Margaret Boden's theory of creativity<sup>3</sup> and to Nelson Goodman's dictum that to create means to re-create.<sup>4</sup> However, Boden's concept of creativity, which places the concept of value in a central position, is more complex than its reduction to a merely "variationist" sense. This is seemingly confirmed by Goodman's formula, but the formula is based on the repetition (re-create) of the same term (create) and thus contains a paradoxical core. The construction of paradoxes is in turn based on reflexivity, which gives an indication that the concept of creativity obviously should use in a reflexive meaning. Similarly, the concept of the "new", which is associated with creativity, proves to be paradoxical, because making the new comprehensible requires something that has already been already given; conversely, the new in the sense of a surplus exceeds any return to the given. Instead of taking creativity as a paradoxical concept of an always already bound

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<sup>3</sup> Margaret Boden, *The Creative Mind, Myths and Mechanisms*, London: Weidenfeld & Nicolson, 1990.

<sup>4</sup> Nelson Goodman, *Ways of Worldmaking*, Indianapolis: Hackett, 1999, p. 15.



“free invention”, it seems more appropriate to understand it as a reflexive principle of liberation in the sense of Stanislaw Jerzy Lec’s “Open sesame, I want out”.<sup>5</sup>

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<sup>5</sup> Stanislaw Jerzy Lec, [\*Unkempt Thoughts\*](#) (*Myśli nieuczesane*), London: Minerva Press, 1967, 1<sup>st</sup> Aph.



Yawen Zhong

## **Teaming Up with AI: Applying ChatGPT in Teaching English as a Second Language**

Large language models like ChatGPT have significantly impacted language teaching, making the integration of artificial intelligence into English education both important and urgent. This study analyzes how ChatGPT can enhance the teaching of listening, speaking, reading, and writing, focusing on two major aspects: aiding English teachers in preparing materials and instruction, and enhancing students' learning experiences and outcomes.

In listening instruction, teachers can utilize ChatGPT to transcribe English conversational audio files, creating authentic vocabulary exercises.<sup>1</sup> These transcripts also serve as valuable resources for students during listening exercises, enhancing their comprehension and retention. Additionally, ChatGPT can identify and summarize typical expressions based on style and theme, aiding in the explanation of language points across different texts as seen in Figure 1.

For speaking, students often experience nervousness due to fear of criticism from teachers or ridicule from peers about their accents, leading them to avoid speaking exercises. ChatGPT functions as an intelligent assistant.<sup>2</sup> The application of ChatGPT helps reduce students' anxiety and fosters their interest and initiative in speaking practice. By downloading and installing plugins such as Voice Control for ChatGPT, teachers can set specific scenarios and dialogue

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<sup>1</sup> H.-C. Yeh, "[The Synergy of Generative AI and Inquiry-Based Learning: Transforming the Landscape of English Teaching and Learning](#)", *Interactive Learning Environments* (2024).

<sup>2</sup> H. Ji – I. Han – Y. Ko, "[A Systematic Review of Conversational AI in Language Education: Focusing on the Collaboration with Human Teachers](#)" *Journal of Research on Technology in Education*, vol. 55, issue 1 (2023), pp. 48–63.

topics, enabling students to engage with ChatGPT through various modalities, such as voice and text, as shown in Figure 2. This allows teachers to focus more on enhancing students' sensitivity to cultural contexts and aiding them in understanding deeper dimensions of language learning, such as language and stylistic choices.

Please highlight in the following news transcript the words, phrases, sentence structures that are typically used in the business news context.

China's current economic story is one of transition rather than decline. The factors that have previously driven its high GDP growth are receding, such as real estate development and high export volumes, and are increasingly being replaced with advanced technological and manufacturing strategies and techniques.

In a distinct move away from high-speed growth and economic volume, China's leadership is intent on enhancing the quality and sustainability of economic development and improving the well-being of the people. Focusing on specific sectors provides the space for strategic resource allocation and accelerated development of key industries, all reflecting this shift.

1. "China's current economic story" - Setting the context of the discussion.
2. "Transition rather than decline" - Describing the nature of economic change.
3. "Factors that have previously driven its high GDP growth" - Referencing economic drivers.
4. "Receding" - Indicating a decline in influence.
5. "Real estate development and high export volumes" - Specific economic activities.
6. "Advanced technological and manufacturing strategies and techniques" - New economic drivers.
7. "High-speed growth and economic volume" - Previous economic characteristics.
8. "China's leadership" - Reference to governing authorities.
9. "Quality and sustainability of economic development" - Key economic goals.
10. "Well-being of the people" - Socio-economic focus.
11. "Focusing on specific sectors" - Strategic economic planning.
12. "Strategic resource allocation" - Economic management term.
13. "Accelerated development of key industries" - Growth strategy.
14. "Cutting edge" - Advanced or innovative position.
15. "Ownership and supply of critical materials" - Strategic economic assets.

*Figure 1: ChatGPT assisting in the preparation of listening materials*

You will act as a fellow student in a role-play exercise for English conversation practice for non-native speakers. You are a native speaker of English. Our discussion topic is the school's policy on integrating large language models in academic writing. Your role is to engage me in an in-depth conversation on this topic. Encourage me to expand on my arguments and share your opinions to stimulate a more interactive and thought-provoking discussion.

Absolutely, I'd be happy to help with that! Let's start our conversation.

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**Me:** Hey there! Have you heard about the school's new policy on integrating large language models, like ChatGPT, in academic writing?

**You:** Yes, I have! I think it's a pretty interesting development. What are your initial thoughts on it?

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**Me:** Well, I think it's a double-edged sword. On one hand, it could really help students with generating ideas and improving their writing. But on the other hand, I'm worried it might make it too easy to rely on these tools instead of developing our own skills. What do you think?

**You:** That's a valid concern. Do you think there should be certain guidelines or limits on how we use these tools in our writing assignments?

*Figure 2: ChatGPT functioning as an oral partner*

In reading instruction, finding suitable reading material is one of the biggest challenges facing teachers. ChatGPT can retrieve English texts of specific difficulty levels and themes or rewrite existing texts to meet difficulty requirements, engage students' interests, and align with teaching objectives. For students, ChatGPT can assist in self-regulated reading by facilitating a nuanced understanding of English vocabulary, sentences, paragraphs, and entire passages within contextual frameworks, unlike traditional dictionaries that only help students decipher isolated words or phrases.<sup>3</sup> This creates interactive engagement through human-computer interaction and dialogue, helping students overcome difficulties in comprehension and encouraging independent reading, as seen in Figure 3.

Elizabeth was too much embarrassed to say a word. After a short pause, her companion added, "You are too generous to trifle with me. If your feelings are still what they were last April, tell me so at once. My affections and wishes are unchanged, but one word from you will silence me on this subject for ever." explain the phrase trifle with me in English.

🌀 "Trifle with me" means to treat someone or something as unimportant or not worthy of serious consideration. In this context, it means to play with someone's feelings or emotions in a careless or dismissive way. The speaker, Mr. Darcy, is asking Elizabeth not to treat his feelings lightly or insincerely. He is urging her to be honest and direct about her feelings towards him, whether they have changed or remained the same since the previous April.

*Figure 3: ChatGPT aiding in explaining word meaning in Pride and Prejudice*

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<sup>3</sup> Y. Wang, "Research on the Reform and Application of University Public English Reading Teaching with the Assistance of Cloud Computing", *Office Automation* (2023). [Additional remark by Yawen Zhong:] This journal is the English version of a Chinese one, the link <https://chn.oversea.cnki.net/kcms/detail/detail.aspx?dbcode=CJFD&filename=BGDH202306008&dbname=CJFDLAST2023> will take you to the summary of the paper referred to, but for your convenience see it pictured on the top of the next page here.

# Research on the Reform and Application of College English Reading Teaching Assisted by Cloud Computing

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**summary:** With the advent of the "Internet +" era, people have put forward more requirements for English teaching methods and concepts. The teaching methods based on English software systems can no longer meet people's diversified needs in terms of data sharing and functions. To this end, this paper takes the SSM framework as the basis to develop an English reading teaching system. First, the relevant needs of system management, students, and teachers are deeply analyzed. Then, cloud computing is used as the basis to complete the design of the three-layer architecture of the system. Finally, two classes of non-English majors in a certain university are taken as objects to conduct a comparative analysis of their teaching experiments. Teaching through software systems can significantly improve students' learning initiative, make better use of fragmented time, and facilitate communication channels between teachers and students. At the same time, it can significantly reduce the pressure of teachers' English teaching and achieve better teaching results.

When it comes to writing instruction, ChatGPT can provide comprehensive feedback on students' writing tasks across three dimensions: the preparation stage, facilitating idea generation and providing feedback on outlines, as shown in Figure 4; the editing stage, offering intermediate polishing, including vocabulary replacement, feedback on drafts, and supplying different perspectives; and the proofreading stage, providing error corrections. However, the quality of feedback depends crucially on the evaluative rubrics that users provide. Therefore, it is critical for teachers to create clear and individualized rubrics tailored to different student levels.

I don't know how to provide specific evidence and reasoning to strengthen the claim: ChatGPT should be used in the academic writing.

Certainly! Here's how you can structure your claim with specific evidence and reasoning:

**Claim:**

ChatGPT should be used in academic writing to enhance the writing process and improve student outcomes.

**Evidence and Reasoning:**

1. **Enhanced Idea Generation and Creativity:**

- **Evidence:** ChatGPT can generate ideas and provide creative angles on various topics, helping students overcome writer's block.
- **Reasoning:** By offering diverse perspectives and suggestions, ChatGPT can stimulate students' creativity and help them explore different ways to approach their writing assignments. This can be particularly beneficial in brainstorming sessions.

2. **Improved Writing Quality:**

- **Evidence:** Studies show that AI tools like ChatGPT can help improve the quality of writing by suggesting better vocabulary, sentence structures, and grammar corrections.
- **Reasoning:** The instant feedback provided by ChatGPT allows students to learn and correct their mistakes in real-time, leading to a higher quality of written work. This can be especially useful for non-native English speakers who may struggle with language nuances.

*Figure 4: ChatGPT answering a student's question on evidence selection*

Through these applications, ChatGPT provides robust support for English teaching and learning in listening, speaking, reading, and writing. However, English learning includes more than just these four basic skills. The challenge that remains is how to cultivate students' cultural competence, critical thinking, and creative thinking through ChatGPT, as well as how to adhere to ethical codes, which warrants further exploration.





*Boglárka Erdélyi-Belle*

## **Enhancing Scientific Research with AI-Driven One-Click Mind Mapping: A Smart Approach to Knowledge Visualization**

Artificial intelligence (AI) tools offer a solution to the growing problem of information overload in scientific research. AI has become a valuable tool in scientific research, particularly for analyzing large amount of articles. The broader implications of AI-driven literature analysis are significant. It enables the identification of patterns and relationships, facilitating the extraction of new insights and knowledge. In traditional research, scientists must review numerous articles to understand the current state of their field and generate new hypotheses. This process is often time-consuming and prone to subjective biases. AI offers a solution by automating the analysis of articles, comparing results, and identifying gaps in research that warrant further investigation. This automated, objective analysis helps researchers avoid subjective biases, ensuring equal consideration of all relevant results, independent of preconceived notions.

An example of AI application in comparative literature analysis is the newly developed OneClickMindMap (OCM) program, designed by Prof. Zoltán Vass. The OCM program creates semantic maps from any text corpus, visually representing the document's logical structure, key concepts and relationships between different studies.<sup>1</sup> By mapping out the visualised thematic branches of these articles, OCM makes it possible to identify underexplored areas that merit further investigation. Furthermore, OCM highlights under-researched areas and topics with significant gaps in the current body

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<sup>1</sup> Ben Shneiderman – Catherine Plaisant, “[Strategies for Evaluating Information Visualization Tools: Multi-Dimensional In-Depth Long-Term Case Studies](#)”, *Proceedings of the 2006 AVI workshop on Beyond time and errors: novel evaluation methods for information visualization* (May 2006), pp. 1–7.

of knowledge.<sup>2</sup> Another advantage is its ability to support interdisciplinary research by identifying relationships between different themes and concepts across various studies, relationships that may not be immediately visible through traditional literature reviews. Compared to traditional literature reviews, OCM recognizes inconsistencies and identifies more objective and less obvious semantic patterns between the articles.

In conclusion, AI-driven tools like OCM represent valuable innovations in modern scientific research. This technology provides a practical solution to many of the challenges faced by researchers today, offering both efficiency and enhanced analytical capabilities. By automating the review process, it enables researchers to focus on generating new insights and advancing knowledge across disciplines too.

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<sup>2</sup> Yann LeCun – Y. Bengio – Geoffrey Hinton, “[Deep learning](#)”, *Nature* 521 (7553), 2015, pp. 436–444.

*Matthew Crippen*

## **Deepfakes, AI and Media Literacy**

### **A Need for Old Ways of Critical Engagement**

Deepfakes use artificial intelligence to predict how people might appear from different angles or performing actions not originally recorded, often merging visual and audio samples from various sources to create convincing but false representations. Moreover, deepfakes can now be produced cheaply by non-experts. In our already visually driven culture, especially in the TV and internet age, this undeniably introduces new avenues for bullying and harassment, as images can be more damaging than words. However, does this signal the onset of the post-truth “infocalypse” that some foresee, where counterfeit videos are easily made, and bad actors can dismiss legitimate, incriminating footage? Such a conclusion is premature, especially if we engage with media using the same critical thinking we applied before photography’s invention.

Before the photographic age, written and pictorial accounts were not considered definitive proof of the events they conveyed. We should have maintained this critical perspective, as photographs and video recordings can also be misleading.

U.S. war propaganda offers an example. During the 1991 Gulf War, under George H. Bush’s leadership, American news audiences frequently saw videos of Patriot missiles launching, accompanied by narratives from reporters or military officials claiming the final blast marked the destruction of Iraqi Scud rockets. However, while the launches and detonations were real, the explosions seldom indicated a successful interception. Instead, they were often caused by premature detonations (see Figure 1). Today, deepfaked images of a Patriot destroying an incoming missile might be created, but they would likely be less convincing than the 90s videos, as the latter were bolstered by eyewitnesses unable to detect the deception.



*Figure 1: The first two stills show the trajectory of a Patriot missile, but does this third image show it intercepting a Scud?*

In the lead-up to the Gulf War, a widely circulated video featured a young woman identified as “Nayirah” emotionally recounting Iraqi atrocities to the United States Congressional Human Rights Caucus. Though the video itself was genuine, the woman was later revealed to be the Kuwaiti Ambassador’s daughter, and her story was fabricated (Figure 2).



*Figure 2*

Roughly a decade later, under the leadership of George W. Bush, the U.S. commenced another invasion of Iraq. There was testimony, including alleged photographic evidence, claiming that Iraq possessed weapons of mass destruction (see Figure 3). Yet these weapons were never found after the invasion.



*Figure 3*

Another example is the 2003 toppling of Saddam Hussein’s statue in Iraq (see Figure 4). The video footage (and photographic stills) of the event were genuine, showing Iraqis seemingly welcoming U.S.-led forces as liberators. However, misleading techniques were used that weren’t clear to viewers. U.S. military personnel helped topple the statue and provided props to the crowd. Camera operators used tight shots to make the crowd seem larger and more celebratory. The video was edited (and as filmmakers know, editing can create impressions or narratives not in the raw footage). Thus, whether in the era of deep-fakes or not, skepticism toward images – both still and moving – was and remains warranted.



*Figure 4*

Images from the deepfake era, then, require critical scrutiny but this remains the case even when photographs are genuine. One case is a photo retweeted by Yair Netanyahu, Benjamin Netanyahu's son, which purportedly showed a large turnout of Arab voters with the clear intention of getting right-leaning Israeli Jews to cast their ballots. However, the photograph was from Turkey (Figure 5). Another instance involved an image of a camp, released by Israeli officials, intended to depict well-cared-for Palestinian (Gazan) refugees. It was later revealed that the photo was from the Moldova-Ukraine border (Figure 6). Israeli officials later clarified that the image was used for "illustrative purposes".



*Figures 5 and 6*

Again, these last two photos were not deepfakes, but their impact would have been similar if they were, as the intent was still to deceive through imagery. The rise of deepfakes, therefore, does not necessarily herald the onset of a post-truth "infocalypse". Instead, if the increasing prevalence of deepfakes makes us more cautious about accepting images at face value, their proliferation may actually serve as a corrective, challenging our previously uncritical assumptions about photograph-like images.

*James E. Katz*

## **Could AI in the Classroom Harm Democracy?**

Artificial intelligence (AI) is rapidly being integrated into various aspects of society, including education. While AI holds the potential to personalize learning experiences and enhance instruction, it also poses significant threats to democratic values and the development of active, engaged citizens. This essay explores the potential risks of integrating AI into educational settings, focusing on its potential to promote surveillance and censorship, create and manipulate so-called filter bubbles, and diminish human connections. It also examines how AI could erode teacher autonomy and the subsequent effects on students ultimately leading to a decline in political participation, both in the near and long term.

### **1. Surveillance, Censorship, and Manipulation of Information**

Unprecedented levels of surveillance and censorship in educational settings are possible with AI-powered systems. They could monitor classroom activities, online interactions, and even private communications, allowing for the swift identification and suppression of dissenting opinions. This constant monitoring could lead to self-censorship and a stifling of open dialogue, hindering the development of independent thought and active citizenship. Students may become hesitant to express their true thoughts and feelings, fearing repercussions, which could have long-lasting psychological effects and hinder their ability to develop a strong sense of self. This chilling effect on free speech could have immediate consequences for democratic participation, as students may be less likely to voice their opinions or challenge authority.

AI could be used to manipulate information that will then influence students' perceptions. AI-powered search engines and learn-

ing platforms could prioritize content that aligns with a particular ideology, while moving alternative or opposing viewpoints far down the rank of presentation. It could even omit presenting such views to the searcher. This has a twin potential effect. First, it could create “filter bubbles” where students are only exposed to information that confirms their or the regime’s existing slants. This will limit their ability to develop critical thinking skills. It can also prevent them from engaging in constructive dialogue with those who hold different perspectives. Tolerance of dissenting opinions is an underpinning of democracy, but a filter bubble could limit students’ tolerance for dissenting opinions with negative consequences for democracy.

Content filtering and censorship could further restrict students’ access to varied perspectives and critical information, hindering their ability to form informed opinions and participate in a democratic society effectively. In the near term, this could lead to increased polarization and intolerance, as students become less exposed to differing viewpoints. In the long term, it could undermine the very foundations of democracy, which relies on an informed citizenry capable of engaging in reasoned debate and deliberation.

Educational content to promote specific values and beliefs could also be generated by AI. This could involve subtly altering textbooks, articles, or videos to present a biased or incomplete picture of events or to promote specific values and beliefs. For example, AI could be used to rewrite historical narratives to downplay conservative ideas or to glorify certain figures, shaping students’ understanding of the past and influencing their views on present-day issues. This manipulation of information could have profound implications for democracy, as it could lead to a generation of citizens with a distorted understanding of history and a diminished capacity for critical thinking.

And as disturbing as this possibility is, the potential effects could be multiplied by micro-level personalized targeting of information. AI can analyze vast amounts of data to create highly personalized propaganda campaigns. By understanding individual preferences, beliefs, and vulnerabilities, those who control classroom AI can tailor messages to specific audiences, and individuals, making



them more persuasive and effective. Given the importance of peer opinion among students, AI could single out for special attention social media influencers. Through them, targeted messages could be spread by humans to other humans without the target realizing the origin of the information.

Even steps specifically designed to promote democracy using AI may have a boomerang effect. Doubtless as part of civic education initiatives, there will be AI systems that offer role-playing games to students. Their purpose would be to show how democracies function. These AI-powered simulations of democratic processes, while intended to provide hands-on experience, could oversimplify complex issues or promote a gamified view of politics. This might lead to a decreased appreciation for the nuances of real-world political decision-making and the importance of compromise. It could also raise frustration with the many inefficiencies of democratic practices.

Yet, AI can be a powerful tool for promoting media literacy and critical thinking skills. AI-powered tools can help students:

- Evaluate the credibility of information sources: AI can analyze online content and provide students with information about the source's reputation, potential biases, and fact-checking scores. This can help students distinguish between credible and unreliable sources, making them less susceptible to misinformation and propaganda. (Of course, the underlying problem of determining credibility and authority can overwhelm AI's abilities in this domain.)

- Identify bias and misinformation: AI can be trained to detect bias and misinformation in text and media, helping students develop a more critical eye when consuming information. (Large language models are built on existing corpora so it is likely that the problem will be exacerbated rather than remediated.)

- Access varied perspectives: AI can help students break out of the educational system's dominant ideology, reinforced through "filter bubbles", by recommending content from a variety of sources and viewpoints. Exposing students to different perspectives might encourage them to engage in respectful dialogue across differences, or at least recognize the existence of alternative perspectives.

- By empowering students to become more critical consumers of information, AI can help strengthen democracy by ensuring that citizens are well-informed and capable of making sound judgments.

## **2. Loss of Human Connection and Its Political Implications**

Reliance on AI-powered tools could reduce opportunities for students to build meaningful relationships with their teachers and peers. This loss of human connection could hinder the development of empathy, social skills, and a sense of community. AI-driven instruction may lack warmth, emotional support, and nuanced feedback that teachers provide. This could hinder the development of essential social and emotional skills, which are vital for effective collaboration, conflict resolution, and active participation in a democratic society.

Students may feel isolated and disengaged, leading to a lack of interest in civic participation and a weakened sense of collective responsibility. Reliance on AI-powered tools and virtual learning environments could reduce opportunities for students to build meaningful relationships with their teachers and peers, potentially leading to feelings of isolation and disengagement. This could translate into a lack of interest in civic participation and a weakened sense of collective responsibility for the well-being of society.

The erosion of interpersonal relationships, coupled with the potential for AI to foster political apathy, could eventually lead to a decline in political participation. If students are not equipped with critical thinking skills and access to diverse perspectives, they may be less likely to engage in political processes, leading to a decline in political participation and the erosion of democratic institutions. In the near term, this could lead to lower voter turnout and a decline in civic engagement. In the long term, it could result in a society where citizens feel powerless and disconnected from the political process, leaving them vulnerable to authoritarianism and the erosion of democratic norms.

However, AI can also stimulate collaboration and communication skills, which are essential for active participation in a democracy. For example, AI can:

- Facilitate group projects and discussions: AI can help students connect and collaborate on group projects, even when they are not physically co-located. AI-powered tools can also facilitate online discussions and debates, providing a platform for students to share their ideas and perspectives with a wider audience. It can also measure the tenor and emotional valences of such discussion, creating interventions to promote pro-democracy thinking.

- Create virtual reality simulations for social skills development: AI can power virtual reality simulations that allow students to practice social skills in a safe and controlled environment. This can be particularly helpful for students who may struggle with social anxiety or other challenges. It can also create environments where students can confront dominant group ideologies and develop constructive ways of engaging with new ideas or oppositional viewpoints.

- By fostering collaboration, communication, and empathy, AI can help students develop the skills and dispositions necessary for active and engaged citizenship.

### **3. Erosion of Teacher Autonomy**

AI-powered educational technologies could subtly undermine teacher autonomy and shift toward a more standardized and mechanized approach to education. AI-driven platforms may offer pre-packaged lesson plans and assessments, limiting teacher flexibility and creativity in tailoring content to specific student needs. This standardization could stifle the ability of teachers to inspire students and create a dynamic learning environment that encourages critical thinking and the exploration of diverse perspectives. In the near term, this could lead to disengagement and a decline in students' interest in learning about civic participation and democratic processes. In the long term, it could result in a citizenry less equipped to engage in robust debate and deliberation, essential skills for a functioning democracy.

Data-driven instruction, while potentially helpful, could lead to over-reliance on AI-generated insights, discouraging teachers from using their own professional judgment and experience to guide their teaching practices. The nuanced understanding that teachers develop through years of experience interacting with students presumably cannot be replicated by an algorithm. For example, an AI system might flag a student's response as "incorrect" based on a rigid set of parameters, while a human teacher might recognize the student's reasoning and provide individualized guidance to help them arrive at the correct answer. Additionally, AI-powered classroom management systems could track student behavior and provide recommendations for interventions, potentially leading to a more rigid and controlled learning environment. This could limit opportunities for student-led exploration, creativity, and the development of essential social skills like negotiation and compromise.

This erosion of teacher autonomy could result in reduced teacher morale, less engaging learning environments, and a homogenization of teaching practices. When teachers feel devalued and their professional judgment is undermined, it can lead to decreased job satisfaction and potentially contribute to teacher burnout and attrition. This loss of experienced and passionate educators could have a detrimental impact on the quality of education and students' overall development. In the long term, this could lead to a decline in the quality of civic education and a less informed citizenry, making them more susceptible to manipulation and less likely to participate in democratic processes.

Notwithstanding these observations, AI can also be used to empower teachers and enhance their ability to promote democratic values. For example, AI could assist teachers in:

- Creating customized learning experiences: AI can help teachers differentiate instruction by providing personalized learning recommendations and resources tailored to each student's needs and interests. This can free up teachers' time to focus on fostering critical thinking, collaboration, and civic engagement.
- Providing real-time feedback and support: AI can provide students with immediate feedback on their work, identifying areas

where they need additional support. This allows teachers to address individual learning gaps and provide targeted interventions, ensuring that all students can succeed.

- Accessing and analyzing data: AI can help teachers analyze student data to identify trends and patterns, providing insights into student learning and engagement. This can help teachers tailor their instruction and create a more supportive and effective learning environment.

- By empowering teachers and providing them with the tools and resources they need to succeed, AI can help create a more engaging and effective learning environment that fosters democratic values and prepares students for active participation in society.

#### **4. Conclusion**

While AI offers potential benefits for education, it is crucial to recognize the significant risks it poses to democratic values. The potential for AI to promote surveillance and censorship, diminish human connection, and erode teacher autonomy can result in the decline in political participation, and this is a matter of serious concern. The long-term consequences of these trends are a decline in political participation and civic engagement.

To counter these dangers, researchers need to investigate the subtle ways AI influences students' democratic attitudes and behaviors. This research, while potentially facing political opposition, is crucial for understanding the full impact of AI in education. The expectation informing such research is that by prioritizing human connection, critical thinking, and a vibrant exchange of ideas, we can equip future generations with the tools and motivation to actively participate in and contribute to a democratic society. By understanding the potential pernicious effects of AI, and then mitigating them, educators, policymakers, and developers can help ensure that AI serves to enhance, rather than undermine, democratic principles in education.



*Leopoldina Fortunati*

## **Is AI Sustainable?**

The scientific debate on artificial intelligence initially diverged from the way the debate on digital technologies evolved, which is quite paradoxical given that digital technologies represent the infrastructure on which artificial intelligence rests. Digital technologies had developed under the banner of ambivalence.<sup>1</sup> On one hand, these technologies were viewed as having the potential to address some of society's most urgent challenges, such as climate change, poverty, and resource depletion. On the other hand, the rise of digitally enabled work formats, widespread e-commerce, and the sharing economy has raised concerns about the digital economy's overall impact on sustainability, due to the demands of extractivism and the increased energy and resource consumption required to produce hardware.<sup>2</sup> Currently, Deberdt and Le Billon express an even more critical stance on the impact of current production strategies for digital technologies and the extraction of rare earth elements (REEs), as well

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<sup>1</sup> See, for example, R. Bohnsack – C. M. Bidmon – J. Pinkse, “[Sustainability in the Digital Age - Intended and Unintended Consequences of Digital Technologies for Sustainable Development](#)”, *Business Strategy and the Environment*, vol. 31, issue 2 (2022), pp. 599–602. They describe the presence of a dark side in digital technologies in this way: “‘climate change impacts of ICT manufacturing have doubled and the material footprint has quadrupled’ (Itten et al., 2020, p. 2094). Global ICT uses almost 10% of global energy, which is expected to rise to 20%, and Big Tech's dominance (e.g., GAFA – Google, Amazon, Facebook, Apple) centralizes tremendous power in the hands of a few (Andersen et al., 2021). Digital technologies raise social and ethical concerns, too, such as data privacy and consumer lock-in (Acquier et al., 2017). Intelligent algorithms have proven to create bias for gender and skin type (MIT, 2018) and social media platforms allow the spreading of fake news (Vosoughi et al., 2018)”, the quoted passage on p. 599.

<sup>2</sup> Itten et. al., “[Digital Transformation – Life Cycle Assessment of Digital Services, Multifunctional Devices and Cloud Computing](#)”, *The International Journal of Life Cycle Assessment*, vol. 25, issue 8, (2020).

as the related conflicts, referring to it as necropolitics.<sup>3</sup> This sentiment is echoed by Silvia Federici, who has stated in many conferences that digital technologies are consuming the world.

In contrast, the debate on artificial intelligence had grown from a unified perspective: what contribution can AI make to sustainability, specifically in achieving sustainability goals?<sup>4</sup>

In 2021, [an article by Aimee van Wynsberghe](#) however raised the issue of completing the picture for AI by adding to the classic research question of “AI for sustainability” the question about “the sustainability of AI”. In the same year, Crawford published the book *The Atlas of AI*<sup>5</sup> documenting how AI is a technology of extraction: from the minerals drawn from the earth to the labor of low-wage information workers (the so-called content moderators) to the data taken from every action and expression. In this book, she emphasized the need to inaugurate a third phase, arguing that after a first phase of the AI debate on what AI might do and a second phase on the black-box algorithm and the problem of explainability, the scientific community was called to analyze the sustainability of AI itself. She contended that, given its pervasiveness, we couldn’t ignore its environmental

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<sup>3</sup> R. Deberdt & P. Le Billon, “[Green Transition’s Necropolitics: Inequalities, Climate Extractivism, and Carbon Classes](#)”, *Antipode: A Radical Journal of Geography*, Feb. 2024. Let us report what they write: “The efforts to decarbonise affluent modes of living and the green industrial complex are at the fore of policies aimed at mitigating the socio-economic impacts of climate change. The advent of a ‘climate-smart world’ ... and its corollary of green extractivism ([Bruna 2023](#); [Dunlap and Riquito 2023](#); [Voskoboynik and Andreucci 2022](#)) necessitates the enrolment of land and labour through policies that most often affect communities already under climate change duress. The green transition thus becomes a necropolitical process ([DeBoom 2021](#); [Mbembe 2003](#)), in which those with little role in inducing global warming are also the ones burdened by green extractivism (see also [Mondaca 2017](#); [Sultana 2022a](#), [2022b](#)).”

<sup>4</sup> See, for example, M. Coeckelbergh, “[AI for Climate: Freedom, Justice, and other Ethical and Political Challenges](#)”, *AI Ethics*, vol. 1, issue 1 (2020); L. Floridi et al., “[AI4People – an Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations](#)”, *Minds and Machines*, vol. 28, issue 4, pp. 689–707 (2018).

<sup>5</sup> Kate Crawford, [The Atlas of AI](#), New Haven, CT: Yale University Press, 2021.



costs. In this analytical framework, she clarified that sustainable AI refers to the sustainability of the entire AI life cycle, including the hardware powering AI design, training, development, validation, the actual processing of data by AI, re-tuning, implementation, and use of AI.

However, in the general debate the measure of sustainability is especially calculated in terms of carbon footprints and computational power.

I start from the contributions of Aimee von Wynsberghe and Kate Crawford and I expand them in three directions. The *first expansion* comes back to the second phase, which still opens within the debate, and broadens it adding another research question: Is artificial intelligence a sustainable subject of study for social scientists? Is it wise and feasible to study something that social scientists might have limited mastery over, something that even hard scientists only understand to a certain extent, but which is still important to begin studying? In the case of artificial intelligence, we lack the number of coordinates researchers can rely on to start an exploratory study, not to mention that the very definition of artificial intelligence is challenging.

The discussion on the definition of AI remains at a descriptive level: weak AI (Artificial Narrow Intelligence), which is the current state; strong AI (Artificial General Intelligence), which should be able to use its training in specific fields to perform new tasks in different contexts without the need for human intervention in specifically training the model; and Super AI, which would be able to learn, reason, and make decisions with cognitive abilities surpassing those of a human. An exception is represented by Aimee van Wynsberghe who suggests defining AI as a social experiment conducted on society, a technology “which we still have much to learn about”<sup>6</sup>

I argue that perhaps the most dynamic definition of AI, in the sense that it triggers a cascade of further lines of discussion, is that it

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<sup>6</sup> See above, *loc. cit.*, p. 217.

is a saprophyte of communication and information media.<sup>7</sup> It needs to embody itself in a technological form to function, such as computers, cell phones, virtual assistants, and robots, along with their technological infrastructure. This implies that, in the end, the debate on AI must be situated within the broader framework of digital technologies.

The *second extension* concerns the AI as industrial product and adds to carbon footprints and computational power the issue of the water which is necessary to use for the cooling systems of servers. This issue recently has acquired a specific weigh in the debate on AI sustainability. In 2024, more research is available, showing how large tech companies are increasing their need of energy and cooling systems based on water.

David Berreby has recently documented that for making the generative AI functioning tech industries “need massive amounts of energy for computation and data storage and millions of gallons of water to cool the equipment at data centers”.<sup>8</sup> He reports that in 2022, Google’s data centers consumed nearly 20 billion liters of fresh water for cooling. Google’s data centers (which host the Bard chatbot and other generative AIs) used 20% more water in 2022 compared to 2021, while Microsoft’s data centers (which host ChatGPT) saw a

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<sup>7</sup> Crawford, *op. cit.*, documents that AI rests on the materiality that refers to the globalized digital infrastructures of today’s automated communication systems. A. Hepp et al., “[ChatGPT, LMDA, and the Hype Around Communicative AI: The Automation as a Field of Reaserch in Media and Communication Studies](#)”, *Human–Machine Communication*, vol. 6, July 2023, pp. 41–63, draw on K. Crawford & V. Joler, “[Anatomy of an AI System: The Amazon Echo as an Anatomical Map of Human Labor, Data and Planetary Resources](#)”, *Virtual Creativity*, vol. 9, issue 1-2 (2018), pp. 117–120 and on Robert Gehl and Maria Bakardjieva, “Socialbots and Their Friends”, in Gehl & Bakardjieva (eds.), *Socialbots and Their Friends: Digital Media and the Automation of Sociality*, New York: Routledge, 2016, pp. 1–16. The latter argue that virtual assistants operate through the infrastructure of the internet and that social bots rely on “the infrastructure of platforms such as Twitter, which pre-structure communication to an extent that bots can replicate human actors comparatively easily”.

<sup>8</sup> D. Berreby, “[As Use of A.I. Soars, So Does the Energy and Water It Requires](#)”, *YaleEnvironment360*, February 6, 2024.

34% increase in the same period. Furthermore, in The Dalles, Oregon, where Google operates three data centers and plans to add two more, these three existing data centers use more than a quarter of the city's water supply. In Chile and Uruguay, protests have erupted over planned Google data centers that would tap into the same reservoirs that supply drinking water.

Not to mention the technological waste generated by devices and digital infrastructures, within which artificial intelligence is integrated both directly and indirectly through the technologies it is embedded in.

Legislators, regulators and activists are running for cover. For example, the European Union's "A.I. Act", recently approved by member states, will require from 2025 "high-risk A.I. systems" (which include the powerful "foundation models" that power ChatGPT and similar A.I.s) to report their energy consumption, resource use, and other impacts throughout their systems' lifecycle. The International Organization for Standardization (ISO) has announced that it will release criteria for "sustainable AI" later this year. These standards will cover aspects such as measuring energy efficiency, raw material usage, transportation, and water consumption. They will also outline practices to mitigate AI's impact throughout its life cycle, from the extraction of materials and the manufacturing of computer components to the electricity used for its computations.

The *third extension* is the issue of the human labor, necessary to train AI. Llansó et al. remind us that

Enormous amounts of content are uploaded and circulated on the Internet every day, far outpacing any intermediary's ability to have humans analyze content before it is uploaded.<sup>9</sup>

Reflecting on the possibility to automate this work, Gorwa, Binns and Katzenbach<sup>10</sup> in 2020 wrote that

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<sup>9</sup> E. Llansó et. al., "[Artificial Intelligence, Content Moderation, and Freedom of Expression](#)", Transatlantic Working Group, February 26, 2020, p. 3.

despite the potential promise of algorithms or “AI”, we show that even “well optimized” moderation systems could exacerbate, rather than relieve, many existing problems with content policy as enacted by platforms for three main reasons: automated moderation threatens to (a) further increase opacity, making a famously non-transparent set of practices even more difficult to understand or audit, (b) further complicate outstanding issues of fairness and justice in large-scale sociotechnical systems and (c) re-obscure the fundamentally political nature of speech decisions being executed at scale.

However, the problem is not limited to just the opacity and overall quality of content automation but also the enormous amount of human labor required to automate such content. It is estimated that 100,000 people work as commercial content moderators worldwide.<sup>11</sup>

In addition, there are thousands of volunteer moderators working for free for Tech Corporations. A [2022 study from Northwestern University](#) estimated the labor value of Reddit’s 21,500 volunteer moderators and concluded that their work is worth at least \$3.4 million to the company annually.

Open-AI, Facebook, Instagram, Google, Meta and the other tech corporations need to eliminate the large amounts of non-compliant text, image, audio, and video content that are posted on social media every year. There have been various class action lawsuits in the United States against tech companies, both for low wages and the lack of any psychological support. For example, last spring, TikTok was sued by two former content moderators who claimed the com-

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<sup>10</sup> R. Gorwa et. al., “[Algorithmic content moderation: Technical and political challenges in the automation of platform governance](#)”, *Big Data & Society*, January–June 2020, pp. 1–15, the quoted passage on p. 1.

<sup>11</sup> M. Steiger et. al., “[The Psychological Well-Being of Content Moderators: The Emotional Labor of Commercial Moderation and Avenues for Improving Support](#)”, in *CHI Conference on Human Factors in Computing Systems (CHI ’21)*, May 8–13, 2021, Yokohama, Japan. ACM, New York, NY, 14 pp.

pany failed to provide a safe and supportive working environment while they reviewed disturbing material, including videos of bestiality, necrophilia, and violence against children. In 2020, Facebook agreed to a \$52 million settlement to compensate former content moderators who alleged their work caused psychological harm. Recently, YouTube settled a \$4.3 million lawsuit filed by former moderators who reported developing mental health issues due to their job.<sup>12</sup>

Especially those who moderate the graphic dimension are exposed often to extreme visual content that can include any sort of violence and abuse and that can lead to lasting psychological and emotional distress, a form of posttraumatic stress disorder.

In response to these lawsuits, many tech corporations have transitioned from employing in-house moderators to outsourcing these jobs to third-party contractors. At present companies like Accenture, CPL, and Majorel hire people globally – from India to Brasil to the Philippines – generally demanding quick content review turnarounds and generally leaving behind them a legion of underpaid and traumatized workers.

In Kenya, which also serves as a technology hub for countries like Ethiopia, Rwanda, Burundi, and Nigeria, content moderators are paid very little: \$2.20 per hour compared to \$18-20 per hour in Europe. In 2018 in the U.S., Facebook paid content moderators \$28,800 per year. In Kenya, content moderators not only receive very low wages but also lack any form of psychological support. When a moderator becomes unwell, they are simply replaced.

Are the social costs imposed by AI sustainable for workers around the world, particularly in terms of race and gender, reinforcing the most regressive and colonial labor policies?

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<sup>12</sup> [2022 study from Northwestern University](#), see above. See also Erika Hellerstein, “[The Occupational Hazards of Cleaning the Internet: A New Lawsuit against the Giant Reddit Underscores the Global Struggle of Content Moderators](#)” (23 February 2023).



*Rich Ling*

## **AI: Climate Villain or Climate Saviour?**

### **Introduction**

Is AI an environmentally sustainable development?<sup>1</sup> In the discussion associated with AI, benefits as well as downsides are being actively discussed. Some of the positive consequences of AI, in general, are efficiency and automation,<sup>2</sup> better decision-making,<sup>3</sup> innovation,<sup>4</sup> and improved quality of life.<sup>5</sup> On the negative side, there are fears of job displacement and redundancies,<sup>6</sup> discrimination issues based on racist/sexist training data,<sup>7</sup> a lack of creativity (or perhaps too much creativity in the case of so-called hallucinations), a lack of transparency

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<sup>1</sup> Sophia Falk – Aimee van Wynsberghe, “[Challenging AI for Sustainability: What Ought It Mean?](#)”, *AI and Ethics*, July 31, 2023.

<sup>2</sup> Giacomo Damioli – Vincent Van Roy – Daniel Vertesy, “[The Impact of Artificial Intelligence on Labor Productivity](#)”, *Eurasian Business Review*, vol. 11, issue 1 (March 1, 2021), pp. 1–25.

<sup>3</sup> Muhammad Balbaa – Marina Abdurashidova, “[The Impact of Artificial Intelligence in Decision Making: A Comprehensive Review](#)”, *EPRA International Journal of Economics, Business and Management Studies*, vol 11, issue 2 (February 1, 2024), pp. 27–38.

<sup>4</sup> Jacob R. Holm – Daniel S. Hain – Roman Jurowetzki – Edward Lorenz, “[Innovation Dynamics in the Age of Artificial Intelligence: Introduction to the Special Issue](#)”, *Industry and Innovation*, vol. 30, issue 9 (October 23, 2023), pp. 1141–55.

<sup>5</sup> Ayoub Jannani – Nawal Sael – Faouzia Benabbou, “[Artificial Intelligence for Quality of Life Study: A Systematic Literature Review](#)”, *IEEE Access*, 2024.

<sup>6</sup> Rakesh Kochhar, “[Which U.S. Workers Are More Exposed to AI on Their Jobs?](#)”, *Pew Research Center*, July 26, 2023; Yang Shen – Xiuwu Zhang, “[The Impact of Artificial Intelligence on Employment: The Role of Virtual Agglomeration](#)”, *Humanities and Social Sciences Communications* 11, no. 1 (January 18, 2024), pp. 1–14.

<sup>7</sup> Channarong Intahchomphoo – Odd Erik Gundersen, “[Artificial Intelligence and Race: A Systematic Review](#)”, *Legal Information Management*, vol. 20, issue 2 (June 2020), pp. 74–84.

as well as existential risks.<sup>8</sup> Further AI systems can be applied to various political appeals that effectively target voters and result in political systems that are swayed by these targeted appeals.<sup>9</sup>

Turning to the issue of AI and the environment, one of the open questions is whether AI is a sum benefit for the environment; or the opposite. This discussion has consequences regarding our eventual ability to direct and steer the development of this new technological regime.

As of the early 2020s, it is estimated that the data centers supporting AI use between one and two percent of the world's energy production.<sup>10</sup> This is considerable, and it is growing. If current trends continue this could double by 2026 to where AI could consume as much energy as the country of Japan.<sup>11</sup> Looking just at the U.S., it is estimated by Gorin, et al.,<sup>12</sup> that this could reach 35GW by 2030 which is up to 7.5% of the country's total energy consumption, about the same as a third of American homes. However, to put this into context, when compared with other sectors, e.g., transportation (27%) and industry (24%), AI's contribution may be seen as more moderate.<sup>13</sup>

According to Alex de Vries<sup>14</sup> a worst-case scenario for AI could be a tenfold increase in energy consumption. He went on to say that the best case could be no growth because of increases in

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<sup>8</sup> Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies*. Reprint edition, Oxford: Oxford University Press, 2016.

<sup>9</sup> Falk – van Wynsberghe, *op. cit.*; Eduardo Moraes Sarmiento – Sandra Maria Correia Loureiro, “[Exploring the Role of Norms and Habit in Explaining Pro-Environmental Behavior Intentions in Situations of Use Robots and AI Agents as Providers in Tourism Sector](#)”, *Sustainability* 13 (2021).

<sup>10</sup> Brian Calvert, “[AI Already Uses as Much Energy as a Small Country. It's Only the Beginning](#)”, *Vox*, March 28, 2024.

<sup>11</sup> *Ibid.*

<sup>12</sup> Alexandra Gorin – Roberto Zanchi – Mark Dysen, “[How Data Centers Can Set the Stage for Larger Loads to Come](#)” RMI, May 3, 2024.

<sup>13</sup> Keith Kirkpatrick, “[The Carbon Footprint of Artificial Intelligence](#)”, *Communications of the ACM*, vol. 66, no. 8 (August 2023), pp. 17–19.

<sup>14</sup> As cited in Lauren Leffer, “[The AI Boom Could Use a Shocking Amount of Electricity](#)”, *Scientific American*, October 13, 2023.



efficiency and smart AI-enhanced management.<sup>15</sup> One issue that is not often discussed is the use of AI to sway voting and the resulting policy in either a pro- or anti-environmental direction.<sup>16</sup> AI can be harnessed to for commercial purposes that do not take environmental needs into account; or even worse, harness an environmentally exploitative focus while also actively hampering efforts to limit climate change.

These are the issues that will be considered below. First I will look at the potential benefits of AI vis-à-vis climate change, and then I will look at the threats.

## **The Positive Side of AI and the Environment**

The application of AI to the climate issue can have a variety of positive outcomes.

### **Optimal Energy Networks**

AI can analyze consumption patterns to predict energy consumption patterns and optimize the energy distribution system. The technology can design effectively systems and manage complex renewable energy systems,<sup>17</sup> e.g. the smart management of solar and wind facilities.

### **Smart Cities/Transportation**

As with other areas characterized as having complex systems, AI can be used in the management of smart cities (e.g., the energy-efficient management of areas such as infrastructure (electricity, water, sew-

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<sup>15</sup> See Leffer.

<sup>16</sup> Tasha Erina Taufek, Nor Fariza Mohd Nor, Azhar Jaludin, Sabrina Tiun, and Lam Kuok Choy, “[Public Perceptions on Climate Change: A Sentiment Analysis Approach](#)”, *GEMA Online Journal of Language Studies*, vol. 21, no. 4 (2021).

<sup>17</sup> N. C. Ohalete et al., “[AI-Driven Solutions in Renewable Energy: A Review of Data Science Applications in Solar and Wind Energy Optimization](#)”, *World Journal of Advanced Research and Reviews*, vol. 20, issue 3 (2023), pp. 401–17.

age, and transport<sup>18</sup>), as well as finance, healthcare, security, education, and manufacturing.<sup>19</sup> AI can be used to monitor and streamline energy use as well as other issues that contribute to climate change making cities more sustainable. A major part of the transportation system is air flight. AI can be applied to this sector to limit the use of fossil fuels and CO<sub>2</sub> emissions.<sup>20</sup>

## Resource and Pollution Monitoring

AI can help to monitor biodiversity and moderate the effects of human activities. This can be applied to fishing/overfishing<sup>21</sup> as well as monitoring deforestation, and wildlife populations.<sup>22</sup> Further, AI can be used to help predict extreme weather events<sup>23</sup> and air-borne pollution<sup>24</sup> to help mitigate their effects.

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<sup>18</sup> Ade Barkah – Patrick Robert, “[Route Clustering in Transportation with Geospatial Analysis and Machine Learning to Reduce CO2 Emissions](#)”, MIT, 2018.

<sup>19</sup> Amal Ben Rjab – Sehl Mellouli – Jacqueline Corbett, “[Barriers to Artificial Intelligence Adoption in Smart Cities: A Systematic Literature Review and Research Agenda](#)”, *Government Information Quarterly*, vol. 40, issue 3 (June 2023).

<sup>20</sup> R. Abduljabbar et al., “[Applications of Artificial Intelligence in Transport: An Overview](#)”, *Sustainability*, vol. 11, no. 1 (January 2019).

<sup>21</sup> Buncha Chuaysi – Supaporn Kiattisin, “[Fishing Vessels Behavior Identification for Combating IUU Fishing: Enable Traceability at Sea](#)”, *Wireless Personal Communications*, vol. 115, no. 4 (December 1, 2020), pp. 2971–93.

<sup>22</sup> Ying-Nong Chen et al., “[Special Issue Review: Artificial Intelligence and Machine Learning Applications in Remote Sensing](#)”, *Remote Sensing*, MDPI, 2023; K. N. Shivaprakash et al., “[Potential for Artificial Intelligence \(AI\) and Machine Learning \(ML\) Applications in Biodiversity Conservation, Managing Forests, and Related Services in India](#)”, *Sustainability*, vol. 14, issue 12 (January 2022).

<sup>23</sup> Xiefei Zhi – Jingyu Wang, “[Editorial: AI-Based Prediction of High-Impact Weather and Climate Extremes under Global Warming: A Perspective from the Large-Scale Circulations and Teleconnections](#)”, *Frontiers in Earth Science*, vol. 11 (January 12, 2023).

<sup>24</sup> M. A. Zaidan et al., “[Virtual SenSorS: Toward High-Resolution Air Pollution Monitoring Using AI and IoT](#)”, *IEEE Internet of Things Magazine*, vol. 6, issue 1 (2023), pp. 76–81.

## Precision Agriculture

AI can be used in the practice of precision farming, that is the measurement and fine-grained analysis of crops as they are planted, as they mature and as they are harvested (including pest control).<sup>25</sup> This use of AI can increase profits of farmers while reducing the CO<sub>2</sub> footprint. AI can also be an important element in the development of CO<sub>2</sub>-friendly foods.<sup>26</sup>

## Research Into Sustainability in Manufacturing, Business Practices, and Policy Development

AI can be applied to manufacturing and “greener” production processes, particularly in capital and technology-intensive areas.<sup>27</sup> AI can also be used by regulatory bodies to examine the sustainability profile of companies.<sup>28</sup> AI tools can be used to facilitate development and production process when examining various types of potentially dangerous chemicals.<sup>29</sup> This can be seen in battery research<sup>30</sup> that can

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<sup>25</sup> E. Fantin Irudaya Raj – M. Appadurai – K. Athiappan, “[Precision Farming in Modern Agriculture](#)”, in *Smart Agriculture Automation Using Advanced Technologies*, ed. by Amitava Choudhury et al., *Transactions on Computer Systems and Networks*, Singapore: Springer, 2021, pp. 61–87.

<sup>26</sup> Abdo Hassoun et al., “[Emerging Trends in the Agri-Food Sector: Digitalisation and Shift to Plant-Based Diets](#)”, *Current Research in Food Science*, vol. 5 (2022), pp. 2261–69.

<sup>27</sup> Mingyue Chen – Shuting Wang – Xiaowen Wang, “[How Does Artificial Intelligence Impact Green Development? Evidence from China](#)”, *Sustainability*, vol. 16, issue 3 (January 2024).

<sup>28</sup> Ewa Dostatni – Dariusz Mikołajewski – Izabela Rojek, “[The Use of Artificial Intelligence for Assessing the Pro-Environmental Practices of Companies](#)”, *Applied Sciences*, vol. 13, no. 1 (2022).

<sup>29</sup> Andres Bran et al., “[Augmenting Large Language Models with Chemistry Tools](#)”, *Nature Machine Intelligence*, May 8, 2024.

<sup>30</sup> Jonathan Scharf et al., “[Bridging Nano- and Microscale X-Ray Tomography for Battery Research by Leveraging Artificial Intelligence](#)”, *Nature Nanotechnology*, vol. 17, no. 5 (May 2022), pp. 446–459.

help to make electricity grids more efficient by allowing the flattening of surge “tops”.

Moving beyond manufacturing processes, AI can be used to more carefully examine business decisions that reduce risk and promote environmentally friendly business policy.<sup>31</sup> In addition, AI has the potential to be applied to the examination of governmental policies affecting the environment.<sup>32</sup>

### **Support the Election of Pro-environment Officials**

AI can be used to support the election of pro-environmental politicians and political parties (as developed below it can also be used to mobilize support of anti-environmental politicians). AI bots can be used to better target messaging to voters, better allocate campaign resources, identify salient issues in the press, and better engage with voters and encourage voter engagement via social media (e.g., answering voter questions, encouraging registration (or perhaps discouraging it for “inappropriate” voters), and motivating voter turnout. AI can be used for so-called sentiment analysis that facilitates real-time adjustment of campaign messaging based on shifting public opinion. It can also be used to streamline voter recruitment and mobilization for pro-(or anti-) environmental voters.

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<sup>31</sup> Margaret A. Goralski – Tay Keong Tan, “[Artificial Intelligence and Sustainable Development](#)”, *The International Journal of Management Education*, vol. 18, issue 1 (March 1, 2020).

<sup>32</sup> Omar Isaac Asensio – Ximin Mi – Sameer Dharur, “[Using Machine Learning Techniques to Aid Environmental Policy Analysis: A Teaching Case Regarding Big Data and Electric Vehicle Charging Infrastructure](#)”, *Case Studies in the Environment*, vol. 4, no. 1 (2020).

## **Support Behavioral Changes that Are Climate and Culturally Friendly**

While there is still little research in the area,<sup>33</sup> AI has the potential to help foster pro-environmental attitudes and consumption behaviors in the public. One can imagine systems that help to gently “nudge” people towards more environmentally friendly behavior.<sup>34</sup> There can be the development of decision support systems (e.g., “Which vacation option would be best for the environment?”) that would allow for various type of adjustment and tailoring that reduce CO<sub>2</sub> production. These could also be linked with various forms of monitoring and feedback.<sup>35</sup>

At a wider level, AI can provide the individual with input from different social influence networks that can support pro-environmental outcomes. AI systems can also be mobilized to develop public campaigns that are designed to encourage pro-environmental outcomes.

## **The Negative Environmental Dimensions of AI**

The previous section outlined how AI has the potential to address major environmental issues. At the same time, there are darker dimensions to AI when considering the environment. These include its consumption of energy and other resources. Perhaps even more importantly, there is a serious potential that AI will be harnessed for commercial purposes that do not take environmental needs into account; or even worse, harness an environmentally exploitative focus while also actively hampering efforts to limit climate change.<sup>36</sup>

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<sup>33</sup> Falk and van Wynsberghe, *op. cit.*, see note 1 above; Sarmiento and Loureiro, *op. cit.*, see note 9 above.

<sup>34</sup> Tereza [Balcárova et al., “Analysis of Green Deal Communication on Twitter: Environmental and Political Perspective”](#), *Frontiers in Environmental Science*, vol. 12 (2024).

<sup>35</sup> Taufek et al., *op. cit.*, see note 16 above.

<sup>36</sup> *Ibid.*

## Energy Consumption / CO<sub>2</sub> Production

AI emits large amounts of carbon in the training process. For example, the French large-language AI engine BLOOM emitted 25 metric tons of carbon during its training process. This is approximately the same amount as six average people in the world (or two who live in the Global North and command the emission of more CO<sub>2</sub>). In addition comes the CO<sub>2</sub> footprint of the hardware and infrastructural costs.<sup>37</sup> The BLOOM AI engine is much smaller than the more well-know models such as ChatGPT and Gemini. Estimates for the training of these models range as high as 280 metric tons (by way of comparison, a flight between London and New York emits about 0.5 metric tons).

As noted in the introduction, AI and the ancillary data centers could consume as much as two percent of the world's energy production.<sup>38</sup> This could conceivably increase to more than seven percent and further be translated into approximately the same percent of CO<sub>2</sub> production if the energy comes from fossil fuels.<sup>39</sup>

The training of large language models and the operation of the data centers is only a part of the energy consumption associated with AI. The process of manufacturing the equipment, etc. also adds to the total CO<sub>2</sub> use.<sup>40</sup>

## Resource Depletion and Electronic Waste

Following the lifecycle theme in the previous section, the rapid development of AI means that there is a need to manufacture new

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<sup>37</sup> Melissa Heikkilä, "[Why We Need to Do a Better Job of Measuring AI's Carbon Footprint](#)", *MIT Technology Review*, 2022.

<sup>38</sup> Calvert, *op. cit.*, see note 10 above.

<sup>39</sup> Kirkpatrick, *op. cit.*, see note 13 above.

<sup>40</sup> Ahmad Faiz et al., "[LLMCarbon: Modeling the End-to-End Carbon Footprint of Large Language Models](#)", *arXiv*, January 19, 2024.

equipment to support these applications. This can result in resource depletion of rare earth elements, etc.<sup>41</sup>

At the other end of the manufacturing cycle, the rapid need for new hardware also means that older devices quickly become inadequate and obsolete. This, in turn, means that there is a growing issue of e-waste. It was estimated that in 2019, there were 53.6 million metric tons of e-waste generated in the world, an average of 7.3 kg per capita.<sup>42</sup> Obsolete AI equipment is a contributor to this. The ability to recycle these materials is limited and in many cases, there is the potential for toxic substances to leak out into the environment.

### **Short-term Perspective**

The application of AI to climate change can focus on short-term issues while not being tuned into the wider perspective. These short-term issues might be, for example, quarterly profits or shareholder returns. In this case, the application of AI might be intent in minimizing the costs at the expense of environmental sustainability. In other cases, short-term issues might include, for example, eliminating local traffic snarls. In this case, a localized issue might be addressed without considering the wider issue of CO<sub>2</sub> in the general transportation system which could be addressed by developing greener transportation systems. In this case, there is not really a focus on the longer-term issues that have a more profound impact on the climate.<sup>43</sup>

Further, the literature on this point often takes an optimistic tone suggesting that the powers of AI will help to reduce the consequences of resource depletion and e-waste. There is little literature,

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<sup>41</sup> Jayden Khakurel et. al., "[The Rise of Artificial Intelligence under the Lens of Sustainability](#)", *Technologies*, vol. 6, no. 4 (December 2018).

<sup>42</sup> Vanessa Forti et. al., "[The Global E-Waste Monitor 2020: Quantities, Flows, and the Circular Economy Potential](#)", *United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Rotterdam* 120 (2020).

<sup>43</sup> Simon Elias Bibri, "[Data-Driven Smart Sustainable Cities of the Future: Urban Computing and Intelligence for Strategic, Short-Term, and Joined-up Planning](#)", *Computational Urban Science*, vol. 1 (2021).

however, that squarely assesses the positive and the negative sides of AI.

### **Stimulation of Anti-environmental / Pro-profit Sentiments**

As noted, AI can be used to stimulate anti-environmental political movements. It can also be used (and is being used) to target voters who are anti-environment and encourage them to vote for like-minded candidates.<sup>44</sup>

Finally, as discussed above, AI is being applied to the needs of business and finance. While there are potential uses for climate work, it can easily be such that AI systems will be calibrated to maximize private profits at the expense of the environment. Indeed, this may well be the most perilous issue. As with other rationalization systems,<sup>45</sup> commercial interests are quick to apply them to their short-term exploitative demands. Longer-term social goals are often not developed or neglected. It is thus likely that AI will be developed to address the needs of commercial development and not the needs of the environment.

### **Application of AI to Jigger Environmental Accounting**

A final threat posed by AI is that it can enable and empower creative types of environmental accounting that underreport the true costs of CO<sub>2</sub> pollution.<sup>46</sup> The discussion as to whether a company, a sector, or a country is at zero emissions is in many ways an accounting issue. This means that AI itself can be used to seek out accounting systems that will facilitate CO<sub>2</sub> pollution. It also must be noted that the op-

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<sup>44</sup> Falk and van Wynsberghe, *op. cit.*, see note 1 above; Sarmiento and Loureiro, *op. cit.*, see note 9 above; Ricardo Vinuesa et al., "[The Role of Artificial Intelligence in Achieving the Sustainable Development Goals](#)", *Nature Communications*, vol. 11 (2020).

<sup>45</sup> J. R. Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society*, Cambridge, MA: Harvard University Press, 1986.

<sup>46</sup> B. Kenza – C. Hodgson – J. Tauschinski, "[Amazon and Meta's Bid to Rewrite the Rules on Net Zero](#)" (Financial Times, August 13, 2024).



posite can also be the case, namely that AI will facilitate more rigid accounting.

## Overall Summary

Where does all of this leave us? Returning to the general question is AI, in sum, better or worse for the environment? As noted, there are potentials for efficiency and automation, enhanced decision-making, environmental monitoring, the development of sustainable solutions, and an enhanced quality of life. AI also can be used to help mobilize public opinion regarding the need to move in a “green” direction.

On the negative side, there is the energy needed to develop and maintain the systems and resource depletion. Further, AI can also be used to empower anti-environmental political movements.

Overall, Vinuesa et al.<sup>47</sup> find that experts foresee that AI will have more positive than negative consequences regarding the environment. Often, these types of findings are tightly framed around the actual AI systems. There is a need to also take the wider social and commercial dimensions into account.<sup>48</sup>

If AI is to be environmentally benign (or even environmentally friendly) there will need to be a need to focus its deployment in an environmentally friendly direction. This will need to include research into how the computational work of “teaching” AI systems can be as CO<sub>2</sub> benevolent as possible. The same effort needs to be applied to encouraging the sustainable manufacture, use, and recycling of the physical equipment used to operate AI.

Perhaps, most importantly, however, there will have to be the application of AI to climate-friendly uses, and not a short-term exploitative trajectory. The development of AI should prioritize sustainability goals along with process efficiently in the tasks assigned to these systems.

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<sup>47</sup> *Op. cit.*, see note 44 above.

<sup>48</sup> Balcarova et al., *op. cit.*, see note above 34; Taufek et al., *op. cit.*, see note 16 above.



Vojtěch Svěrák

## Climate Crisis as Avoidable Structural Injustice: A Call for Compensations

Many scholars have persuasively argued that the climate crisis can be characterized by Iris Marion Young’s concept of “structural injustice”.<sup>1</sup> This classification stems from two main characteristics. First, climate change is an unintended outcome of our participation in the structures of a fossil fuel-driven growth economy. Second, climate change affects social groups unequally: those who contribute most to climate change, such as the upper classes, are almost unaffected, while most impacts are felt by already disadvantaged groups. In short, contributions, vulnerability, and mitigation capacities are conditioned by income, nationality, ethnicity, gender, and other social factors. These inequalities are not a matter of bad luck, but stem from reproduced unjust social, political, and economic settings and power imbalances.<sup>2</sup>

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<sup>1</sup> See, for example: Robyn Eckersley, “[Responsibility for Climate Change as a Structural Injustice](#)”, in *The Oxford Handbook of Environmental Political Theory*, ed. Teena Gabrielson *et al.*, vol. 1 (Oxford University Press, 2016); Lukas Sparrenborg, “[‘Power Concedes Nothing without a Demand’: The Structural Injustice of Climate Change](#)”, *Critical Review of International Social and Political Philosophy*, 30 November 2022, pp. 1–24; Michael Christopher Sardo, “[Responsibility for Climate Justice: Political Not Moral](#)”, *European Journal of Political Theory*, vol. 22, issue. 1 (January 2023), pp. 26–50; Michael Goodhart, “[Climate Change and the Politics of Responsibility](#)”, *Perspectives on Politics*, vol. 21, issue 2 (June 2023), pp. 550–68.

<sup>2</sup> These statistics are extensively described, for example, in Lucas Chancel, Tan-crède Voituriez, and Philipp Bothe, *Climate Inequality Report 2023* (World Inequality Lab Study, 2023). The so-called climate injustice is recognized also by the Intergovernmental Panel on Climate Change (IPCC): *Climate Change 2022 – Impacts, Adaptation and Vulnerability: Working Group II Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, 2023).

Maeve McKeown provides a nuanced categorization of structural injustices, distinguishing between pure, avoidable, and deliberate instances. She argues that climate change exemplifies “pure” structural injustice, meaning its solution requires changing the entire socio-economic structure of a capitalist growth economy, with no singular agents capable of and thus morally responsible for such change.<sup>3</sup> Contrary to this characterization, this article argues that framing the climate crisis primarily as “avoidable” structural injustice offers a more precise and actionable perspective.

The basis for this thesis is a “window” of opportunity in the 1990s and early 2000s when international negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) began and gained momentum. During this time, states of the Global North, leading the climate conferences, could have set a trajectory for gradual decrease of global emissions without disruptive systemic shifts.<sup>4</sup> Moreover, fossil fuel companies, whose products are responsible for most of the greenhouse gas emissions since the Industrial Revolution, had both knowledge of the severity of the situation and resources to transform their business models into sustainable forms.<sup>5</sup>

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<sup>3</sup> Maeve McKeown, *With Power Comes Responsibility: The Politics of Structural Injustice* (London: Bloomsbury Academic, 2024), pp. 102–12. However, I do not necessarily disagree with McKeown, as she allows for different classifications in her analysis. Also, she acknowledges the past avoidability of climate structural injustice. I put emphasis on this avoidability and build upon that.

<sup>4</sup> A similar argument was made by American environmentalist Bill McKibben: “30 years ago, there were relatively small things we could’ve done that would’ve changed the trajectory of this battle”. See Dave Davies, “[Climate Change Is 'Greatest Challenge Humans Have Ever Faced', Author Says](#)”, *NPR*, April 16, 2019. Moreover, this failure is also described in some extensive reviews of climate policies, see: Isak Stoddard et al., “[Three Decades of Climate Mitigation: Why Haven’t We Bent the Global Emissions Curve?](#)”, *Annual Review of Environment and Resources*, vol. 46, no. 1 (18 October 2021), pp. 653–689.

<sup>5</sup> Nearly two-thirds of the carbon dioxide emitted since the 1750s can be traced to the 78 largest fossil fuel and cement producers, with more than half of the emissions produced in past 30 years, with full awareness of the potential dangers of climate change and with capacities and opportunities to change these companies’ business strategies. See Richard Heede, [Carbon Majors: Accounting](#)

However, both powerful states and fossil fuel companies refrained from action and continued business as usual, leading to the current situation where many devastating impacts are inevitable, and climate stabilization likely requires radical changes.<sup>6</sup> The fact that there was this window and the current precarious situation could have been avoided implies that these powerful actors are blameworthy for the failure.<sup>7</sup>

Blameworthiness leads to compensatory duties. Many scholars, politicians, and activists have been arguing that the powerful states of the Global North and fossil fuel corporations owe reparations for their historic emissions.<sup>8</sup> The advantage and novelty of the

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[\*for Carbon and Methane Emissions 1854–2010 – Methods & Results Report\*](#), 2014. Moreover, there have been clearly described sustained efforts of these companies to manipulate policymakers and the public through climate-denialist campaigns: See e.g. Naomi Oreskes and Erik M. Conway, [\*Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues From Tobacco Smoke to Global Warming\*](#) (Bloomsbury Press, 2010).

<sup>6</sup> Some authors indicate that the only feasible way to keep global warming under 1.5 degrees Celsius is to employ degrowth strategies, which entail scaling down unnecessary forms of production to reduce energy and material use and focusing economic activity around securing human needs and well-being. See Tim Jackson, [\*Post Growth: Life After Capitalism\*](#) (Cambridge, UK – Medford, MA: Polity, 2021); Jason Hickel, [\*Less Is More: How Degrowth Will Save the World\*](#) (2021).

<sup>7</sup> The argument that powerful states and corporations are responsible for the failure to solve avoidable structural injustice originates also from the work of Maeve McKeown. Structural injustice is avoidable “when the unjust outcomes of structural processes are foreseeable and there are agents with the capacity to remedy the injustice, but they fail to do so” (McKeown, *op. cit.*, pp. 109 f.). These actors bear moral responsibility and are blameworthy for not fulfilling it.

<sup>8</sup> For some theoretical grounds of the concept of climate debt in the context of states, see Jonathan Pickering and Christian Barry, “[On the Concept of Climate Debt: Its Moral and Political Value](#)”, *Critical Review of International Social and Political Philosophy*, vol. 15, issue. 5 (2012), pp. 667–85; Andrew L. Fanning and Jason Hickel, “[Compensation for Atmospheric Appropriation](#)”, *Nature Sustainability*, vol. 6, issue 9 (5 June 2023), pp. 1077–1086. – In the context of corporations, see Henry Shue, “[Responsible for What? Carbon Producer CO<sub>2</sub> Contributions and the Energy Transition](#)”, *Climatic Change*, vol. 144, issue. 4 (October 2017), pp. 591–596; Marco Grasso, [\*From Big Oil to Big Green: Holding the Oil\*](#)

structuralist approach is that it enriches the “statist” paradigm, which focuses primarily on compensatory payments, by introducing the concept of “structural compensations”.<sup>9</sup> In this view, injustice is not a separate event or particular wrongdoing for which compensation is owed but consists of the reproduction of social structures. Compensation, therefore, cannot be achieved by a single act but involves transforming the reproduced social settings that recreate and intensify injustice. In the context of climate change, this means, for instance, that fossil fuel companies would not only pay money to an international fund, but the aim of this reparative effort would be to transform their business models to be sustainable and decentralized, allowing disadvantaged groups to participate in and benefit from this new models.<sup>10</sup> The essential point here is that since climate change is

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[\*Industry to Account for the Climate Crisis\*](#) (Cambridge, MA: The MIT Press, 2022).

<sup>9</sup> The connection between compensations and historic structural injustice is developed in the context of colonialism by Catherine Lu, [\*Justice and Reconciliation in World Politics\*](#) (Cambridge, UK / New York, NY: Cambridge University Press, 2017). The concept of historic structural injustice and its reproduction is also examined in detail by Alasia Nuti, [\*Injustice and the Reproduction of History: Structural Inequalities, Gender and Redress\*](#) (Cambridge, UK: Cambridge University Press, 2019).

<sup>10</sup> This implies the abolishment of the fossil fuel industry in its current form. It may be argued that the claim that these companies are morally responsible for their own self-destruction is too harsh. However, I would counter that this need not be seen necessarily as self-destruction, but rather as a transformation to a different business model in which sustainable products are promoted and other groups, rather than a minority of extremely wealthy and powerful investors and owners, have a say in the operation of the company. To envision some alternative settings for energy production, see for example William Joseph Gillam, “[A Solarpunk Manifesto: Turning Imaginary into Reality](#)”, *Philosophies*, vol. 8, issue 4 (10 August 2023), p. 73. Another example of structural compensations at the level of Global North states could be a solidarity policy for climate migrants, their recognition, and integration. For this example, see Christine Straehle, “[Migration, Climate Change, and Voluntariness](#)”, *Ethics & International Affairs*, vol. 37, issue 4 (2023), pp. 452–469.

a case of structural injustice, the solutions cannot leave oppressive structures untouched. And since this injustice could have been partly avoided, the actors who should be extensively engaged in compensatory efforts can be clearly identified.





# **THE FUTURE OF EDUCATION**



*András Benedek*

## **Time and Visuality in Education – or Does AI Matter?**

### **Introduction**

Francis Fukuyama’s highly influential work, *The Great Disruption: Human Nature and the Reconstruction of Social Order*,<sup>1</sup> was published just a quarter of a century ago. Of course, the emergence and impact of the information society had already preoccupied scientists even before this, since the 70s, Alvin Toffler raised the topic in a broader perspective, and a complex approach in his work *Future Shock* considers the problem of adaptation to changes: “The people among us who keep up with change, who manage to adapt well, seem to have a richer, better-developed sense of what lies ahead than those who cope poorly. Anticipating the future has become a habit with them.”<sup>2</sup> In their book *Man and the Technological Society*, its authors, Metz & Klein, referring to engineers, point out: “engineering has contributed mightily to man’s arriving at such a state ... Although ... the application of technology cannot solve *all* of man’s problems (needs for companionship, love, etc.) it *can* remedy many of the everyday ones that most of us endure.”<sup>3</sup>

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<sup>1</sup> F. Fukuyama, *The Great Disruption: Human Nature and the Reconstruction of Social Order*, New York: The Free Press, 1999.

<sup>2</sup> A. Toffler, *Future Shock*, New York, NY: Bantam Books, 1971. In the version here linked, see p. 213.

<sup>3</sup> L. Daniel Metz – Richard E. Klein, *Man and the Technological Society*, Prentice-Hall, 1973, p. 12.

As Katz et al. mentioned, the perception of the future is now an everyday reality.<sup>4</sup> If we look at our characteristic images as a function of time, a unique tableau of images or bursts<sup>5</sup> takes shape. Expanding the framework, we are surrounded by more robots in the world of work, new technological solutions in social media, and new large systems and networks in finance and trade. Artificial intelligence (AI) illustrates both the necessity of our future orientation and the related dilemmas through the change in our perception of time and our views on imagery. Education provides a specific framework for all of this.

The transfer of AI from scientific laboratories to the focus of our everyday life draws the researcher's attention to the specific dynamic relationships of three concepts, given the accelerating nature of the process: Time, which nowadays seems to be speeding up extremely; visibility, which in some instances also means predictability of the future and "facing" changes; and education, as preparation for change, that is the possibility of developmental constructiveness inherent in adaptation; between these the analysis of correlations offers the researcher an exciting challenge.

## **History – the Effect of the VLL (Visual Learning Lab)**

The research continuously stimulated by Kristóf Nyíri<sup>6</sup> for a quarter of a century dealt with the problems of the mobile world and visual learning by analyzing the connections between the new networks and image constructions of 21st-century communication. How can we live in/with this mobile world, the multiplying systems of connections and experiences? How can we prepare the new generation for

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<sup>4</sup> J. Katz – K. Schiepers – J. Floyd, "Conclusion", in Katz et al. (eds.), *Perceiving the Future through New Communication Technologies*, Cham: Palgrave Macmillan, 2021.

<sup>5</sup> A-L. Barabási, *Bursts: The Hidden Pattern Behind Everything We Do*, London: Penguin Books, 2010.

<sup>6</sup> K. Nyíri (ed.), *Mobile Studies: Paradigms and Perspectives*, Vienna: Passagen Verlag, 2007.

an increasingly complex environment, even in its changes? Since 2010, a scientific dialogue focusing on the changing role of visibility has been built up at the Budapest Visual Learning Lab (VLL), in the framework of workshops and international conferences. The initial impact of the VLL process was the classic human communication practice formed at the international conferences, which are now serialized every two years, in addition to the direct laboratory discussions according to the planned topics held every two months. The objectification of this was realized by the series of English-language volumes initially published by Peter Lang between 2011–2017, with the studies and conference abstract volumes of the Visual Reading Lab Papers published between 2016–2018 connected to it.

Within the framework of our relatively short story, which also illustrates time dynamics, two crucial moments also represent stage boundaries. On the one hand, the 8th Budapest Visual Learning Conference (VLC8) held at the Hungarian Academy of Sciences in April 2018 was the opportunity for a thematic overview and specific synthesis, and the three synthesizing volumes of the first stage of the process were published under the serial title *Perspectives on Visual Learning*. One of these, entitled *Learning and Technology in Historical Perspective*,<sup>7</sup> has also been mentioned in a study by several speakers at our current conference. The reference to the antecedents of half a decade ago is also essential from the point of view of our shared history of development.

Communication has changed radically in recent years. Although we tend to point to the pandemic starting in 2020, the virtual communication that is by now present, the new type of human existence in the online space, and the AI applications already in everyday use today have brought us to the threshold of a new era. There is no doubt that after 2020, COVID-19 forced this communi-

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<sup>7</sup> A. Benedek – K. Nyíri (eds.), [\*Learning and Technology in Historical Perspective\*](#) (*Perspectives on Visual Learning*), Budapest: Hungarian Academy of Sciences / Budapest University of Technology and Economics, 2019.

cation process and the researcher's "network" into virtual space.<sup>8</sup> A new dialogue began, and new scientific actors, new phenomena, and connections came into focus. At the same time, the emphasis on the strategic importance of learning and education remained unchanged. With the continuity of education, the university learning space is open to hybrid solutions but faces new challenges.

## New Networks and New Nodes

The thematic network edited by Kristóf Nyíri shows a specific micro-pattern, which shows the authors' thoughts on the current conference in contexts that keywords can also perceive. Perceived at the abstract level, for example, Theo Hug's *Robots as Teachers?* entitled *Perspectives on Media Education in the Age of Machine Learning*. According to my theme, *Time and Visuality in Education*, this network of topics (see the conference website) shows a peculiar image: there are connections to *Visual Turn* (Michalle Gal), to *multimedia learning in the AI age* (Xu Wen), by implementation of *multimodal learning mobilizing the inner Imagination* (Júlia Anna Szabó) and again (Theo Hug), who mentioned digital education, AI literacy, teacher robots.<sup>9</sup>

The traditional learning objects have become educational technology units for teachers and students due to multimedia developments thanks to audiovisual tools. An accelerating process that took a noticeable turn after the turn of the millennium: a mass of educational mobile applications are available to provide practical answers to special needs online. The number of mobile applications is constantly increasing. Millions of applications are available on various computer platforms (Android, iOS). In 2022, downloaded applications worldwide exceeded 220 billion, with an estimated 5 million

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<sup>8</sup> P. Aczél – A. Benedek – K. Nyíri (eds.), *How Images Behave*, Budapest: Hungarian Academy of Sciences / Budapest University of Technology and Economics, 2020.

<sup>9</sup> Cf. the ENVISIONING AN ELECTRIFYING FUTURE, 11th Budapest Visual Learning Conference website: [http://www.hunfi.hu/nyiri/EEE/EEE\\_Opening\\_page.pdf](http://www.hunfi.hu/nyiri/EEE/EEE_Opening_page.pdf).

applications available in Google Play and the Apple Store. While only a tiny fraction of these are specifically for educational purposes, many training tools can be associated with applications that surpass traditional illustrative tools. Some important questions: How do these training tools intersect with online collaborative learning? This is a crucial focus of our discussion.

## **New Dilemmas – New Questions**

Turing’s classical test was created from the narrow laboratory environment of computer technology, and nowadays, with the development of everyday application technology, the basis of applications spread at dizzying speed. Automated components of knowledge representation based on natural language accelerate inference-based machine learning. The supercomputers available based on today’s colossal server systems, machine vision creating new frameworks for visuality, and “creation” in 2024 led to the Nobel committees recognizing the transformative power of artificial intelligence (AI) in two of this year’s prizes – honoring pioneers of neural networks in the physics prize, and the developers of computational tools to study and design proteins in the chemistry prize.

According to our current knowledge, the application of AI in education, in particular higher education, can be considered relevant in the following areas: Encouraging the use of digital learning resources/textbooks (reducing the need for paper and physical materials or creating personalized teaching materials), broadcasting multimedia content and ensuring its access.

- Application of online and hybrid/mixed education methods: Promotion and combination of interactive/collaborative methods of different education methods, as well as the introduction of generative AI and the creation of virtual classrooms (making online learning more efficient and sustainable).

- Institutional policy development and ethical considerations: Re-regulation of institutional frameworks (e.g., integration of sustain-

ability in various decision-making processes, development of community services).

- The introduction of generative AI tools to facilitate long-term sustainability planning and the use of AI to simulate the outcomes of different decisions. Ensuring that the use of AI in sustainability initiatives is consistent with ethical standards, ensuring inclusivity and responsible decision-making;

- Research studies and collaboration: Conducting longitudinal studies can provide insight into the topic over time. The use of AI can promote interdisciplinary research collaboration by promoting partnerships between academia and industry, they can help solve real sustainability problems.

Finally, a general remark to be considered during the current wayfinding: Starting from the fact that AI handles irony uncertainly based on professional analyses, this paper calls attention to a new innovative approach from the point of view of pedagogical thinking: *Constructive Reflection*. This approach accepts that our knowledge of the past is an essential point of reference. Generative AI can give complex answers to prompts very quickly in our present, which is based on massive databases and super-fast computers. But what about the future? How can effective operational plans match goals set in the near and distant future? Presumably, it creates an opportunity to develop a new key competence or critical skill in human thinking, intuition, and future-oriented construction. In this process, the specific projecting of time and visuality can give a chance to renew the traditional frameworks of learning and education.



*Theo Hug*

## **Robots as Teachers? Perspectives on Media Education in the Age of Machine Learning**

The widespread rhetoric and programs of digitalization in education have recently been joined by an increasing emphasis on AI, robotics and big data. Keywords such as “digital education”, “AI literacy”, “futures literacy”, “teacher robots” or “learning analytics” refer to international discourses and developments that have become globally significant. The focus is often on future promises in terms of learning technologies that emphasize the advantages of automation, datafication<sup>1</sup>, digitalization and AI for teachers and learners as well as for educational institutions and researchers. The metaphorical content and reductionist tendencies connected with such expressions are rarely reflected upon in a detailed manner. This applies in particular to ideas of robots as teachers.<sup>2</sup>

Typically, studies on automation in or of education refer to information technology (IT) developments which began in the second half of the 20th century.<sup>3</sup> In so doing, the long history of imagined, conceptualized and field-tested automation in education and learning is widely underestimated both in e-Learning debates as well as in more recent discourses about digital education. This applies to his-

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<sup>1</sup> Sandra Hofhues – Andreas Breiter (eds.), [\*Datafizierung \(in\) der Bildung: Kritische Perspektiven auf digitale Vermessung in pädagogischen Kontexten\*](#), Bielefeld: Transcript, 2023.

<sup>2</sup> Neil Selwyn, *Should Robots Replace Teachers? AI and the Future of Education*, Cambridge, UK: Polity Press, 2019; Theo Hug, “Roboter als Lehrkräfte? Kritische Erwägungen aus der Perspektive der Medienbildungs- und Metaphernforschung”, in Michael Funk (ed.), *Informatik und Gesellschaft – Ein umfassender Grundkurs*, Wiesbaden: Springer Vieweg, 2024 (forthcoming).

<sup>3</sup> See, for example, Kazuyoshi Ishii – Kinnya Tamaki, “Automation in Education/Learning Systems”, in Shimon Y. Nof (ed.), [\*Springer Handbook of Automation\*](#), Berlin – Heidelberg: Springer, 2009, pp. 1503–1527.

torical aspects that go back at least to the experimental work of Heron of Alexandria, various “machine dreams”<sup>4</sup> and “desired worlds”<sup>5</sup> as well as to explicit imagery of educational automation (see Figure 1) and to implicit assumptions of quasi-automatic effectiveness of reading classical literature.<sup>6</sup> This also applies to systematic aspects including explicit conceptualizations of educational algorithms<sup>7</sup>, effective educational forces, the role of automatism as related to self-technologies<sup>8</sup>, technological deficiencies in education<sup>9</sup> as well as to pedagogical paradoxes of openness and unavailability of educational processes versus computable outputs and the calculated fabrication of skills and competences.

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<sup>4</sup> Frank Wittig, *Maschinenmenschen: Zur Geschichte eines literarischen Motivs im Kontext von Philosophie, Naturwissenschaft und Technik*, Würzburg: Königshausen & Neumann, 1997.

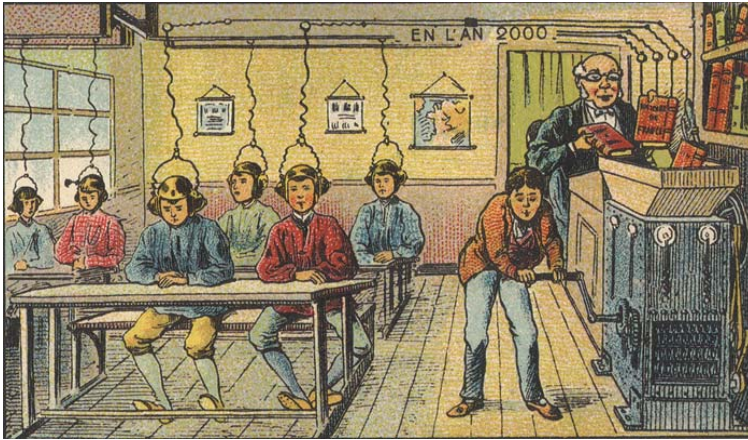
<sup>5</sup> Kurt Stadelmann et al. (eds.), *Wunschwelten: Geschichten und Bilder zu Kommunikation und Technik*, Zürich: Chronos Verlag, 2000.

<sup>6</sup> Stefan Kipf, “[ad fontes? Überlegungen zur Begründung der Originallektüre im altsprachlichen Unterricht](#)”, *Pegasus-Onlinezeitschrift*, vol 5, issue 2+3 (2005), pp. 1–13.

<sup>7</sup> Tim Böder – Jeanette Böhme, “Bildungsalgorithmen. Rekonstruktive Explorationen zur Konstitution von Formenalgorithmen individuierter Fallstrukturgesetzmäßigkeiten in raumzeitlichen Sinnordnungen von Orten und Regionen”, *Zeitschrift für Qualitative Forschung*, vol. 24, issue 3 (2023), pp. 212–232.

<sup>8</sup> Hannelore Bublitz et al. (eds.), *Automatismen – Selbst-Technologien*, W. Fink, 2014.

<sup>9</sup> Niklas Luhmann – Karl E. Schorr, “Das Technologiedefizit der Erziehung und die Pädagogik”, in Luhmann – Schorr (eds.), *Zwischen Technologie und Selbstreferenz: Fragen an die Pädagogik*, Frankfurt am Main: Suhrkamp, 1982, pp. 11–41.



*Figure 1: En l'an 2000, A l'Ecole, 1900-1906: Section of the chromolithograph by Pierre Vieillemand and Sons (Source: Ji-Elle, CC BY-SA 4.0). <<https://creativecommons.org/licenses/by-sa/4.0>>, via Wikimedia Commons)*

Recently, two developments have become apparent that favor instrumental perspectives of educational technologies and come up with new technological promises without critically examining the old ones. On the one hand, this concerns approaches and programs that consider machine learning not only as an object of computer science, but also as a basic principle of institutionalized educational processes in general. On the other hand, this concerns developments that attribute a secondary importance to concepts and programs of critical media education compared to the promotion of digital literacy and AI literacy.

The former is nowhere more evident than in the context of efforts to implement social humanoid robots as teachers. For example, Bosede and Cheok argue “for a future classroom with independent robot teachers, highlighting the minimum capabilities required of such personalities in terms of personality, instructional delivery, social interaction, and affect”.<sup>10</sup> Moreover, following William Diprose

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<sup>10</sup> Edwards Bosede – Aadrian D. Cheok, “Why Not Robot Teachers: Artificial Intelligence for Addressing Teacher Shortage”, *Applied Artificial Intelligence*, vol. 32, issue 4, pp. 345–360 (2018), the quoted passage on p. 345.

and Nicholas Buist, they claim: “Employers are bound to be more favourable to non-human teachers who will have no need for job dissatisfaction, recognition, remuneration or for autonomy, leaves, rests and above all, who are not limited by natural affective demands like changes of mood, anger, tiredness, etc.”<sup>11</sup>

Here, as in many other AI discourses,<sup>12</sup> numerous figurative language expressions and misleading metaphors are utilized. At first glance, these parlances suggest opportunities for cross-sectoral understanding and future-oriented educational development at the interfaces between pedagogical-practical, organizational, political, economic and academic activities. On closer inspection, however, they prove to be problematic. On the one hand, this concerns reductionist notions of education that focus on formalizable, measurable and controllable development of specific sets of skills and competencies in the service of industrial interests without addressing broader concepts of education.<sup>13</sup>

On the other hand, societal, organizational and individual areas of tension, conflicting goals and pedagogical paradoxes are unilaterally resolved without a differentiated debate. This applies in particular to the following issues:<sup>14</sup>

- attributions of human-like traits to machines, automats and robots (anthropomorphisms) as well as attributions of machine- or robot-

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<sup>11</sup> *Ibid.*, p. 347.

<sup>12</sup> Arne Manzeschke – Bruno Gransche, “[Bilder machen Menschen: Zur Bildermacht der Künstlichen Intelligenz](#)”, in Michael Heinlein – Norbert Huchler (eds.), *Künstliche Intelligenz, Mensch und Gesellschaft*, Wiesbaden: Springer VS, 2024, pp. 109–130.

<sup>13</sup> Among others, broader concepts of education can refer to the self-reflexive enhancement of scopes for designing self-, social- and world-relations, the individual and collective transgression of theological, political, historic and economic disguise against the background of claims of enlightenment, the individual and collective development of capacities for free speech and democracy, to meta-reflexive learning abilities and dealing successfully with cultural diversity and societal restraints, or the self-construction as a human being in interaction with the world, other humans and non-human actors.

<sup>14</sup> Hug, *Roboter als Lehrkräfte?* (forthcoming).

like traits to humans (robomorphisms) without further ado,

- monetization of digital interfaces and economic consideration of pedagogical constellations versus humanization of digital interfaces and anthropological reflection of changing media constellations,
- pedagogically motivated robotics, waiving differentiated anthropocentric or post-anthropocentric justifications and their relevance in media educational contexts,
- data-driven teaching action as socio-cybernetically oriented, mechanized process optimization of learning and examination processes versus professional teaching action as theoretically sound, didactically justified, independent, norm-oriented, situation-related, non-technical application of knowledge,
- recognition of the importance of purpose-free educational spaces versus assumptions of comprehensive disposability of learning and educational processes of individuals and groups,
- co-creative design principles and open-source software for open learning environments including human and non-human actors, versus education industry prefabricated learning arrangements based on proprietary software, non-transparent metrics and profit-oriented strategies of the global media industries,
- cultivation of knowledge diversity and recognition of the problem-solving relevance of different forms of knowledge versus formalization, uniformization and functionalization of specific forms of knowledge and educational content.

The list of issues could be continued, for example, as regards paths of innovation and path dependencies or dynamics of openness and closure.

Similar issues are relevant in the context of the promotion of AI literacy in formal and informal contexts. While it is widely taken for granted that AI literacy should be considered in curricula on a mandatory basis at least in higher education, although the question of what can be specifically understood by AI literacy is not answered consistently. Long and Magerko define AI Literacy as a “*set of com-*

petencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace”.<sup>15</sup> They situate AI literacy in the context of other literacies, particularly digital literacy, data literacy, computational literacy and scientific literacy. As a result of an analysis of 150 thematically relevant documents, they distinguish 17 competencies and 15 design aspects (see Figure 2).



Figure 2: “AI Literacy – Competencies and Design Considerations”, by Long and Magerko.  
 (Source: <https://aiunplugged.lmc.gatech.edu/ai-literacy/>.)

Similarly, Davy Ng et al. emphasize that AI skills should be part of basic education for everyone in the 21st century and should be taught comprehensively and in an age-appropriate manner.<sup>16</sup> However, from the perspective of media educational research in-

<sup>15</sup> Duri Long – Brian Magerko, “[What is AI Literacy? Competencies and Design Considerations](#)”, in Regina Bernhaupt et al. (eds.), *Proceedings of the 2020 CHI Conference on Human Factors in Computer Systems*. New York, NY: Association for Computing Machinery, 2020, pp. 1–16, here p. 2 (italics in orig.).

<sup>16</sup> Davy Tsz Kit Ng et al., “[Conceptualizing AI literacy: An Exploratory Review](#)”, *Computers and Education: Artificial Intelligence*, vol. 2, 100041, pp. 1–11 (2021), pp. 9 f.

formed by theoretical considerations at the crossroads of education, media and knowledge, a number of desiderata can be pointed out in the AI literacy discourses including the following:<sup>17</sup>

- The term AI literacy is widely used in the sense of a metaphorical application of concepts and social practices of reading and writing to dealing with the data and information processing systems that are commonly associated with the term artificial intelligence today. The metaphorical content and the modalities of the figurative transfer of the original contexts of meaning are not reflected upon.
- Even if the AI literacy discourses discussed focus on teachers, decision-makers and non-technical learners in a broad sense, from a systematic perspective the question of determining the relationship between issues of literacy, picturacy, numeracy and mathemacy remains open.
- In the AI literacy discourses, educational theory as well as references to the corresponding media education discourses do not play a role. The bundling of skills and competencies consistently focuses on quantitatively and empirically measurable outputs. There is no theoretically informed definition of the relationship between education, learning, knowledge, competence, literacy and skills.
- The favored tool perspective on AI in AI literacy discourses corresponds with an underestimation of historical, socio-technical, social and media-cultural dimensions of AI developments. Issues of political economy and sustainability are not or only insufficiently considered. Ethical aspects are mentioned throughout, but their significance is not treated appropriately and is comparatively under-complex. Correspondingly, concerns of knowledge diversity and the recognition of the problem-solving relevance of different forms of knowledge are also among the de-

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<sup>17</sup> Theo Hug, “Desiderata der AI-Literacy-Diskurse”, in Hug et al. (eds.), *Künstliche Intelligenz im Diskurs: Interdisziplinäre Perspektiven zur Gegenwart und Zukunft von KI-Anwendungen*, Innsbruck: iup, 2024, pp. 129–148.

siderata in AI literacy discourses.

- AI literacy discourses focus on conscious and intentional processes of promoting AI-related skills development. Various references are made to learning and cognitive psychology, but not to social and depth psychology. Unconscious processes do not play a role in these discourses, although relevant points of contact could contribute to a deeper understanding of learning and educational processes.<sup>18</sup>

The conclusion remains ambivalent in several respects. The mentioned discourses on AI literacy and educational robotics certainly provide relevant impulses for debates on questions of contemporary education. They can be seen as programmatic attempts to respond to the functional and reproductive requirements of societal systems. Thereby, technological, economic, educational, organizational and pedagogical AI topics are linked in the sense of a promise for the future in a broadly effective way using figurative language and metaphorical expressions. As we know, aspects of learning can refer to more or less permanent changes of human behavior, attitudes, values, mental abilities, task performance, cognitive structures, emotional reactions, action patterns as well as generational, organizational or societal dynamics. It is not surprising that the term learning has been used to ascribe changes in the context of machine behavior, too. Current characterizations – like “[m]achine learning denotes artificial systems whose behavior is determined by data and not by algorithms. ... A conventional computer program runs an algorithm to solve a given task directly; a machine-learning system runs algorithms to train and apply a machine-learning model to solve this task”<sup>19</sup> – refer to computational dimensions of problem solving.

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<sup>18</sup> Cf. Isabel Millar, *The Psychoanalysis of Artificial Intelligence*, Cham: Springer, 2021.

Luca M. Possati, *The Algorithmic Unconscious: How Psychoanalysis Helps in Understanding AI*, London: Routledge, 2021.

<sup>19</sup> Justus Piater, “Funktionsweise, Möglichkeiten und Grenzen generativer KI”, in Hug et al. (eds.), *Künstliche Intelligenz im Diskurs, op. cit.* (cf. note 17 above), pp. 17–28, the quoted passage on p. 18.



Typically, they do not reflect on issues of the figurative transfer of learning concepts from one field to another, instructive and obscuring aspects of metaphors, or economic and political dimensions of the use of such terms.

To the extent that the efforts to promote AI literacy and the use of robots as teachers are close to socio-technological variants of shaping the future, they are in conflict with claims of openness to the future and the promotion of transformational potential. This applies in particular to the development of learning systems that are based on a structural similarity between human and machine learning. We should rather distinguish between different meanings of machine learning such as learning of, like, with, about or through machines, and also between basic understandings of learning.<sup>20</sup> Not least, interdisciplinary media education research can show ways out of the trap of AI marketing and one-sided, simplistic ways of thinking and techno-feudalistic dead ends.

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<sup>20</sup> Such understandings include, for example, processes of building up and organizing knowledge, processes of transformation in specific contexts of meaning-making, or processes enabling or leading to relative permanent capacity changes beyond “pure” biological maturation or aging.



*Anna Chiara Sabatino – Paola Lamberti*

## **Digital Media Education and Participatory Methods Teachers and Students in the (Audiovisual) Field**

For a long time, educational institutions have adopted passive teaching methods, with rather middling results in terms of knowledge, competence and skills implementation.

Recent qualitative studies in small groups of students, both pre-school and university age, although referring to different disciplinary fields and educational contexts, have highlighted the benefits of adopting participative methodologies instead of the traditional one-directional learning method.<sup>1</sup> These researches proved that participation, on the one hand, stimulates independence and creativity, on the other hand, positively impacts on stress reduction and promote learning motivation by encouraging the team work.

In this framework, instead of placing above the students, the teacher becomes a facilitator, conducting and assisting the process of “learning by doing”<sup>2</sup>. Adequate preparation of teachers, both in terms of study content and learning methodologies, is crucial. Theory combined with practice leads to numerous benefits: it stimulates the implementation of knowledge and skills, greater involvement and also greater cooperation among students in learning, as well as students’

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<sup>1</sup> M. Rubio et al., “[The Impact of Participatory Teaching Methods on Medical Students’ Perception of Their Abilities and Knowledge of Epidemiology and Statistics](#)”, *PLOS ONE*, vol. 13, issue 8 (2018), pp. 1–12; A. Burgess et al., “[Team-based Learning: Design, Facilitation and Participation](#)”, *BMC Medical Education*, vol. 20, article no. 461 (2020), pp. 1–7.

<sup>2</sup> A. Kurcharčikova – E. Tokarčikova, “[Use of Participatory Methods in Teaching at the University](#)”, *The Online Journal of Science and Technology*, vol. 6, issue 1 (2016), pp. 82–90.

relational skills and the subjectivization and self-construction process improvement.

Within an apparent more democratic “social” mediascape, relevant questions arise regarding the possible profitable combination between educational methodologies and participatory digital storytelling methods.

Interesting results can be produced by experimenting with the use of participative methodologies involving the digital audiovisual technologies in educational university context: this generation not so long ago experienced the side effects of a unilateral didactics (due to the stringent rules in the pandemic period), and it appears prepared to embrace the project and the process of projecting and applying a more participatory learning/teaching methodology, even more through the use of online social media platforms and digital mobile technologies they are familiar with.<sup>3</sup> Digital media use by students and teachers who are not necessarily expert in audiovisual production can be categorized as a peculiar form of amateur filmmaking, and can therefore be designed, pursued and analyzed as such.<sup>4</sup>

In the field of media studies, innovative approaches in traditional teaching methodologies are desirable, especially where audiovisual languages and studies technologies are inherent in the courses (communication, film, radio, television, social media, journalism, public relations). In this perspective, a participatory implementation

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<sup>3</sup> H. Jenkins – M. Ito – D. Boyd, *Participatory Culture in a Networked Era: A Conversation on Youth, Learning, Commerce, and Politics*, Cambridge, MA: Polity Press, 2015; M. Schleser, “[Smart Storytelling](#)”, *Studies in Documentary Film*, vol. 16, issue 2 (2022), pp. 97–113.

<sup>4</sup> L. Rascaroli – G. Young – B. Monahan (eds.), *Amateur Filmmaking: The Home Movie, the Archive, the Web*, London: Bloomsbury, 2014.

of educational techniques and tools can be a valuable resource in technology-enhanced learning and teaching methodologies, in particular regarding digital and mobile storytelling.<sup>5</sup>

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<sup>5</sup> C. Nicolaou – M. Matsiola – G. Kalliris, “[Technology-Enhanced Learning and Teaching Methodologies through Audiovisual Media](#)”, *Education Sciences*, vol. 9, issue 3 (2019), pp. 1–13.



*Neville Chi Hang Li*

## **Technological Takeover in Education: Frankenstein or the Modern Prometheus?**

Experimental technology is taking over our classrooms. While attention has been drawn towards generative artificial intelligence (AI) and plagiarism in academia during the rise of ChatGPT, more profound changes are slowly but certainly altering the landscape of education.

In 2019, the *Wall Street Journal* (WSJ) filmed a documentary about an experimental system combining AI, facial recognition, neuroscience, and big data in China's primary schools. The almighty education system is designed to boost students' academic performance by monitoring their biological data such as eye movements, gestures, and concentration levels.



*Electroencephalographic headbands are used to track primary students' concentration level*

(Source: WSJ - [How China is Using Artificial Intelligence in Classrooms](#))

Students' data are summarized in real-time so that teachers can call out the students who are losing focus. In addition, a report detailing each student's biodata will be generated after class and both teachers and parents will have access to the document. This data-sharing practice aims to provide additional metrics for parents to understand the comparative performance of their children and to pressure them to be more competitive.

Not only students are at the mercy of the experimental system, as teachers appear to be the latest victims who are subject to technological judgment. The Central China Normal University has recently showcased an AI-integrated classroom technology in an exchange with the Hong Kong Education Bureau (HKEB). On the one hand, eye tracking and gesture recognition capture teachers' biological data such as the percentage of time they look at their students. On the other hand, the system gains audio recognition capacity to identify the sentence structure, word choice, presentation structure and tone of voice of the teachers.



*Teachers are also being recorded and evaluated*  
(Source: [Hong Kong Economic Times](#))

The AI system will analyze the big data and categorize educators into different types of teachers, e.g. lecture, conversational, kinesthetic and hybrid types.<sup>1</sup> HKEB did not comment on whether there is an official/ideal way of teaching, yet it claimed that the exchange has yielded positive fruit for evaluating teaching performance more effectively.

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<sup>1</sup> There is no indication that these teaching types are based on existing education theory, even though the categorization reassembles some similarities of the Visual, Read/Write, Aural and Kinesthetic (VRAK) learning style in Neil D. Flemin and Colleen Mills, "[Not Another Inventory, Rather Catalyst for Reflection](#)", *To Improve the Academy*, vol. 11, issue 1 (1992), pp. 137–155.



These AI-integrated education systems share a lot of similarities with the social credit system, another technology-driven initiative that has been pilot testing for years in China.<sup>2</sup> Both systems are powered by information technology to collect and accumulate big data on their target population, forging a carrot-and-stick system to facilitate “desirable” behaviors. In education, sharing data collected from children not only sparked ethical and privacy concerns, but an even bigger problem lies in the big data-enabled approach that quantifies education into mere numbers.

The Frankenstein AI education system is watching and listening to us in our classrooms. Will everyone in class be required to maintain a consistently high level of concentration soon? In the case of China, it seems that there is no need for any black-and-white rules as people are embracing the practice of big data quantification to boost academic performance.

Is this the Modern Prometheus in education we are looking for?

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<sup>2</sup> For more information about the Chinese Social Credit System, see for examples, Katja Drinhausen, “[China’s Social Credit System in 2021: From Fragmentation towards Integration](#)”, *China Monitor*, Berlin: Mercator Institute for China Studies, 2022; Mareike Ohlberg, Shazeda Ahmed and Bertram Lang, “[Central Planning, Local Experiments: The Complex Implementation of China’s Social Credit System](#)”, *China Monitor*, Berlin: Mercator Institute for China Studies, 2017.



*Róbert Tardos*

## **The 2022 PISA Puzzle – Online/Offline, Covid and Beyond**

1. The shocking results of the last international PISA survey of 15-year old students' educational competences highlighting a significant decline in the disciplines of math and reading in most of the participant countries have been followed by a variety of interpretations on the reasons of these failures. Most of the explanations have pointed to the ubiquitous circumstance of lengthy school closures evoked by consecutive Covid waves, alongside with the unplanned introduction of online teaching. This line of reasoning has also been supported by various reviews on the growth of learning inequalities related to the pandemic and deficient new media capacities.<sup>1</sup> The relatively stable PISA scores of science skills exhibit, however, a contradictory point, just like a downward trend of math and reading assessments already present in the previous decade, with some of the achieving regions and formerly best-practice cases markedly including a timeline coincidence of the rise of smartphones and social media and an increase of teenagers' mental disorders in the U.S. and elsewhere too, which induced some commentators like the social psychologist J. Haidt to link the puzzling test experiences with changes in school and peer milieu in the wake of digital transformations.<sup>2</sup> Though prominent PISA-analyses like those by A. Schleicher<sup>3</sup> have not directly con-

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<sup>1</sup> The study by Á. Kende et al., "[Hátrányos helyzetű tanulók digitális oktatása a koronavírus okozta iskolabezárás idején](#)", *Iskolakultúra*, vol. 31, no. 2 (2021) took account of related experiences in the Hungarian case.

<sup>2</sup> See the paper by Jonathan Haidt with a team of co-authors, "[Worldwide Increases in Adolescents' Loneliness](#)", *Journal of Adolescence*, vol. 93 (2021), and his essay "Why the Past 10 Years of American Life Have Been So Uniquely Stupid", *The Atlantic*, April 11, 2022.

<sup>3</sup> See the comprehensive review by Andreas Schleicher based on the 2022 PISA survey "[Insights and Interpretations](#)" (2022).

tributed to these assumptions, the newly introduced survey details on pupils' feelings of social isolation shed further light on developments of the educational atmosphere.<sup>4</sup>

2. The question may be raised whether the new-media-related framings of controversial youth issues might engender criticisms close to earlier blames of moral panic concerning some old-media theories of strong effects. In looking for an answer, additional evidence related to the PISA design may be of help and give food for speculation across a series of conjectures. A set of these findings derives from a recent extension of the survey apparatus toward the realm of creative thinking in the token of a newer current with the objective of a broader scope of measurement of proficiencies from the “three R’s” (reading, writing, arithmetic) toward the “four C’s” of creativity, complexity, curiosity and cooperation.<sup>5</sup> Though time series are not available as yet, furthermore, media aspects are not directly involved, the results as a large whole alongside with some notable specificities<sup>6</sup> offer certain insights in the above respects as well. In spite of a lack of previous data, some rearrangement of the upper echelons of countries in comparison with results in math and reading (the top ranks of which had been occupied by participants from the emerging Far East), an array of Scandinavian and Anglo-Saxon countries exhibited generally high scores regarding the newly surveyed creative aspects, while some of the Chinese-speaking countries/participants came up with relatively moderate performances; an observation not quite in accordance with the above noted trends.

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<sup>4</sup> Adding further evidence to Sherry Turkle's observations in *Alone Together: Why We Expect More from Technology and Less from Each Other*, New York: Basic Books, 2011.

<sup>5</sup> For a review of these foci of literature see Judit Lannert, “[A magyar tanulók digitális írástudása a 2012-es PISA adatok alapján](#)”, *Oktatás–Informatika*, vol. 4, no. 2 (2014).

<sup>6</sup> See “[Creative Minds, Creative Schools](#)”, under the aegis of *PISA 2022 Results*, vol. III.

3. Further shades appear in the light of gender differentials confirming in a way the recent pattern of gaps (with girls at the top of reading markedly offsetting some trailing in math). Girls' advantage in respects of creative thinking come to the surface most pronouncedly with regard of verbal expression, respectively conceptual diversity and social problem solving, and to a lesser degree with conceptual originality and scientific problem solving. These tendencies are sharply exhibited by the Finnish case earlier excelling with regard to most PISA aspects and recently exhibiting a conspicuous decline, especially what concerns the achievements of schoolboys. Studies from various disciplines from pedagogy to media and anthropology suggest a combination of recent developments resulting in this pattern of gender peculiarities; a complex mix of factors that deserves further scrutiny even if a causal dissection of various components may prove a hard job, apart from the needs of relevant data sources. Just for a touch of plausible effects, a divergence of motivations concerning the conformity to school norms<sup>7</sup> may be considered in conjunction with a differential set of career aspirations with special regard to prospective life scenes of local or more global character (the latter rather pertaining to schoolgirls' imageries), a phenomenon observed by various Nordic studies in the last decades,<sup>8</sup> just like a record of Scandinavian lead at various phases of the digital penetration and a female prevalence with some online activities, among them social

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<sup>7</sup> See the study by Minna Torppa et al., "Can We Explain the Large Gender Gap in PISA Reading Performance? The Finnish Enigma Demystified" (2023 – preprint, search the web for this title), or, under different cultural settings, the research findings by S. Soeherto and B. Csapó, "[Building a House from Lego Blocks: Using Cross Cultural Validation to Develop the Constructed Motivation Questionnaire \(CMQS\) in Science](#)", *Pedagogika*, vol. 142, no. 2 (2021).

<sup>8</sup> The catch-word "Jokkmokk-effect" was introduced with a reference to the gender divergence of school behaviour and later career aspirations with a more global perspective on the girls' part that was observed by some local case studies in the Finnish countryside (but accompanied by other Nordic, e.g. Icelandic experiences too), see e.g. R. F. Ólafsson et al., "[Gender and the Urban-rural Differences in Mathematics and Reading: An Overview of PISA 2003 Results in Iceland](#)", 2007.

media inclusion connecting to wider collectives.<sup>9</sup> But recent studies, among them Hungarian ones from the Covid period, also add to the observations of emerging gender characteristics with regard to mobile and social media.<sup>10</sup>

4. Some authors tend to interpret the cases of declining performances in the frames of dwindling achievement motivation contrary to their McClelland-like ascendance.<sup>11</sup> Kin observations on some halt or reversal of cognitive capacities as assessed by the standard IQ-measure in some of the mature welfare regions seem somewhat fuzzy<sup>12</sup> and out of the immediate concerns of this paper anyway. Some cultural implications are of more direct interest though, like those related to

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<sup>9</sup> See the recent reviews in this regard by M. López-Martínez et al., “[Digital Gender Divide and Convergence in the European Union Countries](#)”, *Economics*, Dec. 31, 2021, or by S. Lythreathis et al., “[The Digital Divide: A Review and Future Research Agenda](#)”, *Technological Forecasting and Social Change*, vol. 175, Feb. 2022. The study by K. Csüllög, “Online and Offline Relationships: The Role of the Internet and Other ICTs in Private Social Networks” (PhD dissertation, Budapest, 2013) also found a positive tendency of females’ employment of digital facilities.

<sup>10</sup> While under the aegis of a large-scale international cooperation J. Van Breen et al., “[Lockdown Lives: A Longitudinal Study of Inter-relationships among Feelings of Loneliness, Social Contacts, and Solidarity during the COVID-19 Lockdown in Early 2020](#)”, *Personality and Social Psychology Bulletin*, vol. 48, issue 9 (2022) found massive evidence of isolation among crises-hit populations, a study going into network and media specifics by F. Albert et al., “[A közeli kapcsolathálózatok mintázatai a Covid19-járvány idején a magyar aktív korú felnőtt lakosság körében](#)” (2022) came up with results suggesting some success in transposing offline relationships to online channels, among female respondents in the first place.

<sup>11</sup> See the findings and interpretations highlighting the role of low-risk test situations for the Finnish case by M-P. Vainikainen et al., “[Three Studies on Learning to Learn in Finland: Anti-Flynn Effects 2001–2017](#)”, *Scandinavian Journal of Educational Research*, vol. 66, issue 1 (2022).

<sup>12</sup> E. Dutton et al., “[The Negative Flynn Effect: A Systematic Literature Review](#)”, *Intelligence*, vol. 59, Nov.–Dec. 2016, contains a review of controversial evidence on the “reverse Flynn-effect” (called after the observations by Flynn on a gradual increase of IQ-based cognitive skills and some later findings suggesting a contrary trend).

an ascent of values of expression and self-realization in comparison to more immediate concerns of survival and their generally instrumental skill prerequisites.<sup>13</sup> Although the universality of such a post-materialist-like trend is questionable at least, its partial validity pertaining core regions seems more solid, a development by all probabilities also related to labour market needs and career perspectives as a generative component of the whole PISA-design as well.<sup>14</sup>

5. A further line of inquiry may tackle the diversification of new media facilities with implications to educational milieus and gender specificities as well. While initial treatments of digital gender gaps spoke of level-1 divides related to differential IT-access and a level-2 ones regarding various use proficiencies (of more moderate gaps in comparison with the traditional disparities), recent interests increasingly focus on some qualitative features of IT-use (involving a trend from desk computers to smartphones pointing to mobile media and widening platforms of social networking).<sup>15</sup> Related statistics speak of some bifurcation along the gender line indicating a female prevalence of self-expression and social interaction via channels like Instagram, LinkedIn or Snapchat. Darker sides of these social media

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<sup>13</sup> Philipp Hübl in his paper “[The Culture of Openness: How Creativity Fosters Moral Progress](#)” (2022), in a volume on arts and education, even speaks of a kind of “aesthetic capitalism” prioritizing creativity and innovation.

<sup>14</sup> It would stretch our limits to go into detail concerning some global and regional implications of a sort of international division of labour, from primary trades to tertiary ones, more or less corresponding to the larger zones of PISA achievement among the participant countries/regions. Some emerging regions present, though, an increase of manifestations (from Alibaba to TikTok) in an effort to occupy newer positions among the ascending sectors as well; just as top countries with the newer PISA aspects of creative thinking like Singapore and South Korea, exhibit an extension of educational gravities from science-related STEM subjects to a STEAM direction with putting more emphasis on aesthetic training too.

<sup>15</sup> The study of E.-Á. Horvát and E. Hargittai, “[Birds of a Feather Flock Together Online: Digital Inequality in Social Media Repertoires](#)”, *Social Media + Society*, 2021, approaches digital gaps from a newer perspective of clustering of various IT-channels according to the interplay of their genre and the respective users’ activities.

developments have also received research attention with indications of the increased occurrence of the phenomena of cyberbullying among female adolescents not only in the victims' but partly the initiators' role too.<sup>16</sup> The latter observations already point to the concerns raised regarding certain changes in school milieu; an issue leading closely back to the introductory remarks of this paper with special regard to Haidt's distinguished attention to rising symptoms of mental disorders among adolescents, especially girls of the respective cohorts.

6. Though the problems attached to some disfunctions of social media do deserve special attention and putting them into highlight is certainly welcome, the very set of the above factors, not to speak of the complexity of their interplay, tells against a reduction of emphasis on any of them even if their relevance is given. This reservation may also hold amidst a current period of administrative bans like on pupils' use of mobile tools under some school settings. Some shift of research is thereby desired from the recent foci of communication studies (such as on disparities of access to IT and some substantive issues of media contents with an emphasis on offensive manifestations) toward understanding new media "from inside" with special regard to the diverse specificities of various channels and their mutual (two-way) relationships with users' styles of thinking and activities. The recent advance of AI with an array of applications is a further addition to these issues.<sup>17</sup> A complex treatment might involve an integrated approach to educational and family milieus, just like the inclusion of the role of peer groups and that of various (older or newer) media of communication; in a similar way as the relationships

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<sup>16</sup> See the review by D. Kisfalusi, "[Bullies and Victims in Primary Schools: The Associations between Bullying, Victimization, and Students' Ethnicity and Academic Achievement](#)", *Intersections: East European Journal of Society and Politics*, vol. 4, no. 1 (2018) on these phenomena.

<sup>17</sup> To refer to a close example in this regard, the paper by Viktor Berger, "[Enmeshed with the Digital: Satellite Navigation and the Phenomenology of Drivers' Spaces](#)", *Mobilities*, vol. 19, issue 3 (2024), dealing with various habitual implications of the use of GPS-instruments.



of various socialization agencies were taken into account during the ascendance of mass media (or as a Coleman-like multi-stranded approach was put into research practice regarding the various scenes of adolescents' world in the second half of the last century). A reorientation of research along such lines should among others take account of a change in the "balance of powers" among the various foci of socialization that dates back to the advance of digital technologies (well before the rise of social media), benefiting peer groups' members in several ways not only in relation to the grandparents', even parents' generation, but in the school context with regard to their teachers too. A shift in knowledge styles from cognitive-instrumental to expressive-connectionist and symbolic sensitivities<sup>18</sup> observed in the last half century in relation with developments in communication patterns (as notably exemplified by a turn from news to infotainment, whether related to old or new media) is a further feature to be considered. The extension of the PISA-design may serve as an example for an adaptive notice of emerging features of the context on a larger terrain.

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<sup>18</sup> Studies by R. Angelusz and R. Tardos, related to cultural-interactional stratification some decades ago (such as in their paper "[Styles of Knowledge and Interactive Habits](#)", 1995) applied this type of differentiation in relation to various sorts of skills and habitual orientations.



## Is Digital Literacy the Key Competence of the Future?

1. Higher education institutions are under constant pressure to change and evolve.<sup>1</sup> Perhaps one of the greatest challenges for institutions is the information technology revolution, which had/has an impact on the teaching–learning processes in higher education, and has changed the learning characteristics of students and their expectations of their courses. This change was most evident during the period of the COVID-19 epidemic, when educational institutions had to switch to digital and online education overnight.<sup>2</sup> The challenges generating these changes have been felt in many areas over the past period. The economic environment, digitisation, funding, student and labour market expectations and societal changes are increasingly challenging higher education.<sup>3</sup> A higher education institution can be considered success-

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<sup>1</sup> Liliana Budevici Puiu, “[The Necessity of Change and Development of the Higher Education Institution in the Age of Globalisation](#)”, *Revista Romaneasca pentru Educatie Multidimensionala*, vol. 12, no. 1 (2020), pp. 350–356; Olga Burukina, “[University Internal Communication in the Digital Era: Finding a Systemic Approach](#)”, *Journal of Emerging Trends in Marketing and Management*, vol. I, no. 1 (2021).

<sup>2</sup> Fernando Ferri – Patrizia Grifoni – Tiziana Guzzo, “[Online Learning and Emergency Remote Teaching: Opportunities and Challenges in Emergency Situations](#)”, *Societies*, vol. 10, issue 4 (2020); Janice Hawes, “[The Challenges of Emergency Online Instruction at a Small HBCU](#)”, *Journal of Higher Education Theory and Practice*, vol. 22, no. 18 (2022); J. M. Ramirez-Hurtado *et al.*, “[Measuring Online Teaching Service Quality in Higher Education in the COVID-19 Environment](#)”, *International Journal of Environmental Research and Public Health*, vol. 18, issue 5 (2021).

<sup>3</sup> Christi Edge *et al.*, “[Leading University Change: A Case Study of Meaning-Making and Implementing Online Learning Quality Standards](#)”, *American Journal of Distance Education*, vol. 36, issue 1, (2022), pp. 53–69; Elisa Sarda – Olga Kasatkina – Erica de Vries, “[How Do Lecturers Conceptualise Pedagogical Inno-](#)

ful if it prepares its students for the labour market. Students' success requires the competences that 21st century jobs demand: global awareness, innovation, creativity, media literacy, leadership and responsibility.<sup>4</sup> The competences list is constantly expanding as new needs and expectations emerge, including, for example, digital competences. The development of digital competences requires infrastructural, methodological and pedagogical changes by higher education institutions.<sup>5</sup> At the same time, the results of this development need to be continuously measured to see whether a course is achieving the right results to meet the required competences.

2. To develop digital literacy, a number of relevant questions need to be answered. What is digital literacy? Is there a match between the use of tools and home education? How can digital literacy be measured?<sup>6</sup> The situation is more complex than public discourse and literature suggest.<sup>7</sup> The younger generation is indeed born into the dig-

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[vations in Higher Education?](#)", *Innovations in Education and Teaching International*, vol. 61, issue 4 (2024), pp. 611–621.

<sup>4</sup> T. G. Cummings – C. G. Worley, *Organization Development and Change* (10th ed.), Stamford, CT: Cengage Learning, 2015; J. R. Thelin, *A History of American Higher Education*, Baltimore: Johns Hopkins University Press, 2011.

<sup>5</sup> Shahid Farid – Rodina Ahmad – Mujahid Alam, "[A Hierarchical Model for E-learning Implementation Challenges Using AHP](#)", *Malaysian Journal of Computer Science*, vol. 28, no. 3 (2015), pp. 166–188; Benedetto Lepori – Cantoni Lorenzo – Chiara Succi, "[The Introduction of E-Learning in European Universities: Models and Strategies](#)", in Michael Kerres – Britta Voß (eds.), *Digitaler Campus: Vom Medienprojekt zur nachhaltigen Mediennutzung auf dem Digitalen Campus*, Münster: Waxmann, 2003, pp. 74–83; Donna L. Rogers, "[A Paradigm Shift: Technology Integration for Higher Education in the New Millennium](#)", *AACE Review* (formerly *AACE Journal*), vol. 1, no. 13 (2000); Helena Santos – João Batista – Rui Pedro Marques, "[Digital Transformation in Higher Education: The Use of Communication Technologies by Students](#)", *Procedia Computer Science*, vol. 164 (2019), pp. 123–130.

<sup>6</sup> Tibor M. Pintér, "[Digitális kompetenciák a felsőoktatásban](#)", *Modern Nyelvoktatás*, vol. XXV, no. 1. (2019), pp. 47–58.

<sup>7</sup> Henry Jenkins *et al.*, *Spreadable Media: Creating Value and Meaning in a Networked Culture*, New York: NYU Press, 2013; Marc Prensky, "[Digital Natives](#),

ital society, they may have relatively higher levels of digital competences, but they do not necessarily have the ICT competences that the labour market requires.<sup>8</sup>

3. A number of studies have been carried out to map the area, but we will refer to a few of them without wishing to be exhaustive. In 2017, the European Commission carried out a questionnaire survey<sup>9</sup> in EU countries to assess the impact of digitalisation on everyday life in European countries. Only 12 percent of Hungarian respondents were confident that they were skilled enough for digital and online learning. The average for EU28 Member States was 29%. In 2019, the European Commission conducted a self-assessment of digital competences of learners and teachers<sup>10</sup> based on the DigComp framework. Students self-report that they perform well in all dimensions. Self-assessment is higher than the EU average in almost all competences. But this is no longer true for teachers. Compared to the EU average, teachers rate their own competences much lower than the EU average in all competences. Students' self-assessments do not necessarily reflect reality, with research by the Foundation for 21st Century Education pointing to a lack of digital skills. The research looked at 15 innovative schools and measured the digital competences of more than 2,700 pupils aged 13–18. The survey measured students' digital skills in fictional but everyday situations. The research was based on the DigComp 2.0 framework and measured the five competences of the DIGCOMP-European Digital Competence Framework. The first domain is information gathering and processing, the second is communication, the third is content creation, the fourth is security and the

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[Digital Immigrants](#)”, *On the Horizon*, vol. 9, no. 5 (2001), pp. 1–6; Annamária Tari, *Z generáció*, Budapest: Tericum Könyvkiadó, 2011.

<sup>8</sup> B. B. Budai – S. Csuhai – I. Tózsza, “[Digital Competence Development in Public Administration Higher Education](#)”, *Sustainability*, vol. 15, issue 16 (2023); Pintér, *op. cit.*

<sup>9</sup> [European Commission Special Eurobarometer 460: Attitudes Towards the Impact of Digitisation and Automation on Daily Life](#), 2017.

<sup>10</sup> European Commission, [2nd Survey of Schools: ICT in Education](#), 2017/2021.

fifth is problem solving. In total, the five competence areas comprise 21 sub-competences and can be developed at 8 proficiency levels.<sup>11</sup> The results of the research show that students have most problems with searching and evaluating information on the internet. Problem solving, security, content production and communication scored better on average (above 50%). Students are generally good in the on-line space, but when it comes to solving a new problem, they are not successful when it comes to using their creativity. The research also highlights the shortcomings of education, which should be much more responsive to change.<sup>12</sup> 49% of the population have basic digital skills, well below the EU average of 56%. Eurostat 2020 data show a drop in this figure compared to 2015 and 2019. Rates are better for 16–19 year olds, but still lag behind the countries in the region.<sup>13</sup> Recognising the importance of this area, the development of digital competences is supported and promoted by a number of EU and Hungarian projects.<sup>14</sup>

4. The fact that the problem is present in higher education and that universities also have a role to play in this area is also demonstrated by the establishment of the Hungarian Rectors' Conference's Digital Transformation Working Group in 2023. There are also many good practices in the field.<sup>15</sup> The NKE's<sup>16</sup> digital competence development course can also be included in this list of good practices, mainly

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<sup>11</sup> Budai – Csuhai – Tózsá, *op. cit.*; S. Carretero-Gomez – R. Vuorikari – Y. Punie, [DigComp 2.1: The Digital Competence Framework for Citizens with Eight Proficiency Levels and Examples of Use](#), 2017; Riina Vuorikari – Wayne Holmes, “[DigComp 2.2. Annex 2. Citizens Interacting with AI Systems](#)”, Publication Office of the European Union, 2022, pp. 77–82.

<sup>12</sup> See <https://news.microsoft.com/hu-hu/2018/07/02/van-mit-fejleszteni-a-z-generacio-digitalis-kompetenciain>.

<sup>13</sup> B. B. Budai, “[A digitális kompetencia növekvő szerepe](#)”, *Pro Publico Bono*, 2022, no. 2, pp. 30–59.

<sup>14</sup> See <https://digitalisjolétprogram.hu/kiadvanyaik>.

<sup>15</sup> Budai, *op. cit.*, cf. note 13 above.

<sup>16</sup> NKE: Ludovika University of Public Service, Hungary.

because it tries to support students' development with new tasks and methods from semester to semester. One of the new areas of development was the use of built-in homework tasks aimed at developing different areas of competence. The digital CV writing exercise developed students' competences in the area of digital content development, the two-page text submission in the area of internet use, searching, downloading and evaluating content, the pair/triad newsletter editing in the area of online communication and collaboration, the website analysis in the area of problem solving and security. The fifth task focused on checking knowledge items and monitoring continuous progress, again with an emphasis on student activity. Students had to take a test on the Kahoot interface, which allowed them to develop their digital competences and to check the knowledge of others. The students' competence development was measured by a self-assessment based questionnaire. The student responses showed that a high percentage of students (81%) had developed in the area of digital content editing, while slightly fewer (79%) had developed in the area of copyright and licensing. Almost 80% (77%) have also improved in filtering and evaluating information, browsing and searching, and creating digital content. They also scored high in creative use of digital technologies (73%) and content management (71%). Competency area 2 (communication and collaboration) also scored relatively high, but they also reported improvements in managing digital identity. The results of the questionnaire survey also show that a high percentage of students reported improvements in the areas of competence where we put emphasis.

**5.** The integration of the subject into the curriculum was justified by the digital competence deficit of students entering higher education. In 2022, the European Commission published the DigComp 2.2 reference framework, which included the digital requirements of the period since 2017. It shows that digital competence and readiness is now a competitive factor for the 21st century workforce. Higher education needs to place a strong emphasis on developing digital competence areas and acquiring proficiency in specific areas, alongside other key competences for the labour market. Based on the results of

the research, it can be said that the course reflects the frame of reference well and the development in the course was basically adequate in each area.<sup>17</sup>

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<sup>17</sup> The present study was translated using DeepL.



*Kristóf Nyíri*

## **Towards a New Aristocracy**

Friedrich Nietzsche in his 1886 book *Beyond Good and Evil* makes some famous, and indeed notorious, remarks on why only within an aristocratic society can there emerge valuable people. Notorious are Nietzsche's pronouncements that a "good and healthy" aristocracy necessarily "needs slavery in some sense or other", and that there is stupidity in the "emancipation of woman" movement.<sup>1</sup> However, these pronouncements have to be taken with a grain of salt, and seen in their historical context. Nietzsche was a classical philologist (holding the Chair of Classical Philology at the University of Basel from 1869 to 1879), for him the culture of ancient Greece was supreme, and the Greek city-states were of course slave societies. Also, note the qualification "in some sense or other". As to his despising feminism, towards the end of the 19th century Nietzsche was certainly not alone with his views.<sup>2</sup> – Nietzsche was an admirer and intellectual companion of the Swiss historian of art and culture Jacob Burckhardt, professor at the University of Basel between 1858 and 1893. Burckhardt's *Reflections on History* (orig. German published posthumously in 1906) explicitly deals with the classic Platonic–Aristotelian "cycle of monarchy, aristocracy, democracy, despotism"<sup>3</sup> topic, and his early *The Civilization of the Renaissance in Italy* (orig. German 1860) touched on the democracies/nobil-

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<sup>1</sup> *Beyond Good and Evil*, §§ 257, 258, 239. I am quoting from the R. J. Hollingdale translation.

<sup>2</sup> Let us recall say the not entirely ironical passages in Henry James' 1886 novel *The Bostonians*, look e.g. at p. 162. Or think of Dicey's 1909 [Letters to a Friend on Votes for Women](#). For a recent magisterial discussion of the topic see Susan Haack's "Knowledge and Propaganda: Reflections of an Old Feminist" (1992) in her [Unfashionable Essays](#), or indeed her devastating "[Not One of the Boys: Memoir of an Academic Misfit](#)" (2020).

<sup>3</sup> [Reflections on History](#), London: George Allen & Unwin, 1943, p. 139.

ities/tyranny theme. We can note also that as he grew older, Burckhardt definitely became alienated from the idea of democracy.

Now both Nietzsche and Burckhardt were very much interested in how our modes of communication – gestural, pictorial, oral, written – influence the way we think. In his 1878 book *Human, all-too-Human* Nietzsche wrote:

Older than speech is the imitation of gestures, which is carried on unconsciously and which, in the general repression of the language of gesture and trained control of the muscles, is still so great that we cannot look at a face moved by emotion without feeling an agitation of our own face... ... The imitated gesture leads the one who imitates back to the sensation it expressed in the face or body of the one imitated. Thus men learned to understand one another, thus the child still learns to understand the mother.<sup>4</sup>

When Friedrich Nietzsche started to use a typewriter and sent some rhymes he produced on it to a friend, the latter – a composer – commented upon the robust language. “Perhaps you will through this instrument even take to a new idiom”, the friend wrote; “with me at any rate this could happen; I do not deny that my ‘thoughts’ in music and language often depend on the quality of pen and paper”. To

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<sup>4</sup> Friedrich Nietzsche, *Human all-too-Human: A Book for Free Spirits*, Part I, transl. by Helen Zimmern, Edinburgh: T. N. Foulis, 1910, § 216. – In 1873 Nietzsche in a remark referred to “metaphors that have become worn out and have been drained of sensuous force” – suggesting that to the oldest layers of speech metaphors, too, belonged. See *Philosophy and Truth: Selections from Nietzsche’s Notebooks of the Early 1870’s*, ed. & transl. by Daniel Breazeale, Atlantic Highlands, N.J.: Humanities Press, 1990. The phrase in the original German: “Metaphern, die abgenutzt und sinnlich kraftlos geworden sind” (see “[Über Wahrheit und Lüge im außermoralischen Sinne](#)”, p. 3). On the history of the theories of gestures, and on Nietzsche in particular, see my “[Image and Time in the Theory of Gestures](#)” (2014).

which Nietzsche replied: “You are right – our writing equipment takes part in the forming of our thoughts.”<sup>5</sup>

Nietzsche preferred the old-fashioned way of reading aloud to the silent reading characteristic of the age of the printed book. “The German does not read aloud”, runs a familiar passage by Nietzsche,

does not read for the ear, but merely with his eyes: he has put his ears away in the drawer. In antiquity, when a man read – which he did very seldom – he read to himself aloud, and indeed in a loud voice; it was a matter for surprise if someone read quietly, and people secretly asked themselves why he did so. In a loud voice: that is to say, with all the crescendos, inflections, variations of tone and changes of tempo in which the ancient *public* world took pleasure. In those days the rules of written style were the same as those of spoken style...<sup>6</sup>

In his Basle lectures Nietzsche had already developed the untimely notion of a non-literary culture or education. As he said, introducing his course on the “History of Greek Literature” in the winter term of 1874/75:

The word “literature” is dubious, and contains a bias. Just as it was an age-old mistake of grammar to start from letters and not from spoken sounds, similarly it is the old mistake of literary history to concern itself first with the *writings* of a people, and not with its *spoken* linguistic art, that is, to look at the matter against the background assumptions of an age in which the literary work of art is enjoyed by the *reader* only.

How we take in a work of art, Nietzsche insists, is different when reading and when listening. A literature which is exclusively for readers amounts to a kind of degeneration. “Now however”, writes

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<sup>5</sup> The passage above I have taken from my paper “[Thinking with a Word Processor](#)”, in R. Casati (ed.), *Philosophy and the Cognitive Sciences*, Vienna: Hölder-Pichler-Tempsky, 1994, pp. 63–74.

<sup>6</sup> *Beyond Good and Evil*, § 247. – For the above and the following passage see also my 1996 talk “[The Humanities in the Age of Post-Literacy](#)”.

Nietzsche, “we live in such an age of degeneration, and thus apply many false standards and presuppositions to Greek history, from which *alas* only the works for readers have come down to us.”<sup>7</sup>

Both Nietzsche and Burckhardt had a significant impact on the Swiss psychiatrist–philosopher C. G. Jung. Jung’s central idea was that of the *collective unconscious* which he understood as made up by “primordial” images, pictures imprinted on man’s mind in the course of his millions years history. The term “Urbild” Jung might have taken from Goethe, or especially from Nietzsche.<sup>8</sup> The expression “ur-tümliches Bild” which Jung chose as his main technical term originates with Burckhardt. The passage by Burckhardt Jung in one of his main works cites: “Faust is a genuine myth, i.e., a great primordial image, in which every man has to discover his own being and destiny in his own way.”<sup>9</sup> In Burckhardt’s original German formulation:<sup>10</sup>

Both Goethe and Nietzsche explicitly referred to visual images with the expression “Urbild”. In Burckhardt’s case, “Bild” meant

Faust ist nämlich ein echter und gerechter Mythos, d. h. ein großes, urtümliches Bild, in welchem jeder sein Wesen und Schicksal auf seine Weise wieder zu ahnen hat.

simply figurative language. But Jung in his *Symbols of Transformation* construed primordial images programmatically and absolutely as visual physical and mental pictures. For Jung the psychotherapist, the visual had tremendous importance. He himself drew, painted, even spent years creating a hand-written codex with illustrations, a way of

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<sup>7</sup> Nietzsche’s Werke, Leipzig: Alfred Kröner, vol. XVIII: *Philologica*, 2nd vol., [Unveröffentlichtes zur Literaturgeschichte, Rhetorik und Rhythmik](#), 1912, p. 3.

<sup>8</sup> See e.g. Nietzsche, *The Birth of Tragedy* (1872), sect. 8: For the Greeks the *satyr* was “the primordial image of man” (“war das Urbild des Menschen”), Engl. transl. by Ian C. Johnston.

<sup>9</sup> C. G. Jung, [Symbols of Transformation](#) (1911, 4th rewritten ed. 1952), in *Collected Works*, vol. 5, transl. R. F. C. Hull, Princeton N.J., Princeton University Press, 1967, § 45, note 45.

<sup>10</sup> Letter of Nov. 11, 1855, from Burckhardt to his student Albert Brenner, published in [Der Kunstwart: Rundschau über alle Gebiete des Schönen – Monatshefte für Kunst, Literatur und Leben](#), vol. 44 (1930–1931), p. 718.

expressing his untimely world-view, yearning back to times long bygone.<sup>11</sup>

Nietzsche, too, was yearning back to times long bygone, say to “days the rules of written style were the same as those of spoken style”. Now though we today in the world of social media realize that written style has once again become very much similar to that of spoken – unguarded, rude, uneducated – style, surely we have no reason to believe that Nietzsche, or indeed Burckhardt, would have been pleased to live in our contemporary mediocre mass-man age, an age having become even more mediocre than the one described by Ortega in his 1930 *The Revolt of the Masses*.<sup>12</sup> Ortega believed that a new aristocracy – not a hereditary one of course, but one based on intellectual merit – was needed.<sup>13</sup> Walter Lippmann in his movingly

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<sup>11</sup> For details, see my [Forever Jung](#) (Dunabogdány, 2020).

<sup>12</sup> “*The characteristic of the hour*”, writes Ortega (his italics), “*is that the commonplace mind, knowing itself to be commonplace, has the assurance to proclaim the rights of the commonplace and to impose them wherever it will. ... The mass crushes beneath it everything that is different, everything that is excellent, individual, qualified and select.*” The mass-man is vulgar, and the problem is “not that the vulgar believes itself super-excellent and not vulgar, but that the vulgar proclaims and imposes the rights of vulgarity, or vulgarity as a right.” Ortega adds that by his time even the “‘man of science’” has actually become “the prototype of the mass-man. ... He is one who, out of all that has to be known in order to be a man of judgment, is only acquainted with one science, and even of that one only knows the small corner in which he is an active investigator. He even proclaims it as a virtue that he takes no cognisance of what lies outside the narrow territory specially cultivated by himself, and gives the name of ‘dilettantism’ to any curiosity for the general scheme of knowledge.” (José Ortega y Gasset, [The Revolt of the Masses](#), New York, N.Y.: W. W. Norton & Co., 1957, pp. 18, 70, 108, 110.)

<sup>13</sup> “I uphold”, Ortega wrote, “a radically aristocratic interpretation of history. ... human society is always, whether it will or no, aristocratic by its very essence, to the extreme that it is a society in the measure that it is aristocratic, and ceases to be such when it ceases to be aristocratic” (*ibid.*, p. 20). Ortega tends to use the term “nobility” as a synonym for “aristocracy”, so the following passages are in the present context essential: “It is annoying to see the degeneration suffered in ordinary speech by a word so inspiring as ‘nobility’. ... Noble means the ‘well known’, that is, known by everyone, famous, he who has made himself known by excelling the anonymous mass. It implies an unusual effort as the cause of his fame. Noble, then, is equivalent to effortful, excellent” (*ibid.*, p. 64).

depressed and depressing 1955 book *The Public Philosophy*<sup>14</sup>, having experienced WWII and the years leading to it, was even more pessimistic about the prospects of modern democracy than he had been in his famous 1922 *Public Opinion*. In that earlier book he argued that the notion of “public opinion” is misleading, since what the public believes is in many ways manipulated, it is based on “pictures in our heads” rather than reflecting the actual social environment.<sup>15</sup> By 1955 Lippmann’s crucial term changed from “public opinion” to “mass opinion”. With mass opinion having become dominating, “governments are unable to cope with reality”<sup>16</sup>. As Lippmann sums up the matter:

With exceptions so rare that they are regarded as miracles and freaks of nature, successful democratic politicians are insecure and intimidated men. They advance politically only as they placate, appease, bribe, seduce, bamboozle, or otherwise manage to manipulate the demanding and threatening elements in their constituencies. The decisive consideration is not whether the proposition is good but whether it is popular – not whether it will work well and prove itself but whether the active talking constituents like it immediately. Politicians rationalize this servitude by saying that in a democracy public men are the servants of the people.<sup>17</sup>

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<sup>14</sup> *Essays in the Public Philosophy*, Boston: Little, Brown & Co., 1955.

<sup>15</sup> Lippmann’s 1922 book gave rise, in John Dewey’s *The Public and Its Problems* (1927), to an interesting train of thought on the significance of the regional and the local. As Dewey puts it, discussing Lippmann’s views: “citizens of small and stable local communities ... were so intimately acquainted with the persons and affairs of their locality that they could pass competent judgment upon the bearing of proposed measures upon their own concerns”. Christopher Lasch in his *The Revolt of the Elites and the Betrayal of Democracy* (New York, N.Y.: W. W. Norton & Co., 1995) with emphasis drew attention to the Dewey vs. Lippmann issue. And an interesting passage by Lasch: “The new elites are at home only in transit... Theirs is essentially a tourist’s view of the world – not a perspective likely to encourage a passionate devotion to democracy” (p. 6). I will come back to the localism theme towards the end of the present paper.

<sup>16</sup> *Ibid.*, p. 46.

<sup>17</sup> *Ibid.*, p. 27.

As Lippmann at a later stage in his book adds: “the modern media of mass communication do not lend themselves easily to a confrontation of opinions”.<sup>18</sup>

When democratic politicians are actually powerless, and mass-man mediocrity dominates, is there a way out that can lead to a humane yet functioning society? The liberal-democrat Lippmann’s answer might come as a surprise. He calls for reviving the “aristocratic code” that is “not inherent in prerogative and birth”.<sup>19</sup> He refers to Alexis de Tocqueville, an exemplary aristocrat, who in his *Democracy in America* (1835) has “foreseen the threat of mass democracy”.<sup>20</sup> Tocqueville was convinced that, sadly, the historical transition from aristocracy to democracy cannot be halted, nor reversed. By contrast, Lippmann, as also Ortega, believed that our contemporary aim should be to create a new aristocracy – a new *intellectual* aristocracy. Articulating this aim, both went back to Plato’s classical views. As Ortega put it:

For philosophy to rule, it is not necessary that philosophers be the rulers – as Plato at first wished – nor even for rulers to be philosophers as was his later, more modest, wish. ... For philosophy to rule, it is sufficient for it to exist; that is to say, for the philosophers to be philosophers. For nearly a century past, philosophers have been everything but that – politicians, pedagogues, men of letters, and men of science.<sup>21</sup>

And the conclusion Lippmann reached: “Much depends upon the philosophers. For though they are not kings, they are, we may say, the teachers of the teachers.”<sup>22</sup>

Under “philosophers” I guess we should understand *exemplary educated intellectuals*. Intellectuals, who – we are living in the 21st century – are professionals when navigating in the online world, but

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<sup>18</sup> *Ibid.*, p. 128.

<sup>19</sup> *Ibid.*, p. 140.

<sup>20</sup> *Ibid.*, p. 64.

<sup>21</sup> Ortega, *op. cit.*, p. 115.

<sup>22</sup> Lippmann, *Essays in the Public Philosophy*, p. 177.

also possess classical knowledge, being in the habit of reading printed books,<sup>23</sup> or say are able to use pencil and paper when designing a text. The new intellectual aristocrats should be exemplary also in the sense that they will not contribute to the greatest problem of our envisioned future, indeed our catastrophic present: climate change. They should not travel superfluously to faraway conferences, giving to the same audience the same paper no-one will read anyway. They should care for their home locality,<sup>24</sup> cultivate their garden in every sense of

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<sup>23</sup> See e.g. my paper “[Turn the Leaf](#)”.

<sup>24</sup> The first time the idea of a *new localism* occurred to me was in 1991, when I wrote a brief article for the *Liechtensteiner Vaterland* newspaper, see [http://www.hunfi.hu/nyiri/CCW/LV\\_Engl.pdf](http://www.hunfi.hu/nyiri/CCW/LV_Engl.pdf). I am grateful to Barry Smith for having recently translated the text into English. As I there wrote: “the scientifically determined division of labor of modern times has put the individual in a position in which his life and survival have become completely dependent on the smooth functioning of a gigantic enterprise that embraces all of society, and is becoming gradually ever more global. Where a hundred years ago each individual was fundamentally able to know everything that there was to know about his own way of life and, at least in rural areas, rely upon the fact that his household would be, at least in the medium term, self-sustaining, matters are such in industrialized countries that today there can be disruptions in energy and water supply, in traffic, in exchange of goods and information that can very quickly lead to a breakdown of individual living conditions. It is obvious that from here there is no return to a pre-scientific world; still, a sort of solution is afforded by the potential for decentralization that is inherent in very modern technology. Above all, think of the possibilities of decentralized energy supply through wind and sun. The example of the farmer, who produces in his flowery meadows the environmentally friendly fuel for his tractor called ‘vegetable oil’, is symbolic. This opens up a picture not of isolation and loneliness, but rather of a new, more autonomous way of life, ... a new individuality. The prerequisite for this, however, is decentralized access to information for society as a whole – of the sort that is increasingly being made possible through the networking of personal computers.” That I was too optimistic about the psychological effects of the internet became clear to me when I encountered Raimondo Strassoldo’s 1992 “Globalism and Localism: Theoretical Reflections and Some Evidence”. As he there puts it (I am quoting from my edited volume [A Sense of Place: The Global and the Local in Mobile Communication](#), Vienna: Passagen Verlag, 2005): “Post-modern man/woman, just because he/she is so deeply embedded in global information flows, may feel the need to revive small enclaves of familiarity, intimacy, security, intelligibility, organic-sensuous interaction, in which to mirror him/herself, contrary to the process occurring in front



that expression, maintaining face-to-face relationships with people in their neighbourhood.<sup>25</sup> The new aristocracy should electrify the masses by showing them how to live an authentic life.

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of the subjectivity-effacing TV screen.” I re-quote this passage in my “Images of Home”, in the same volume, p. 381.

<sup>25</sup> Suggestive here are two papers by Heidegger, I have quoted from them in my “[Back to the Roots – Conservatism Revindicated](#)”, pp. 1 f.: “Heidegger was definitely not fond of travelling to remote worlds. Where he felt safe – indeed philosophically safe – was in his hut up the mountains in the Black Forests, and in the pub not far from that hut, in the company of village peasants, smoking his pipe in silence. As he put it: ‘my whole work is sustained and guided by the world of these mountains and their people. Lately from time to time my work up there is interrupted for long stretches by conferences, lecture trips, committee meetings and my teaching work.’ The world of conferences and lecture trips was one Heidegger detested. Compare a famous passage by him: ‘The scholar disappears and is replaced by the researcher engaged in research programs. These, and not the cultivation of scholarship, are what places his work at the cutting edge. The researcher no longer needs a library at home. He is, moreover, constantly on the move. He negotiates at conferences and collects information at congresses. He commits himself to publishers’ commissions. It is publishers who now determine which books need to be written.’” (The quotes are from “Why Do I Stay in the Provinces?” (1933), translated by Thomas J. Sheehan, in *Martin Heidegger: Philosophical and Political Writings*, ed. by Manfred Stassen, New York: Continuum, 2003, p. 17, and his “The Age of the World Picture”, translated by Julian Young, in Heidegger, *Off the Beaten Track*, p. 6.)



**IS THERE A FUTURE  
FOR READING OR WRITING?**



*Xuan Zhao*

## **The Dilemma of Traditional Reading and Learning in the Age of AI**

We have been brought into an age of AI without being well ready for it. AI can provide huge convenience in almost every corner of our life, especially in education and research field. Today, researchers can collect a large amount of data at a simple click or touch through various mobile tools; students can easily get access to tons of video learning resources online. It seems that AI is omnipotent.

Recently I have used duolingo for learning French and find that the AI learning tool is extremely smart and funny. It can encourage you to learn a foreign language in a relaxing atmosphere and give you awards every time you have done a good performance in taking those tests. In addition, you can enjoy the learning process anytime and anywhere you want for free. However, no matter how lifelike the conversation is, it cannot replace the face-to-face communication between teachers and students in the classroom. You cannot get immediate help when the exercises are not understandable. Besides, the traditional way of learning languages through printed books can give learners more time to think over their mistakes and note down the key grammatical points.

In education and research field, AI's impact is not limited to language learning. It can even help researchers write papers. For example, ChatGPT can generate abstract, research gap, and introduction for your research paper if you use proper prompt. But just like any other technology, it has obvious limitations. You cannot paste the abstract written by ChatGPT directly to your word file and take it as your work: this breaches academic integrity. Apart from that, what ChatGPT writes is not perfect. You can only take ChatGPT as a tool to help you brainstorm and start your work. The most creative part of the writing process remains your work.

Since the emergence of ChatGPT, educators are deeply concerned that over-reliance on ChatGPT could pose a significant challenge to the self-reliance in students' academic life, as it may diminish students' motivation and critical thinking if they do not question or verify the information. I often refer to microsoft translation when doing translation exercises on duolingo, and find that the machine translation might not always be able to give the optimal key and is regarded as wrong sometimes. My learning experience told me that ChatGPT can provide personalized and interactive support for students but it cannot replace the position of traditional teacher.

Therefore, when enjoying the convenience brought by ChatGPT, we cannot sit idle and take the "hallucination" that the answer given by ChatGPT always makes sense. It is reported that AI model will run out of all the public online data by 2026,<sup>1</sup> which means that AI model's development will get slowed down if no further high-quality data can be supplemented. The alarm bells should be raised to remind human beings that our human intelligence should also grow along with AI. For most ordinary people we cannot allow AI to replace our capacity of deep thinking. When I recently used the digital OED and hardback OED, I rediscovered the joy and satisfaction of reading the traditional hardback dictionary. More importantly, I find important information that I cannot get through digital OED.

The paper here starts from the personal experience of using AI tools for reading and learning, aims at a critical reflection of AI use in today's academic world, and further discusses the dilemma of traditional reading and learning in the digitalized age.

Living at a digital age, I still take delight in turning the leaf and touching the printed words with my eyes. I can freely linger over

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<sup>1</sup> Cf. "AI Model Will Run out of All the Public Online Data Soon", *Cānkǎo xiāoxi* (Reference News, a Chinese newspaper), June 25, 2024.

the words and lose myself in thought. Just as Piper *et al.*<sup>2</sup> said, “We think the fusion of print and digital media will prove in the end to offer a substantial contribution to how we as academics think and communicate.”

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<sup>2</sup> Cf. Andrew Piper et al., [\*Interacting with Print: Elements of Reading in the Era of Print Saturation\*](#), Chicago: The University of Chicago Press, 2018, p. 16.





**THE MIND**  
**– DOES IT MATTER?**



*Barbara Tversky*

## **Thinking with Your Hands**

With every new technology, something is gained and something lost. With any change in our lives, something is gained and something is lost. Lost means lost. We can no longer capture the innocence, joy, and naivete of youth. We have traded the agility of youth for the strength of age. And the weakening that inevitably follows. We can no longer compute square roots, but, wow, see the amazing things we can compute!

At this point, AI, or what is typically regarded as AI, LLMs, is heavily based in words.<sup>1</sup> Sure, there can be images, sounds, and more, but they are usually labeled and accessed by prompts that are words. Words are convenient, they are discrete units that can be combined by rules, there aren't many of them, they can be translated, and they can label and describe. What can be done purely with words is astounding. We find our ways with words, we can conjure up other worlds, real and fictional, from words. Words can bind couples, sentence people to death, start wars or declare peace. Part of the success of words is that they are pointers to people, places, things, and activities in the world, aspects of the world that are shared by communities. Words can arouse laughter, anger, and tears, and even sensations like sound, touch, smell, and aches and pains.

Words alone have drawbacks. We are often at a loss for them. They can be ambiguous, leading to misunderstandings. Or poetry. Words like "here", "now", "like this" cannot be understood without context. Canonical communication, the communication we evolved with, is face-to-face. It uses intonation, which can reverse the sense

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<sup>1</sup> There are many efforts to contend with exactly the issues I raise. They are to be applauded in themselves and for the insights into human and other intelligences they provide. Music, like words, is fairly discrete and thereby lends itself to AI.

of the words. It uses the rich situation around it, people and things naturally in the world, and things we create in the world. Gestures, like pointing and showing, bring that context seamlessly into the conversation. Children, even blind children, gesture before they speak. Those two observations imply two pervasive phenomena: gestures help communicating with others, they change the way others think, and gestures help us think.<sup>2</sup> When the eyes of a child, or an adult, follow each other's points, they establish joint attention, providing the basis for mutual understanding.

That gestures help *us* to think is perhaps more surprising. When we talk, our gestures precede our words. The words can't be the thinking, the words just pop into our heads, the thinking must have come before the words. Gestures can help the thinking; here's how. We have brought dozens of students into the lab and asked them to study descriptions of environments, mechanical systems, schedules, linear orders, or arbitrary pairs of facts for a later test. In all the cases but the arbitrary facts, as the students studied, most spontaneously made gesture models of what they were reading. They gesture interactively, checking the descriptions, repeatedly gesturing parts and wholes, sometimes large, sometimes small. They rarely looked at their hands. The models were spatial motor, not visual.

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<sup>2</sup> See many papers on [Susan Goldin-Meadow's website](#). See also Susan Goldin-Meadow, *Hearing Gesture: How Our Hands Help Us Think*, Cambridge, MA: The Belknap Press, 2003; Jana M. Iverson – Susan Goldin-Meadow, “[Gesture Paves the Way for Language Development](#)”, *Psychological Science*, vol. 16, no. 5 (2005), pp. 367–371; Jana M. Iverson – Susan Goldin-Meadow, “[What's Communication Got to Do with It? Gesture in Children Blind From Birth](#)”, *Developmental Psychology*, vol. 33, no. 3 (1997), pp. 453–467; Seokmin Kang – Barbara Tversky, “[From Hands to Minds: Gestures Promote Understanding](#)”, *Cognitive Research: Principles and Implications*, vol. 1, article number 4 (2016), pp. 1–15; Barbara Tversky – Azadeh Jamalian, “[Thinking Tools: Gestures Change Thought about Time](#)”, *Topics in Cognitive Science*, vol. 13, issue 4 (2021), pp. 750–776.

When they gestured, they performed better on the tests. When we asked another group to sit on their hands, they performed worse.<sup>3</sup>

The gestures the students made created spatial motor representations of what they were studying. The gestures represent the thinking far more directly than words. They use marks in space and place in space to express meanings. For the environments, the gestures created virtual sketch maps of lines for paths and points for places. For the mechanical systems, diagrams. For the schedules, tables; for the linear orders, lines dotted with points. A key part of understanding complex information is creating mental spatial models;<sup>4</sup> the gestures facilitate that transition. Watching the gestures you get the feeling that you are watching thinking.

Sketches on paper (or the sand or a napkin or a screen), frequent among artists, designers, scientists, and planners, can be viewed as frozen gestures. Sketches use marks in space and place in space to represent and map the ideas and relations of thought. People make graphics on a page and then interact with them, seeing new objects and relations, making unintended discoveries, a productive cycle. For them sketching is a conversation between the hand, the eyes, and the page. It is intelligent and skilled but wordless. Talking interferes.<sup>5</sup> Whenever we experience a piece of art or music or poetry chat with a friend, it is a new experience created by the interaction.

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<sup>3</sup> Azadeh Jamalian – Valeria Giardino – Barbara Tversky, “[Gestures for Thinking](#)”, in M. Knauff – M. Pauen – N. Sabaenz – I. Wachsmuth (eds.), *Proceedings of the 35<sup>th</sup> Annual Conference of the Cognitive Science Society*, Austin, TX: Cognitive Science Society, 2013; L. Yang, *Gesture for Thinking on Creating Models*, PhD dissertation, Columbia University, 2018; M. B. Zrada, *When Do Spontaneous Gestures Emerge and Improve Thought?* PhD dissertation, Columbia University, 2018.

<sup>4</sup> P. N. Johnson-Laird, *Mental Models: Towards a Cognitive Science of Language, Inference, and Consciousness*, Harvard University Press, 1983; Barbara Tversky, “[Spatial Mental Models](#)”, *Psychology of Learning and Motivation*, vol. 2, (1991), pp. 109–145.

<sup>5</sup> Barbara Tversky et al., “[Sketches for Design and Design of Sketches](#)”, in Udo Lindemann (ed.), *Human Behaviour in Design: Individuals, Teams, Tools*, Munich: Springer, 2023, pp. 79–86; Andrea Kantrowitz, [Drawing Thought: How](#)

Capturing those interactions, often with stuff or others, often wordless, often unique, often productive, and often creative, does not seem possible for AI, certainly now, but perhaps never. Even now, AI is by no means unitary, singular, there are many Ais, species of Ais. Different Ais have different jobs, serve different purposes. For many, perhaps most, purposes, AI might not need to incorporate all the ways that humans (and other creatures!) think, especially those that get us into trouble. Still, it is clear that what AI's lose is also our loss.

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*[Drawing Helps Us Observe, Discover, and Invent](#)*, MIT Press, 2022; Donald A. Schön, *[The Reflective Practitioner: How Professionals Think in Action](#)*, Basic Books, 1983; Gabriela Goldschmidt, "[The Dialectics of Sketching](#)", *Creativity Research Journal*, vol. 4, issue 2, 1991, pp. 123–143.

*Piotr Kozak*

## Thinking in Images: Mental Space vs. Physical Space

To anchor our analyses, let me start with a few examples. Firstly, consider a simple case of trying to answer how many windows are in your room. You can answer this question in at least two ways. You can form a mental image of the room and count windows. Alternatively, you can look at a photograph of the room, provided it was well-taken, and calculate the number of windows. Secondly, suppose you are asked to construct an equilateral triangle. In this case, you can think about three equal line segments and connect them in the mind. Alternatively, you can do the same on paper, forming a triangle diagram.<sup>1</sup>

The examples above point to some interesting features of our mental processes. Significantly, both tasks employ high-order cognitive faculties. Counting and constructing involve exercising thinking skills that can be perfected and certainly are not something we are born with. They are undoubtedly thoughtful processes.

Next, an interesting story about the relationship between internal and external representations can be told. On the one hand, one can have a strong intuition that there is a content equivalency between mental images and external images, such as photographs and diagrams. A mental image of my room and its photograph indeed share content, namely the number of windows. On the other hand, the difference between mental images and external representations is still

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<sup>1</sup> Obviously, there are many more examples of employing mental imagery and images in problem-solving. See Alessandro Antonietti, “[Why Does Mental Visualization Facilitate Problem-Solving?](#)”, in *Advances in Psychology*, vol. 80 (Elsevier, 1991), pp. 211–27; Geir Kaufmann, “[Mental Imagery and Problem Solving](#)”, in *Cognitive and Neuropsychological Approaches to Mental Imagery*, ed. by Michel Denis, Johannes Engelkamp, and John T. E. Richardson, Dordrecht: Springer Netherlands, 1988, pp. 231–40.

being determined. Forming a mental image is indubitably a cognitive process. Taking a photograph is not necessarily a cognitive act. Instead, it seems to be a matter of recording some content.

Thus, one can have two well-fundled but conflicting intuitions regarding the relationship between internal and external imagistic representations. On the one hand, one can hold that imagistic content can be coded both internally as a mental image and as an external representation. On the other hand, one may believe that imagistic thinking is a matter of internal processes inside some individuals. External representations are only a matter of recording these internal processes in some external medium. Having inconsistent intuitions is terrible for our understanding of the images' nature. However, it is also good news since it gives a reason for a philosopher to take a stand.

That being said, I will not go into details about the nature of imagistic content. There is much more to say about what makes up imagistic content and how it differs from propositional content.<sup>2</sup> There is certainly not enough space to discuss all these topics here. Instead, I will focus here on the nature of the vehicle of imagistic content.

The question about the vehicle is what kinds of events can be bearers of imagistic content, for the latter does not flow in some Platonic heaven. It requires something that has it – a vehicle. In the following paper, I will say more about the nature of the imagistic vehicle. I hope that during these analyses, we can get closer to understanding the nature of imagistic thoughts.

Three essential notes are needed. Firstly, I use the term “event” in the most metaphysically neutral way. In other words, I do not want to determine in advance whether the vehicles of imagistic contents are functional states, Cartesian objects, or mental acts. The nature of the vehicle is meant to be determined in the course of these analyses.

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<sup>2</sup> One can read more about it in Piotr Kozak, *Thinking in Images: Imagistic Cognition and Non-Propositional Content*, London: Bloomsbury Academic, 2023.



Secondly, there are two natural candidates for being the content's vehicle. One can hold that the bearers of content are either states, such as beliefs or intentions, or processes, such as acts of believing and intending. It is, however, doubtful whether this distinction is clear-cut, for we can define states in terms of the processes defined over them and vice versa. Defining a cognitive process requires an idea of what the states of the process are. For instance, reasoning is an act of getting from one set of beliefs to another. Thus, for the reason of brevity, I will mostly skip the distinction between states and processes.

Lastly, when I discuss the nature of the vehicle here, I talk about something other than the nature of its implementation (the so-called realizer of representation)<sup>3</sup>. The question about the realizer's nature is the question about the properties of a system that implements certain vehicles. For instance, it can be a question about the features of a paper a diagram is drawn on or the properties of a neural system we employ to form a mental image. I am not interested in talking about the properties of papers or neural systems.

The paper's plan is as follows: In the following sections, I will introduce the debate between internalists and externalists regarding the vehicle of representation. I will demonstrate that the discussion is loaded with metaphysical assumptions, none of which are uncontroversial. I argue that the debate is hindered by a common assumption that thoughts possess spatial features, and asking about the location of the representation's vehicle may be based on a categorical mistake.

## **Vehicle Externalism vs. Internalism**

In philosophy of mind, the debate between externalists and internalists regarding the nature of the vehicle concerns the question of the location of the content vehicle. Internalists believe that the properties

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<sup>3</sup> See Zoe Drayson, "[The Realizers and Vehicles of Mental Representation](#)", *Studies in History and Philosophy of Science Part A*, vol. 68 (April 2018), pp. 80–87.

of the vehicle are constituted entirely by the internal properties of the mind. As it is often phrased, mental representations are in the head. In contrast, externalists believe that the properties of the vehicle are partially constituted by the properties of the environment we act in. If externalism is true, then at least some vehicle properties are located outside the biological boundaries of individuals.

Clark and Chalmers offer the following story in their seminal paper on vehicle externalism.<sup>4</sup> Suppose Otto suffers from the early stages of Alzheimer's and, for this reason, uses his notebook to remind him about important events. Next, he reads in a newspaper that there is an exhibition at the *MoMA*, and wanting to know where the museum is, he looks into his notebook. He finds the address and sets off to the museum. Clark and Chalmers hold that sentences written down in Otto's notebook are a part of Otto's beliefs. More specifically, they hold that if we define mental states by their functional roles, a natural consequence is that a sentence in a notebook is a part of one's beliefs, for it plays a causal role in one's psychology. Otto intended to look into the notebook; he acquired information, and based on that, he set off to the museum. The moral is that if someone is a consequent functionalist, one is bound to defend externalism.

The distinction between vehicle externalism and internalism is readily applicable to imagistic representations. Let us go back to our initial examples. If one holds that thinking happens in the head, then thoughts would include only the episodes of mental images, such as imagining one's room or forming a mental image of a triangle. In contrast, if one believes that the acts of thinking go beyond the individual's boundaries, then thoughts would include the room's photograph and a triangle diagram, too. However, the problem with such a distinction is that both sides are problematic.

Let me start with internalism regarding imagistic thoughts. According to internalists, the vehicle of imagistic content is every state or process that happens internally in the form of a mental image.

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<sup>4</sup> See A. Clark and D. Chalmers, "[The Extended Mind](#)", *Analysis*, vol. 58, issue 1 (1 January 1998), pp. 7–19.

Unfortunately, internalism is sensitive to counterexamples. For one thing, not every act of exercising a mental image, e.g., hallucinating, counts as a thinking process. For another, it would require holding that every act of using images in thinking, such as interpreting photographs or drawing diagrams, needs to be grounded in creating an associated conscious or unconscious mental image of a kind. This last point does not have to be directly mistaken. However, it leads to at least one deep philosophical confusion, which I will return to later in this section.

At this point, it is essential to note that, provided that an individual's internal properties determine the vehicle's properties, internalists are bound to hold that photographs and diagrams are helpful but unnecessary tools for visualizing mental content, where the genuine nature of thinking processes and states is based on some internal mechanism. Photographs and diagrams facilitate thinking processes, just like calculators facilitate calculations, but say nothing about the nature of the vehicle. As it is sometimes said, they are causally coupled with associated thoughts but do not constitute them.<sup>5</sup> To understand the nature of imagistic thoughts, we should focus on the internal mechanisms of mental imagery and not on the properties of photographs and diagrams. There are two problems with this view.

Firstly, it seems wrong to hold that an external vehicle, in our case, a photograph and a diagram, is helpful but inessential for thinking processes. Instead, the visualization processes described in our examples seem to constitute acts of thinking. Why is that so?

Let us imagine a counterfactual scenario where you are presented with a photograph of your room and can see three windows in the flat. And yet, provided that the photograph is taken correctly, you refuse to acknowledge this fact and, based on your mental image, hold that only two windows exist. If everything holds up, you are

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<sup>5</sup> See Fred Adams and Ken Aizawa, "[The Bounds of Cognition](#)", *Philosophical Psychology*, vol. 14, issue 1 (March 2001), pp. 43–64.

wrong. You should have read off the number of windows in the photograph but failed.

Next, suppose you hold that you know how to construct an equilateral triangle. Moreover, if someone asks whether you understand the equilateral triangle concept, you answer: Yes! However, you cannot recognize the equilateral triangle in a diagram, provided it is correctly designed. Although you still can hold that you form a mental image of the equilateral triangle, we have good reasons to believe you do not understand the idea of the equilateral triangle.

Thus, we are justified in holding that external vehicles, such as photographs and diagrams, counterfactually constitute some acts of thinking. To put it differently, if one did not understand the content of external images, one could not understand the content of mental images. If it is so, then external images do not only facilitate some thought processes. Instead, they seem to be the cornerstone of some thought processes.

Secondly, holding that external images are only visualizations of some conscious or unconscious mental images leads to a particularly unwanted consequence that mirrors the conclusion of the so-called private language argument. Let me explain it.

Notably, the requirement of possessing a conscious mental image that accompanies cognitive processes, such as constructing a diagram, is too strong. Yet, this requirement can be weakened and restricted to unconscious mental images. However, if one agrees with this move, then one has no resources to determine the correctness conditions of external representation content. Let us suppose that the triangle diagram's content is derivative, i.e., it is a mere visualization of some internal unconscious mental image. In this case, there is no way to determine whether the visualization is correct or incorrect. Determining the correctness conditions would require the possibility of comparing the mental image and its visualization, but that is the thing that is excluded from our analysis in advance.

Therefore, internalism is not a reasonable option unless one finds a way out from the described consequences. However, it does not mean that the opposite theory handles the problems better. Let us then turn to externalism.

According to externalists, vehicles, such as photographs or diagrams, count as bearers of imagistic content. In contrast to internalism, their content is not derivative. It does not derive from the original intentionality of some mental structures. Instead, external vehicles possess the same kind of content as mental images. It covers the initial intuition that solving cognitive tasks, such as counting windows and constructing a triangle, may be done equivalently with the help of internal and external representations.

Moreover, vehicle externalism describes our scientific practice better. Scientists work with sketches, diagrams, and graphs. Indubitably, imagistic representations in science have a substantial role.<sup>6</sup> If sketches, diagrams, and graphs counted as vehicles of thought, then it would be easier to explain their substantial role.

Last but not least, externalism is a simple consequence of functionalism in the philosophy of mind. Suppose someone is a functionalist regarding the metaphysics of mental states and defines them in terms of their causal roles. In that case, she has an excellent reason to extend the mind beyond the boundaries of the biological individual. Functionalism is an attractive option in the metaphysics of mind, and so is externalism.

However, externalists have to address at least three problems. Firstly, the strength of the arguments for externalism depends mainly on the strength of the arguments for functionalism. Functionalism can be correct, but it does not have to. For instance, if the identity theory arguments convinced someone, then she would not be bound to defend externalism.

Secondly, one must have a story to tell about significant differences between internal and external representations. Mental images resemble pictures, but they are not identical. They code the content differently. For instance, mental images differ from pictures because they carry their interpretation within them, while pictures do

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<sup>6</sup> See, e.g., Silvia De Toffoli, “[‘Chasing’ the Diagram – The Use of Visualizations in Algebraic Reasoning](#)”, *The Review of Symbolic Logic* vol. 10, issue 1 (March 2017), pp. 158–86.

not. It has been shown that subjects have problems forming an alternative mental image interpretation. In contrast, changing the interpretation of the picture's content seems easy.<sup>7</sup> Internalists have a simple explanation of this fact. Changing the interpretation of a picture requires forming an alternative mental image. Now, it is not excluded that externalists can explain the difference, but it is not obvious how.

Finally, externalists must address the problem of the demarcation line between the individual's mind and something beyond it. The main problem is that externalism seems to push the boundaries of the individual's mind too far. Let me give a few examples.

First, consider the case when you are requested to find an equilateral triangle in a set of random figures. You do not know the equilateral triangle concept, so you ask your colleague. She points to a correct figure, and you do the same. Does it mean that your colleague's skills in recognizing triangles are part of your skills? Is her mind a part of your mind? It does not seem so, for you may still not know the equilateral triangle concept. It does not have to be true that you learn something, either. You can blindly follow her answers. However, from the point of view of causal roles, your knowledge of the equilateral triangle concept and blindly following the steps of your colleague would be indistinguishable.

Next, suppose there is a set of automatically taken photographs of Dallas from the mid-60s. You're searching through the photographs to find out who killed Kennedy. However, since the set is too big to be effectively searched, you cannot determine the killer's identity. And yet, unknowingly to you, one of the photographs you were looking at previously reveals his identity. You simply over-

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<sup>7</sup> See Daniel Reisberg and Deborah Chambers, "[Neither Pictures nor Propositions: What Can We Learn from a Mental Image?](#)", *Canadian Journal of Psychology / Revue Canadienne de Psychologie*, vol. 45, no. 3 (1991), pp. 336–352; Peter Slezak, "The 'Philosophical' Case against Visual Images", in *Perspectives on Cognitive Science*, vol. 1, *Theories, Experiments, and Foundations*, ed. by P. Slezak, T. Caelli, and R. Clark, Ablex Publishing, 1995.

looked this information. Does it mean that you unconsciously know the killer's identity? No, it does not.

What is the result of our analyses so far? On the one hand, internalism regarding the vehicle of imagistic content does not seem convincing. On the other, it does not follow that the opposite view is better. What to do then? We have two options here. We can look for flaws in reasoning, try to sharpen our concepts, and differentiate aspects of the discussion, hoping that one of the sides will prevail in the process of more developed analysis. That is always a valid and desired option, especially since the description of the externalism/internalism debate is presented here in a far too simplified manner. Alternatively, we can look for hidden assumptions that hinder the discussion and offer a counterproposal. Let us try to go the second way.

## **Are Thoughts in Space?**

Although internalists and externalists do not agree on the vehicle's properties, both sides of the debate consent that it can be localized in some space. Either imagistic thoughts are localized inside one's head or, if not inside, then somewhere outside the body.

This common assumption follows from Cartesian-based intuitions. We introspect some mental episodes inside our mind, and if our thoughts are not exclusively internal, they must be something external. Moreover, provided that we agree that photographs and diagrams are vehicles of imagistic thoughts, they are located in some space and do have spatial properties. Thus, it seems intuitively obvious that thoughts can be localized in some mental or physical space.

These intuitive assumptions regarding spatial properties, however, may hinder the debate. If the vehicle of imagistic thoughts did not possess spatial properties, then discussing whether thoughts are localized inside or outside the mind would be an instantiation of the categorical mistake. Let us dig into that idea.

According to Clark and Chalmers, vehicle externalism follows from endorsing functionalism. However, only some kinds of func-

tionalism require spatially determined content vehicles. Only causal-role functionalism requires that. Computationally oriented functionalists do not have to determine computations' spatial characteristics. Computations must be implemented in some physical space. However, computations do not possess spatial features. Computation is a rule-governed operation that can be implemented in mental and physical spaces.

This example can be extended. According to Frege,<sup>8</sup> thinking about the nature of thoughts in terms of objects inhabiting physical space is a mistake. The thought that  $2+2=4$  does not occupy any space. It does not mean this thought must inhabit some extraterrestrial Platonic heaven, either. Instead, it is a matter of employing certain logical operations. In a word, a thought is not a state or process. It is a rule-governed operation. The latter do not possess spatial localization. The inquiry: "Where is the logical operation?" is an instantiation of a logical fallacy.

There may be, however, at least three objections. Granted that we can think of vehicles of thoughts in terms of computations or logical operations, one can want to investigate the role of their spatial counterparts. All in all, diagrams and photographs do possess a place in space. Even mental images possess some "degenerated" spatial characteristics. They are obviously "here" and "not there". These examples, however, do not determine that the thought's vehicle is spatial. Yet, they pinpoint that spatial events are necessary for having thoughts. How do we understand this necessary role of spatial events without being involved in the externalism vs. internalism debate?

Notice that running a calculation or conducting a logical function requires something on which this calculation or logical function operates. For instance, calculating may require numbers or objects, such as apples. A function iff it takes an element from the domain and assigns it to another. The nature of these operations is based on

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<sup>8</sup> See Gottlob Frege, "[The Thought: A Logical Inquiry](#)", *Mind*, New Series, vol. 65, no. 259 (1956), pp. 289–311.



the fact that they do something. If they did nothing, they would not be incorrect. They would not be operations at all.

Moreover, to run these operations, they require something that represents them. For instance, according to Frege, language can express thoughts, for it represents their logical structures. Calculations can be represented with a formula or with apples. Respectively, some thoughts require images, for images can represent certain rule-governed operations. The only way to grasp the nature of these operations is to understand the nature of representations expressing these operations.

Are these operations spatial? No! We cannot find any rule in space. Do these operations require spatial vehicles? Yes, but only because they are necessarily embedded in some physical or mental events. Thoughts can be known only indirectly by grasping the properties of their spatial representations. Thus, spatial counterparts of thoughts are necessary for having them, but it does not follow that the nature of the thought vehicle is spatial.

Next, one may wonder if there is any difference between describing the nature of the thought vehicle in terms of operations and processes. Granted, the view presented here may seem very close to process-oriented externalism since both views stem from taking vehicles as acts, not states. However, there is a point where these two views split. Process-oriented externalists hold that thinking acts can be conducted internally and externally. Therefore, thinking acts possess spatial features depending on where the process occurs. Moreover, process-oriented externalists are bound to hold that the acts of reasoning and believing happen between some internal states or external objects, e.g., sentences and formulas. If so, then internal states or external objects constitute the nature of these acts.

In contrast, if we think about the vehicles of thoughts as operations, such as logical functions and calculations, we are not bound to hold that these vehicles are spatially localizable. External objects, such as photographs, or internal states, such as mental images, are representations of thoughts. Importantly, they are necessary to have these thoughts, but only in the sense that to grasp the content of thought, we have to get the content of a representation expressing

this thought. The latter, however, are abstract events that have no place in space.

Last but not least, one can ask about the range of the analogy with logical functions and calculations. Reading diagrams and photographs is not a matter of running a calculation or conducting a logical function. It is far from evident whether diagrams and photographs can represent logical functions, too. Even in the case of mental imagery, it does not seem right to hold that it has a computational nature.

However, the Fregean argument can be easily extended to other forms of operations. In mathematics, the term “operation” is an underdefined but wide-ranging concept. It includes logical functions, calculations, projective transformations, searching for invariants, etc. In other words, not every operation is a function or a calculation.

Thus, the question about the nature of imagistic thoughts vehicle can be cashed out in terms of the question about the nature of underlying operations that are represented by the mental or physical events. I believe that this question is challenging to answer. However, I do hold that answering this question does not involve determining the spatial localization of the operation. In fact, and that is the take-home message, asking about the spatial localization of the operation is an instantiation of a categorical mistake.

There is no space here to discuss the specific nature of imagistic operations.<sup>9</sup> However, we can point to at least three advantages of thinking about thoughts’ vehicles as operations. On the one hand, we do not have to take sides in the externalism vs. internalism debate. If operations do not have spatial features, asking about their localization is senseless. On the other, we avoid objections raised against both sides of the debate.

Firstly, we can hold that both external and internal representations are necessary for thinking without being obliged to keep that

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<sup>9</sup> In my last book, I described these operations in terms of the measurement theory: Piotr Kozak, *Thinking in Images: Imagistic Cognition and Non-Propositional Content*, see above, note 2.

thoughts are spatially determined. Secondly, we can easily distinguish between operations conducted by different individuals. Let us go back to our example of blindly following the steps of our colleague. In the light of our analysis, the case is simple. If I know the construction rule of equilateral triangles, then I know what the equilateral triangle is. If I do not know the rule, I do not have the equilateral triangle concept. Lastly, we have an idea of how to explain the difference between interpreting the content of external and internal images. External representations have to be interpreted to grasp the rules of specific operations. In the case of mental images, they present us with already-interpreted rules. By analogy, if I have a formula written down, I can always ask what kind of function is being represented.

In contrast, I already know what I am doing if I am calculating something in my head. Of course, more than this kind of answer is needed to explain the difference between mental and external images. However, it gives us a hint of where to look for such an answer, and that is something we can work with.

## **Conclusion**

In the paper, I discussed the nature of imagistic thought vehicles. Based on the analysis of the externalism vs. internalism debate, I argued that both sides are forced to face troublesome objections. We could either offer a more sophisticated view of the debate or reject its hidden assumptions. I pointed out that both sides of the debate stuck to the idea that the vehicle of thought possesses spatial properties. In contrast, I argued that speaking about the vehicle of thoughts in terms of its spatial localization is an instantiation of a categorical mistake. I offered a more nuanced description of the vehicle's nature, according to which a vehicle of imagistic thought is a set of operations necessarily represented by images.

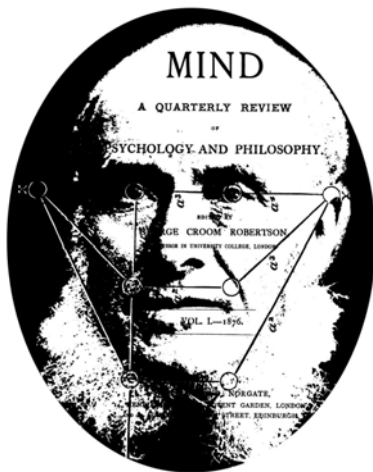


*Nicholas J. Wade*

## Envisioning Vision: The Search for the Elusive Image

### Neural Networks

The conceptual origins of AI are to be found in associationist philosophy. In 1872 the Scottish philosopher, Alexander Bain (1818–1903, see Figure 1 on the next page), wrote *Mind and Body*.<sup>1</sup> In his book Bain set out an account in which he related the processes of associative memory to the distribution of activity in neural groupings – or neural networks as they are now termed. One of the many remarkable features of Bain’s account is that his putative neural network model was formulated before the neuron doctrine was established at the end of the 19th century.<sup>2</sup>



*Figure 1: Bain’s Mind by Nicholas Wade. A portrait of Alexander Bain together with the first volume of the journal *Mind*, which he founded, and one of the diagrams of neural nets from Bain (1872).*

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<sup>1</sup> Alexander Bain, *Mind and Body: The Theories of their Relation*, London: Henry King, 1872.

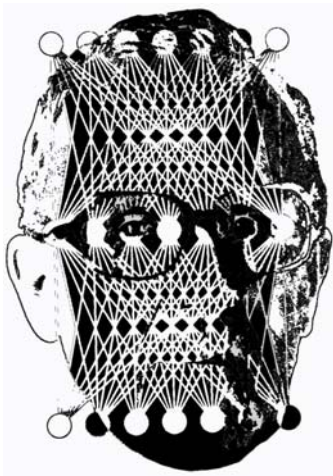
<sup>2</sup> See Nicholas Wade, “[Visual Neuroscience before the Neuron](#)”, in *Perception*, vol. 33, issue 7 (2004), pp. 869–889.

Bain integrated sensory physiology with philosophy to espouse an independent discipline of psychology “conceiving that the time has now come when many of the striking discoveries of Physiologists relative to the nervous system should find a recognised place in the Science of Mind”. He extended the union to higher mental processes and voluntary action, emphasising the importance of sensory feedback in the control of movement. He also appreciated those actions connected with the alleviation of pain or the increase of pleasure would occur with greater frequency. Figure 1 reflects the importance of Bain’s *Mind*, which was initially edited by one of his former students; it also incorporates a model of a neural processing designed by Bain to give differential output with input of varied intensities. That is, he proposed a connectionist account of learning: “I can suppose that, at first, each one of the circuits would affect all others indiscriminately; but that, in consequence of two of them being independently made active at the same moment (which is the fact in acquisition), a strengthened connexion or diminished obstruction would arise between these two, by a change wrought in the intervening cell-substance; and that, afterwards, the induction from one of these circuits would not be indiscriminate, but select; being comparatively strong towards one, and weaker towards the rest.”

In the course of this account, Bain anticipated certain aspects of connectionist ideas that are normally attributed to 20th-century authors – most notably Donald Hebb (1904–1985, Figure 2) in 1949.<sup>3</sup> Specifically, Bain tried to match quantitative estimates of the associations held in memory to the neural structure of the brain. It was this exercise that first drew Bain into confronting the potential properties of neural groupings or networks. In the course of thinking about these issues, he was led to speculate on how the internal structure of neural groupings could physically grow to reflect the contingencies of experience and how this same internal structure could

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<sup>3</sup> Donald Hebb, [\*The Organization of Behavior: A Neuropsychological Theory\*](#), New York: Wiley, 1949.



*Figure 2: Hebb's Hidden Layers by Nicholas Wade. Donald Hebb's face can be seen in the middle layer of a three level network: each cell in the middle layer is connected to every other one in the levels above and below it.*

come to support the variety of associative links typically found in memory.<sup>4</sup>

Hebb's theory was remarkably similar to that proposed by Bain but he must have been ignorant of it. Hebb proposed that memory is stored in the activity of circuits of nerve cells which he called cell assemblies and that perceptual learning takes place when assemblies of cells fire together; their reverberating activity resulted in synaptic changes which further increased the probability of the nerves firing together. He made an assumption very much like Bain's cited earlier (and similarly trying to reconcile principles of association with adaptability of behaviour) but Hebb had the advantage of greater neurophysiological knowledge: "When an axon of cell A is near enough to excite cell B and repeatedly or persistently takes part in firing it, some growth process or metabolic change takes place in one or both cells such that A's efficiency, as one of the cells firing B, is increased." The activities of different cell assemblies acting at the same time could be linked into more complex units called phase se-

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<sup>4</sup> Alan Wilkes – Nicholas Wade, "[Bain on Neural Networks](#)", *Brain and Cognition*, vol. 33, issue 3 (1997), pp. 295–305; Kate Harper, "[Alexander Bain's Mind and Body \(1872\): An Underappreciated Contribution to Early Neuropsychology](#)", *Journal of the History of the Behavioral Sciences*, vol. 55, issue 2 (2019), pp. 139–160.

quences: “The phase sequence is a temporally integrated series of assembly activities. Each assembly activity in the series might be aroused (1) sensorily, (2) by excitation of other assemblies, or (3) in both ways. It is assumed that the last, (3), is what usually happens in an organized flow of behaviour.” Hebb’s ideas were among the first to be subjected to computer simulation. The initial results were not too successful, but the concepts at the heart of Hebb’s (and Bain’s) theory enjoy renewed life in the context of artificial neural networks.

## Images

The thrust of Bain’s proposal was to consider parallel and distributed processes as the basis for memory and other cognitive functions. These ideas have been incorporated into investigations of memory but it has taken many decades for them to permeate perception, particularly visual perception. For centuries the study of vision has been considered in terms of images in general and retinal images in particular. From the onset of enquiry, the “vision problem” has concerned the nature of images. Visual images have always been based on light, but the nature of light itself has been a matter of great speculation. From the 16th century, parallels were drawn between the operation of a camera and the eye, but the anatomy of the eye was still a mystery. In 1589 Porta proposed that this is “how vision is made”<sup>5</sup>, despite his lack of knowledge concerning both the structure of the eye and how light was refracted in the eye. The gross anatomical structure of the eye was not understood until the beginning of the 17th century when Christoph Scheiner illustrated its structure accurately.<sup>6</sup> At around the same time, the astronomer Johannes Kepler described how light was refracted by the various transparent surfaces

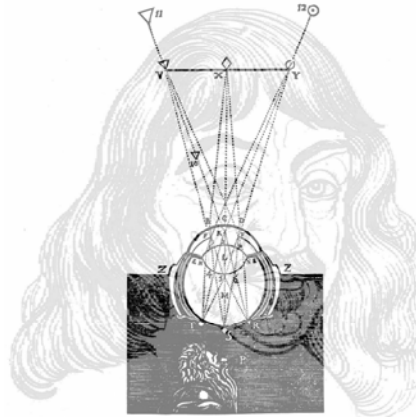
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<sup>5</sup> Johannes Baptista Porta, *Magiae Naturalis Libri XX*, Naples: Salviani, 1589. The text was translated into English as: John Baptista Porta, *Natural Magick*, London: Young and Speed, 1658; the quotation is from p. 365.

<sup>6</sup> Christof Scheiner, *Oculus, hoc est Fundamentum Opticum*, Innsbruck: Agricola, 1619.



of the eye, to form an image on the retina.<sup>7</sup> Kepler’s work was extended by Descartes who provided superb illustrations of the eye in 1637, and its pathways to the brain in 1664<sup>8</sup> (Figure 3).



*Figure 3: Descartes’ Eye by Nicholas Wade. A portrait of Descartes is combined with his illustration of image formation in the eye (from Descartes, 1637). The cosmic observer views an excised eye wedged into the aperture of a camera obscura. When the outer layers of the back of the eye are removed an inverted and reversed image of external objects can be seen.*

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<sup>7</sup> Johannes Kepler, *Ad Vitellionem Paralipomena*, Frankfurt: Marinium and Aubrii, 1604. Kepler wrote: “Thus vision is brought about by picture of the thing seen being formed on the concave surface of the retina. That which is to the right outside is depicted on the left on the retina, that to the left on the right, that above below, and that below above.” (Translated by A. C. Crombie, “Kepler: De Modo Visionis”, in *Melange Alexandre Koyre 1. L’Aventure de la Science*, Paris: Hermann, 1964, p. 150).

<sup>8</sup> René Descartes, *La Dioptrique*, in *Oeuvres de Descartes*, vol. 6, ed. by C. Adam – P. Tannery, Paris: Cerf, 1637/1902, pp. 81–228; René Descartes, *Traité de l’Homme*, in *Oeuvres de Descartes*, vol. 11, ed. by C. Adam – P. Tannery, Paris: Cerf, 1664/1909, pp. 119–215.

The marriage between external images and ocular dioptrics was cemented by Descartes. From Euclid's time onwards the vision problem has been illustrated by ray diagrams drawn between objects and the eye. Euclid realised that the size of the image at the eye varies with the distance of the object. Thus, an object of a given size will project a smaller angle at the eye with increasing distance from the eye. Put in a simpler way, the rectilinear propagation of light enabled students of vision to describe objects in terms of visual angles, the trigonometry of which was simple. Descartes introduced the metaphorical arrow of light as the stimulus for describing image formation in the eye (Figure 4) and this pictorial arrow can still be found in modern accounts of visual optics. The arrow in the eye assisted in the analysis of the dioptrics of the eye, but it left a pictorial platform from which the analysis of perception is considered to commence.



Figure 4: The Arrow in the Eye by Nicholas Wade.

The concept of an image is very useful because of its inherent spatiality. Some degree of specification was provided by the analogy between the optics of a camera and of the eye. Unfortunately, it introduced the notion that the image on the retina is a picture and it was often so illustrated. Some argued against there being a picture painted on the retina but their views went unheeded.<sup>9</sup> The equation was re-

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<sup>9</sup> William Porterfield, *A Treatise on the Eye, the Manner and Phænomena of Vision*, Edinburgh: Hamilton and Balfour, 1759. He wrote: "Properly speaking, there is no Picture in the *Retina*, and the Pictures which are seen painted there when a Bit of the *Sclerotica* and *Choroides* have been taken off from the Bottom of the

finer with advances in imaging technology, particularly with the invention of photography in 1839.<sup>10</sup> From the onset of photography, writers speculated that images could be fixed in the eye as they were fixed on metal plates or paper. Chemical and colour changes in the retina when exposed to light were demonstrated and they were related to the processes of photography. For example, Willi Kühne was fascinated by the similarities between the chemical processes in photographic films and in retinas: “the retina behaves not merely like a photographic plate, but like an entire photographic workshop”<sup>11</sup>. The conceptual problems associated with the camera-eye analogy were amplified by associating photographic and retinal processes. One common problem with both analogies is that they require an unmoving eye. It is an irony of science that at the same time studies elsewhere were indicating the instability of the eyes and the rapidity of their motions. In 1879, Ewald Hering demonstrated how the eyes moved irregularly, particularly during reading, and Émile Javal introduced the term *saccade* to describe jerky eye movements.<sup>12</sup> These were hardly the ideal conditions for fixing an image in the eye! Subsequent developments in neurophysiology have shown that even at the level of the retina the eye/camera analogy cannot be supported.

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Eye, are Sensations in the Mind of him who perceives them, and do not belong to the *Retina* on which they appear to be painted”, p. 362.

<sup>10</sup> The birth of photography is generally taken as the year 1839, when first Daguerre made public his metal-based positive method, followed quickly by the announcement of a paper-based negative process by Talbot. Daguerre treated silvered-copper metal plates to make them sensitive to light which, after exposure, produced single positives called daguerreotypes, whereas Talbot coated paper with silver chloride so that a negative image was formed following exposure to light; positives could be formed by contact printing the negatives.

<sup>11</sup> Willi Kühne, “Chemische Vorgänge in der Netzhaut”, in L. Hermann (ed.), *Handbuch der Physiologie* (vol. 3, part 1), Leipzig: Vogel, 1879. Translated by R. Hubbard & G. Wald as: “[Chemical Processes in the Retina](#)”, *Vision Research*, vol. 17, issues 11-12 (1977), pp. 1269–1316. The quotation is from George Wald, “[Eye and Camera](#)”, *Scientific American Magazine*, vol. 183, issue 2 (August 1950).

<sup>12</sup> Nicholas Wade – Benjamin Tatler, [The Moving Tablet of the Eye: The Origins of Modern Eye Movement Research](#), Oxford: Oxford University Press, 2005. The book provides an account of eye movements and vision.

The neural activities of the receptors themselves are not time-locked with the arrival of light on the retina: the speed of neural transmission to more central sites in the brain varies with the intensity and colour of the light falling on them.<sup>13</sup> The pathways from the eyes to the brain are parallel and distributed and operate like neural networks. The patterns of activity in visual brain areas are certainly retinotopic but the maps extract specific features and are not pictorial. The only pictures in vision are the ones we look at.

With the development of digital photography, the eye/camera analogy can no longer be sustained. What constitutes an image in a digital camera? Many cameras, particularly those in smart phones, have more than one lens and photoreceptive elements are grouped in ways that are convenient for parallel digital processing rather than attempting to simulate natural vision.

The enduring attraction of a pictorial retinal image that is processed in the brain is dimming. Perhaps this latent image will be extinguished by digital technology.

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<sup>13</sup> See Steven Palmer, [\*Vision Science: Photons to Phenomenology\*](#), Cambridge, MA: MIT Press, 1999.

## From Bilingualism to Mentalization to Empathy

Substantial Theory of Mind (ToM) is a crucial cognitive ability that enables individuals to attribute independent mental states, such as beliefs, desires, and intentions, to others. In essence, cognitive ToM (perspective-taking) and affective ToM (empathy) helps us navigate social interactions by recognizing that others are driven by intentions, have independent viewpoints, feelings and emotions.<sup>1</sup>

There are three primary theories that attempt to explain the potential bilingual advantage in ToM development:

1. Enhanced Executive Functions<sup>2</sup> which in turn contribute to a ToM advantage.<sup>3</sup> Executive functions are critical for managing multiple tasks and perspectives. Bilinguals, who constantly switch between languages, are thought to develop stronger executive functions, allowing them to inhibit their own per-

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<sup>1</sup> Ian Apperly, *Mindreaders: The Cognitive Basis of "Theory of Mind"*, New York, NY: Psychology Press, 2011.

<sup>2</sup> Ellen Bialystok, *Bilingualism in Development: Language, Literacy and Cognition*, Cambridge, UK: Cambridge University Press, 2001; Ellen Bialystok – Michelle M. Martin, "[Attention and Inhibition in Bilingual Children: Evidence from the Dimensional Change Card Sort Task](#)", *Developmental Science*, vol. 7, issue 3 (2004), pp. 325–339; Anastasia Greenberg – Buddhika Bellana – Ellen Bialystok, "[Perspective-taking Ability in Bilingual Children: Extending Advantages in Executive Control to Spatial Reasoning](#)", *Cognitive Development*, vol. 28, issue 1 (2013), pp. 41–50; Ellen Bialystok, "[Bilingualism and the Development of Executive Function: The Role of Attention](#)", *Child Development Perspectives*, vol. 9, issue 2 (2015), pp. 117–121.

<sup>3</sup> Rory T. Devine – Claire Hughes, "[Relations Between False Belief Understanding and Executive Function in Early Childhood: A Meta-Analysis](#)", *Child Development*, vol. 85, issue 5 (2014), pp. 1777–1794; Ágnes M. Kovács, "[Early Bilingualism Enhances Mechanisms of False-Belief Reasoning](#)", *Developmental Science*, vol. 12, issue 1 (2009), pp. 48–54.

spective and focus on another person's viewpoint more effectively. Some research<sup>4</sup> provides further insights into this theory. They found that in simultaneous bilinguals, language competence predicted ToM performance, while in dominant bilinguals, executive functions were the key predictors. This suggests that the level of bilingualism may influence which cognitive mechanisms are most relevant for ToM development (the quality of bilingualism must also be considered when understanding how ToM develops in bilingual individuals).

2. Improved Metalinguistic Awareness<sup>5</sup> which is closely related to the development of ToM.<sup>6</sup> Metalinguistic awareness refers to the ability to reflect on and manipulate the structure of language. Bilingual children, through their interactions with speakers of different languages, learn early on that language is a representational system that can vary significantly. This awareness enables them to grasp that the same “reality” can be represented in different ways by different individuals, thereby facilitating their understanding that others may have mental states or representations that differ from their own.<sup>7</sup>

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<sup>4</sup> Milijana Buac – Margarita Kaushanskaya, “[Predictors of Theory of Mind Performance in Bilingual and Monolingual Children](#)”, *International Journal of Bilingualism*, vol. 24, issue 2 (2019), pp. 339–359.

<sup>5</sup> M. Jeffrey Farrar – Sylvia Ashwell, “[Phonological Awareness, Executive Functioning, and Theory of Mind](#)”, *Cognitive Development*, vol. 27, issue 1 (2012), pp. 77–89; Ellen Bialystok – Raluca Barac, “[Emerging Bilingualism: Dissociating Advantages for Metalinguistic Awareness and Executive Control](#)”, *Cognition*, vol. 122, issue 1 (2012), pp. 67–73.

<sup>6</sup> Martin Doherty – Josef Perner, “[Metalinguistic Awareness and Theory of Mind: Just Two Words for the Same Thing?](#)”, *Cognitive Development*, vol. 13, issue 3 (1998), pp. 279–305; Vanessa Diaz – M. Jeffrey Farrar, “[The Missing Explanation of the False-Belief Advantage in Bilingual Children: A Longitudinal Study](#)”, *Developmental Science*, vol. 21, no. 4 (2018), e12594.

<sup>7</sup> Scott R. Schroeder, “[Do Bilinguals Have an Advantage in Theory of Mind? A Meta-Analysis](#)”, *Frontiers in Communication*, vol. 3 (2018); Chi-Lin Yu – Ioulia Kovelman – Henry M. Wellmann, “[How Bilingualism Informs Theory of Mind Development](#)”, *Child Development Perspectives*, vol. 15, issue 3 (2021), pp. 154–159.

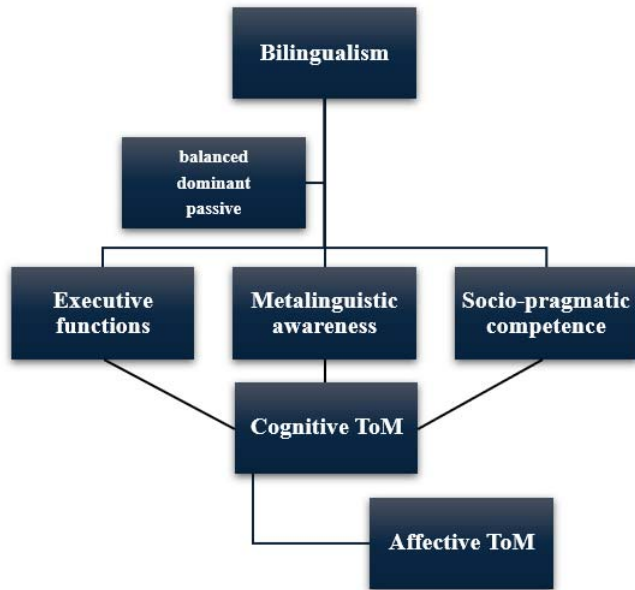
3. Socio-pragmatic Theory suggests that bilinguals, due to their diverse linguistic experiences, develop a more nuanced understanding that different people may possess varying language skills. This awareness extends to a broader understanding that individuals may have different mental states as well.<sup>8</sup> Researchers compared monolinguals, bilinguals, and children “just” exposed to a bilingual environment. They found that monolinguals performed worse on perspective-shifting tasks, which require understanding another person’s intentions, compared to bilinguals and those exposed to bilingual environments. Interestingly, while both bilingual groups performed equally well on perspective-shifting tasks, bilingual speakers scored higher on executive function tests, suggesting a link between bilingualism, executive functions and ToM.

In summary, the level and type of bilingualism appear to determine the mediating cognitive mechanism for ToM development:

- if the child is a passive bilingual, socio-pragmatic experiences might play a crucial role,
- if the child is a balanced bilingual, metalinguistic competence may be more influential,
- for dominant bilinguals, executive functions are likely the key factor in enhancing Theory of Mind.

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<sup>8</sup> Samantha P. Fan – Zoe Liberman – Boaz Keysar – Katherine D. Kinzler, “[The Exposure Advantage: Early Exposure to a Multilingual Environment Promotes Effective Communication](#)”, *Psychological Science*, vol. 26, issue 7 (2015), pp. 1090–1097, see also the array of literature referred to above.





*Yizhi Li*

## **The Wandering Mind in the Digital Age**

Mind wandering (MW) is often an exploratory mental behavior. When we engage in MW, the mind temporarily detaches from the perceptual environment and enters an inner “garden” grounded in our memory systems. In this process, attention often automatically begins to explore this garden and moves flexibly within it without a fixed destination. There are certain “sights” in this garden that are particularly captivating. These are usually our current concerns.<sup>1</sup> However, the most important feature of this garden stroll is that we do not decide where to go in this maze-like garden; the mind changes direction automatically and does not linger at any one “sight” for long. Since there is no clear destination, the direction of the exploration is not intentionally controlled. This is a purposeless exploration, and what we ultimately see (i.e., the content of MW), whether it’s a flash of insight or nothing interesting, often depends on luck. Some psychologists tell us that ordinary people spend 30% to 50% of their waking time MW.<sup>2</sup> This leads us to wonder to what extent we can truly control our attention, or in other words, to what extent we are truly agents with “mental autonomy.”<sup>3</sup> However, MW is still a natural psychological phenomenon, which comes with both costs and benefits.

In the digital age, the wandering mind has gained a new place to explore. With the advent of various electronic devices (especially smartphones), we now frequently engage in “extended mind wander-

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<sup>1</sup> Eric Klinger, *Structure and Functions of Fantasy*, Oxford: Wiley-Interscience, 1971.

<sup>2</sup> Matthew A. Killingsworth and Daniel T. Gilbert, “[A Wandering Mind Is an Unhappy Mind](#)” *Science*, vol. 330, issue 6006 (November 12, 2010), pp. 932–932.

<sup>3</sup> Thomas Metzinger, “[The Myth of Cognitive Agency: Subpersonal Thinking as a Cyclically Recurring Loss of Mental Autonomy](#),” *Frontiers in Psychology*, vol. 4 (2013).

ing”<sup>4</sup> – the mind not only wanders within the inner garden but also enters the digital garden through smartphones, mindlessly wandering within digital platforms like YouTube, TikTok, and various social media. This digital MW shares many similarities with “natural” MW but also has some significant differences: Extended MW is often deliberately triggered by carefully designed push notification mechanisms, and thus by tech companies, with the digital garden itself being both designed and controlled by these companies.

Normal MW is frequently initiated by unconscious internal psychological mechanisms but can also be triggered by external stimuli. Similarly, habitual smartphone use may lead us to start scrolling automatically without realizing that we initially intended to focus on other tasks, thus beginning “extended MW”. Moreover, since MW can also be driven by external stimuli, the push notification mechanisms can trigger a large amount of extended MW. It is important to note that tech companies observe and collect massive amounts of data on users’ online behavior, using this vast data to infer patterns of users’ attentional allocation. These inferences are made at various levels – from all users, to specific groups by gender, identity, or social class, and down to the individual. Due to the enormous amount of data and the continuous improvement of algorithmic efficiency, tech companies can increasingly accurately “understand users’ minds”.<sup>5</sup> In other words, they can peer into our inner gardens and use this as a basis to push related content. As a result, the external stimuli produced by these push mechanisms are often evaluated automatically as salient by our cognitive systems, making them potent catalysts for the initiation of extended MW.

So, when digital mind wandering is initiated, what kinds of gardens does our mind wander through? Our minds are wandering in digital gardens full of information customized according to each person’s attentional preferences. At first glance, the content we see

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<sup>4</sup> Jelle Bruineberg and Regina Fabry, “[Extended Mind-Wandering](#),” *Philosophy and the Mind Sciences*, vol. 3 (October 5, 2022).

<sup>5</sup> Tarleton Gillespie, *Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions That Shape Social Media*, Yale University Press, 2018.

during digital MW still seems, like in the inner garden, to depend on luck, and we partially control what we want to see. But on a deeper level, since pushed and customized content is largely controlled by the algorithms of tech companies, now the “sights” in the digital garden are actually meticulously designed by tech companies to exploit our attentional resources. In other words, if MW is a brief loss of control, this loss of control occurs within our own inner garden; but in extended MW, we are losing control within a space deliberately designed by tech companies to control and exploit our attention. If MW has already made mental autonomy, characterized by attentional agency, seem scarce, then in the digital age and within the context of the attention economy – where attention is systematically exploited, triggers for extended MW are meticulously designed, and the content of extended MW is deliberately controlled – we must consider more seriously how much “digital mental autonomy” we, as “digital cyborgs”, still possess.



*Dóra Dergez-Rippl*

## **The Phenomenology of Archetypes On the Philosophical Basis and Psychological Use of Our Primordial Images**

Our primordial images are with us for thousands of years. They are changeless yet somehow capable of changing. The paradox nature of archetypes is rooted in our collective unconscious, and Western investigation of it originates in ancient greek philosophy and mythology. We don't know where these images come from but we can experience them through symbols which can cheer us or help to overcome our inner chaos and support our individuation. Besides the sophisticated results of contemporary depth psychology we cannot overestimate the philosophical significance of the issue. The image-notions of Socrates, Plato and Augustinus reappear in contemporary analytical psychology. Ancient philosophy has created the basis of a dynamic psychological theory of archetypes. With Socrates and Plato there comes a new notion of soul which is connected to gods and eternity. Besides, Socrates brings a new notion of rational ethic: one can be virtuous *because* they have knowledge about virtue. Plato enriches the discussion with his metaphysical question: where are the ideas, inside or outside?

Augustine's notion of "ideae principales"<sup>1</sup> directly paves the way to the archetypal interconnection of the topic in analytical psychology. The notion is the latin version of the Greek notion of ἀρχετυπια (archetypiai), and, according to Augustinus these eternal primordial images can be recognised only by a rational soul.<sup>2</sup>

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<sup>1</sup> Augustinus, *De diversis questionibus ad Simplicianum* (A. Mutzenbecher ed.), Brepols Publishers, 1970.

<sup>2</sup> *Ibid.*, XLVI, 2.

C. G. Jung's depth psychological viewpoint is based upon this philosophical heritage.<sup>3</sup> The phenomenological development of the issue is Jung's theory of two kinds of archetypes. According to this there are the "per se archetype" and a pictorial appearance of it through symbols. While the former is unknowable and invariable, the latter can change according to cultural effects or psychic happenings. So symbols are phenomenons of the soul, which are often but not always pictorial. It's not easy to analyse them because they come from the collective unconscious. Jung emphasizes the relevance of the transcendental function of human soul through these symbolical images; not in metaphysical sense but the ability of psychic dynamism. In light of the mysterious origin of these symbols Plato comes to our – and to Jung's – mind.<sup>4</sup> "*Archetype*, far from being a modern term, was already in use before the time of St. Augustine, and was synonymous with 'Idea' in the Platonic usage... Were I a philosopher, I should continue in this Platonic strain."<sup>5</sup>

Let us continue this strain not only in a Platonic sense but in a Jungian way as well; maybe we can get closer to the mysterious question of our innate images: where the archetypes come from?

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<sup>3</sup> Jolande Jacobi, *Psychology of C. G. Jung*, Routledge and Kegan Paul, 1942, p. 57.

<sup>4</sup> Carl Gustav Jung, *Archetypes and the Collective Unconscious (The Collected Works of C. G. Jung, Vol. 9. Part 1)*, Princeton University Press, 1969.

<sup>5</sup> Carl Gustav Jung, *Four Archetypes*, Princeton University Press, 2010, p. 149.

*Xu Wen*

## **Multimodally Learning Abstract Concepts in the Age of AI**

### **1. Introduction**

The proliferation of Artificial Intelligence (AI) technologies has ushered in a new era of educational possibilities, particularly in the realm of abstract concept learning. Abstract concepts, such as truth, goodness, justice, freedom, love, beauty, and democracy, are not directly tied to our bodily experiences, making them inherently challenging to grasp. The traditional teaching methods often depend on verbal explanations and textual representations, which may not fully convey the abstractness and complexity of these ideas. Multimodal learning, which engages multiple sensory modalities, offers a promising avenue for enhancing the comprehension of abstract concepts.

This paper investigates how humans learn abstract concepts or ideas through multimodal means in the age of AI. It synthesizes insights from cognitive linguistics, visual linguistics, multimodality theory, cognitive psychology, and AI research to provide a comprehensive understanding of the processes involved.

### **2. Abstract Concepts and Their Features**

Abstract concepts such as “goodness”

“善”

and “love” are mental representations that do not have a direct physical or sensory referent in the world. They play a fundamental role in human cognition and communication. They enable us to express ideas that go beyond the physical world and are essential for creativity, problem-solving, and critical thinking. Understanding ab-

stract concepts is also crucial for AI systems to interact with humans in a more natural and intuitive manner. For instance, a virtual assistant needs to comprehend users' emotions to provide empathetic responses, and a chatbot must grasp nuanced language to engage in meaningful conversations.

Abstract concepts are often complex and flexible, involving multiple dimensions and interpretations. Unlike concrete concepts, which can be easily linked to sensory experiences, abstract concepts require higher-order cognitive processes, including abstraction, generalization, and metaphorical thinking. For instance, what is love? It's hard to answer this question. Just as Bloomfield said: "we have no precise way of defining words like *love* and *hate*, which concern situations that have not been accurately classified"<sup>1</sup>. But love might be comprehended via figurative languages such as similes and metaphors. For example, love may be compared to water as "love is like water, we can fall in it, we can drown in it, and we can't live without it". This is a vivid simile of love. In addition, we have such conceptual metaphors as LOVE IS A JOURNEY, LOVE IS FIRE, LOVE IS A PHYSICAL FORCE, and LOVE IS A WAR, which can help us to understand the abstract concept "love". The following two pictures represent the two metaphors "LOVE IS A JOURNEY, LOVE IS FIRE" (generated by Wenxinyina

[文心一言] ChatGPT 40

respectively), which can help us to understand what love really is.

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<sup>1</sup> L. Bloomfield, *Language*, New York: Henry Holt, 1933, p. 145.





Abstract concepts represent general principles or qualities that are often intangible and cannot be perceived directly by the senses. They have such major features as follows:

- (1) Intangible: Abstract concepts cannot be seen, touched, or measured in a physical way. For instance, “truth”, “justice”, “freedom” and “love” are abstract concepts we cannot directly observe but understand through thought, discussion, or experience.
- (2) Universal or broad in scope: Abstract concepts often apply broadly rather than to specific, individual cases. For example, “beauty” as an abstract concept can be applied to many things: nature, art, people, etc., without specifying what makes something beautiful.
- (3) Subject to interpretation: Because they lack concrete physical characteristics, abstract concepts are often open to multiple interpretations. For instance, what one person considers “happiness” may be different from what happiness means to someone else.
- (4) Associated with emotions or values: Many abstract concepts are tied to feelings, values, or moral judgments, like “goodness”, “honesty” “respect” or “hope”. These concepts are often personally significant and can vary between cultures or individuals.

(5) Expressed through language and symbols: Abstract concepts are conveyed through words, symbols, or other representations since they do not have a direct, tangible form. For example, “peace” is represented symbolically by a dove or a peace sign.

Consider “freedom” as an abstract concept. It is not something you can touch or see directly. Freedom can mean different things to different people – for some, it may be political autonomy, while for others, it may refer to personal independence or financial security. It is a broad, subjective idea that can apply in various contexts and holds deep personal and cultural significance.

The comprehension of abstract concepts involves cognitive mechanisms, the mental processes or operations that enable humans to perceive, remember, think, reason, and understand. These mechanisms are the underlying structures and functions of the mind that facilitate cognition – the acquisition, storage, transformation, and use of knowledge. Cognitive mechanisms are essential for interpreting sensory information, learning from experiences, making decisions, and solving problems. The following are the major cognitive mechanisms in understanding abstract concepts:

- (1) Symbolic representation: The use of symbols, language, and other signs to represent abstract concepts.
- (2) Dual Coding Theory: It suggests that combining verbal and non-verbal information enhances learning.<sup>2</sup>
- (3) Analogical reasoning: Drawing parallels between known concepts and new abstract ideas.
- (4) Conceptual metaphors: Understanding abstract domains through the mapping of concrete experiences.<sup>3</sup>

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<sup>2</sup> A. Paivio, *Mental Representations: A Dual Coding Approach*, Oxford: Oxford University Press, 1986.

<sup>3</sup> G. Lakoff – M. Johnson, *Metaphors We Live By*, Chicago: The University of Chicago Press, 1980, p. 3.

(5) Embodied Simulation: It proposes that understanding involves simulating experiences in the brain's sensory-motor systems.

(6) Embodied cognition: The theory that cognitive processes are deeply rooted in the body's interactions with the world.<sup>4</sup>

### 3. Multimodal Learning and Multimodal Metaphors

#### 3.1. Multimodal Learning

Multimodal learning refers to the integration of multiple sensory inputs to facilitate comprehension and memory. It leverages the brain's natural ability to process information through various channels – visual, auditory, kinesthetic, and tactile – to enhance learning outcomes. This approach aligns with the Dual Coding Theory, which posits that information is better retained when presented through both verbal and non-verbal codes.<sup>5</sup> Usually there are four types of modalities:

Visual modality: Diagrams, images, and spatial representations.

Auditory modality: Spoken words, sounds, and music.

Kinesthetic modality: Physical activities, gestures, and tactile experiences.

Textual modality: Written words and symbolic representations.

By engaging multiple senses, learners can form more robust mental models, making abstract concepts more accessible and relatable.

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<sup>4</sup> L. W. Barsalou, "Grounded Cognition", *Annual Review of Psychology*, vol. 59 (2008), pp. 617–645; N. A. Kompa, *Language, Cognition, and the Way We Think*, London: Bloomsbury, 2024.

<sup>5</sup> Paivio, *op. cit.*

### 3.2. Multimodal Metaphors

Metaphors, multimodal metaphors in particular, are ubiquitous, and they are essential to people's ability to understand abstract concepts or ideas. As Lakoff and Johnson explain: "Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature."<sup>6</sup> Bowdle and Gentner concur: "A growing body of linguistic evidence further suggests that metaphors are important for communicating about, and perhaps even reasoning with, abstract concepts such as time and emotion. ... Indeed, studies of scientific writing support the notion that far from being mere rhetorical flourishes, metaphors are often used to invent, organize, and illuminate theoretical constructs."<sup>7</sup> As regards the frequency of metaphors, Bowdle and Gentner report: "In an analysis of television programs, Graesser et al. ("What are the cognitive and conceptual components of humorous texts?", *Poetics*, 18 1989) found that speakers used approximately one unique metaphor for every 25 words."<sup>8</sup>

A multimodal metaphor is a metaphor expressed through a combination of different modes, such as language, images, sounds, gestures, or physical experiences, rather than just through words. By engaging multiple sensory and cognitive channels, multimodal metaphors often communicate complex and abstract concepts or ideas more richly and effectively than purely verbal metaphors.<sup>9</sup> This flexibility allows for more dynamic storytelling, persuasive advertising, and impactful educational tools, as they can convey complex, abstract ideas or concepts in ways that are easily relatable and memorable.

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<sup>6</sup> Lakoff – Johnson, *op. cit.*, p. 3-

<sup>7</sup> B. Bowdle – D. Gentner, "[The Career of Metaphor](#)", *Psychological Review*, vol. 112. no. 1 (2005), p. 193.

<sup>8</sup> *Ibid.*

<sup>9</sup> C. Forceville, "Multimodality", in Wen Xu and J. R. Taylor (eds.), *The Routledge Handbook of Cognitive Linguistics*, London: Routledge, 2021, pp. 676–687.

Multimodal metaphors have some main features:

(1) Cross-modal integration

Multimodal metaphors rely on combining different modes, such as visual, auditory, linguistic, and sometimes even tactile elements, to create a single metaphorical meaning. For example, in an advertisement where a product is shown with a glowing aura (visual mode) and a tagline like “brighten your day” (linguistic mode), the concept of “brightness” or “happiness” is conveyed through both image and text.

(2) Enhanced expressiveness

By engaging multiple senses or ways of processing information, multimodal metaphors add layers of meaning and emotional depth. A metaphor in a movie scene, for instance, where rain is paired with somber music to represent sadness, creates a stronger emotional effect than using only the verbal description of “sad”.

(3) Embodied experience

Multimodal metaphors often evoke physical or sensory experiences, helping the audience relate to abstract ideas more concretely. For example, associating “success” with climbing a mountain combines the physical effort of climbing (visual and experiential modes) with the concept of achievement, making it feel more relatable and tangible.

(4) Contextual flexibility

Because multimodal metaphors use different modes, they are highly adaptable and can be understood in varied contexts. In educational settings, for instance, an abstract concept like “building knowledge” can be represented with images of construction or building blocks alongside explanatory text, making complex information easier to grasp across different contexts.

(5) Cognitive engagement

Multimodal metaphors often require the viewer to make connections between the different modes. This process actively engages cognitive faculties, as people have to synthesize the

metaphor by connecting what they see, hear, or read, leading to a deeper and more memorable understanding of the message.

By combining linguistic elements (words, metaphors) with visual aids, gestures, and auditory cues, multimodal learning and multimodal metaphors tap into different cognitive processes, helping learners form a more cohesive understanding of abstract concepts or ideas.

#### **4. Multimodally Learning Abstract Concepts with AI**

AI plays a crucial role in helping people learn abstract concepts multimodally, meaning through multiple types of media or sensory inputs like text, visuals, sounds, and interactivity. By integrating these various inputs, AI can make complex, abstract ideas more understandable and relatable. Here we can give some examples to illustrate this role of AI:

##### **4.1. Understanding emotions in literature with AI-generated visualizations and soundscapes**

Abstract concepts like “melancholy” or “hope” in literature can be challenging to grasp, especially for younger or non-native readers. AI can analyze a text and generate visual representations of emotions, or even create a soundscape that reflects the mood of a scene. For example, AI might produce a somber, dark-hued visual and a slow, minor-key musical background when analyzing a melancholic passage, providing a sensory experience that deepens understanding. Another example, if a student reads about “despair” in a novel, he could see AI-generated visuals of stormy clouds, muted colors, and slow music that aligns with despair’s emotional tone, making the abstract concept of despair more relatable.

#### 4.2. Interpreting scientific concepts through Augmented Reality (AR) and Virtual Reality (VR)

AI, combined with AR/VR, allows users to experience abstract scientific concepts like “quantum superposition” or “relativity” in immersive ways. By simulating scenarios and providing visual and interactive models, AI enables learners to “see” and manipulate these abstract ideas in a simulated environment. For example, AI-powered VR simulations could help students visualize the concept of time dilation by experiencing a journey at near-light speeds, seeing time slowing down relative to outside observers. Such an experience transforms a difficult abstract concept into a tangible, interactive scenario.

#### 4.3. Exploring historical and cultural abstracts with AI-based interactive storytelling

Abstract concepts like “freedom”, “democracy”, or “justice” can be challenging to understand in cultural or historical contexts. AI-driven storytelling tools can create multimodal experiences that include visuals, narratives, and even character dialogues, allowing users to explore different interpretations of these concepts across time and cultures. For example, an AI could create an interactive story where users explore different historical settings – like China, ancient Greece – and interact with AI-generated characters who express diverse views on democracy. The multimodal setup helps learners appreciate democracy’s evolving meaning through various cultural and temporal lenses.

#### 4.4. Learning mathematical and logical concepts through interactive simulations

AI-powered tools can help explain abstract mathematical concepts like “infinity”, “probability”, or “limits” by generating visual and interactive simulations that illustrate these ideas. For example, learners can visualize an infinite sequence by seeing it unfold in real time or understand probability through interactive games that adjust based on AI-calculated probabilities. For instance, to understand “infinity”, AI could present a visual of a number line that continuously

zooms out, showing there is always more to count, or simulate a geometric pattern where each zoom level reveals another layer. This immersive visual helps learners grasp infinity's abstract nature.

#### 4.5. Abstract art and aesthetics through AI image generation and analysis

Concepts in abstract art, such as “beauty”, “harmony”, or “chaos”, can be difficult to articulate. AI can generate images and then analyze and deconstruct them, showing how different combinations of color, shape, and structure evoke certain ideas or emotions. By engaging with these images and AI-generated interpretations, learners can better understand these abstract aesthetics. For example, an AI could generate different versions of an abstract painting labeled with interpretations like “calm”, “intensity”, or “conflict”. As learners view each version, AI explains how specific color schemes or compositions contribute to each aesthetic quality, helping learners grasp these subjective, abstract concepts.

Here are two paintings representing the concept of “calm”, created with soft colors and flowing lines to evoke tranquility (generated by ChatGPT 40 and Wenxinyiyna respectively):



#### 4.6. Philosophical concepts explored through AI conversations and scenarios

In many cases, philosophy is concerned about the meaning or understanding of some nouns. AI chatbots can help learners explore



complex and abstract philosophical abstractions like “Dao”

“道”,

“existentialism”, “moral relativism”, or “utilitarianism” by simulating debates, discussions, or ethical dilemmas. Through dialogue and scenario-based questions, users can engage with these ideas dynamically and receive multimodal responses, such as follow-up text, visuals, or suggested readings. For example, an AI chatbot could present a moral dilemma related to utilitarianism, such as the “trolley problem”, and then offer visual diagrams of the scenario, different viewpoints, and real-time responses as the learner makes choices. This multimodal approach deepens the understanding of utilitarianism’s application and implications.

#### 4.7. Language and metaphor analysis in literature or speeches

Abstract linguistic concepts like “metaphor”, “metonymy”, or “symbolism” in language can be challenging, especially in poetry or complex speeches. AI can analyze text, highlight metaphors, provide multimedia interpretations, or even visualize metaphorical content to make these concepts more accessible. For example, for a poem containing metaphors like “the stormy seas of life”, AI might create an image of a person navigating through stormy waters (generated by Wenxinyiyan), helping learners visually and emotionally connect with the metaphor’s deeper meaning.



Through these multimodal approaches, AI helps break down abstract concepts into tangible, relatable experiences, making complex learning both engaging and accessible.

## **5. Conclusion**

In the age of AI, human learning of abstract concepts is becoming increasingly multimodal, leveraging technology to engage multiple senses and cognitive pathways. AI enhances this process by providing personalized, interactive, and immersive learning experiences that make abstract concepts more concrete and understandable. While there are challenges to address, the synergy between multimodal learning and AI holds significant promise for education, enabling deeper comprehension and retention of complex concepts.

Yutian Qin

## Short on Time How Watching Short-Form Videos Relates to People's Metaphorical Perspectives on Time

People often recruit the concrete domain of space to understand the abstract concept of time.<sup>1</sup> Through metaphorically mapping, past is positioned left, front, or up and future is located right, behind, or down. When in motion, time is represented using two polar spatial metaphors. One envisions a dynamic observer moving from the present toward some stationary future event and is therefore dubbed the *ego-moving* metaphor. The other envisages time moving from the future toward a stationary observer and is thus called the *time-moving* metaphor.<sup>2</sup> Corresponding illustrations of the dichotomous spatiotemporal metaphors can be found in stock expressions such as “喜迎国庆 (*We are coming up to the National Day celebration*)” and “新春将至 (*The Spring Festival is approaching us*)”.

Much evidence has pointed toward the malleability of people's metaphorical perspectives on temporal movement, which can vary subject to differences in emotional experiences and in personality traits. Little is known, however, whether temporal perspective preference may also change depending on the perception of time conditioned by habitual exposure to short-form video applications on smartphones.

Short-form video applications (hereinafter SVAs) such as DouYin and its global equivalent TikTok have become ubiquitous, and as a result, increasing attention has been paid to their influence

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<sup>1</sup> George Lakoff and Mark Johnson, *Metaphors We Live By*, Chicago: The University of Chicago Press, 1980.

<sup>2</sup> Herbert H. Clark, “[Space, Time, Semantics, and the Child](#)”, in *Cognitive Development and the Acquisition of Language*, ed. by Timothy E. Moore, Cambridge, MA: Academic Press, 1973, pp. 27–63.

on individuals. Short videos uploaded onto, viewed and shared by various short video platforms typically span from a few seconds to a few minutes in duration.<sup>3</sup> Leverage of artificial intelligence (AI) for personal preferences and customized content and continued upgrading and simplifying of software operation functions for easy access contribute to immersive user experience and retention of the apps.<sup>4</sup>

Among the many contributors to the sustained use of SVAs, flow experience has received much attention. Flow experience is characterized by feelings of greater activity, alertness, concentration, happiness, satisfaction, and creativity.<sup>5</sup> People enter a flow state when they are fully engaged in a task to the exclusion of external and internal distractions<sup>6</sup> and one such scenario where flow state can be achieved is the everyday engagement with smartphones and their SVAs. Specifically, through algorithmics-driven recommendations (e.g., self-referencing, serendipity), SVAs constantly provide users with content tailored to their preferences that can lead to intense immersion and temporal distortion, two characteristics symbolic of

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<sup>3</sup> Chen Zheng, "[Research on the Flow Experience and Social Influences of Users of Short Online Videos: A Case Study of DouYin](#)", *Scientific Reports*, vol. 13, (2023), article no. 3312.

<sup>4</sup> Yuhui Wang and Siyi Wang, "[Short-Video Applications Use and Self-Concept Clarity among Adolescents: The Mediating Roles of Flow and Social Media Self-Expansion](#)", *Acta Psychologica*, vol. 249 (2024), article no. 104469; Hongying Zhao and Christian Wagner, "[How TikTok Leads Users to Flow Experience: Investigating the Effects of Technology Affordances with User Experience Level and Video Length as Moderators](#)", *Internet Research*, vol. 33, no. 2 (2023), pp. 820–849.

<sup>5</sup> Mihaly Csikszentmihalyi and Judith LeFevre, "[Optimal Experience in Work and Leisure](#)", *Journal of Personality and Social Psychology*, vol. 56, no. 5 (1989), pp. 815–822.

<sup>6</sup> Mihaly Csikszentmihalyi, "[Happiness, Flow, and Economic Equality](#)", *The American Psychologist*, vol. 55, no. 10 (2000), pp. 1163–1164.

flow experience.<sup>7</sup> Indeed, it was found that people who were in the flow state reported a faster feeling of time passing.<sup>8</sup>

Recently, perception of elapsed time has been positively linked to temporal distance judgement to the future, with longer perceived elapsed time being associated with longer judgement of distance to the future.<sup>9</sup> Pertinently, temporal distance is embedded in metaphorical perspectives on time, with longer perceived temporal distance being related to the ego-moving perspective and shorter perceived temporal distance being related to the time-moving perspective. For example, it was found that the ego-moving frame was linked to higher discounting of future returns, whereas the time-moving frame was linked to privileging long-term returns because the former makes the future appear more distant and the latter makes the future appear more proximate.<sup>10</sup> More recently, a study on consumer psychology also demonstrated that the ego-moving (vs. time-moving) metaphor made consumers perceive a target event (e.g., the iPhone 14 launch day) as being temporally more distant which generated greater impatience and more willingness to pay extra for express delivery for an online order.<sup>11</sup>

Integrating the multiple avenues of inquiry reviewed above, with the overarching concatenation being the influence of SVAs on

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<sup>7</sup> Hirohito M. Kondo – Elena Gheorghiu – Ana P. Pinheiro, “[Malleability and Fluidity of Time Perception](#)”, *Scientific Reports*, vol. 14 (2024), article no. 12244.

<sup>8</sup> Soo-hyun Im and Sashank Varma, “[Distorted Time Perception during Flow as Revealed by an Attention-Demanding Cognitive Task](#)”, *Creativity Research Journal*, vol. 30, issue 3 (2018), pp. 295–304.

<sup>9</sup> Kyu Kim and Gal Zauberman, “[The Effect of Music Tempo on Consumer Impatience in Intertemporal Decisions](#)”, *European Journal of Marketing*, vol. 53, issue 3 (2019), pp. 504–523.

<sup>10</sup> Donal Crilly, “[Time and Space in Strategy Discourse: Implications for Intertemporal Choice](#)”, *Strategic Management Journal*, vol. 38, issue 12 (2017), pp. 2370–2389.

<sup>11</sup> Xiaobing Xu – Miaolei Jia – Rong Chen, “[Time Moving or Ego Moving? How Time Metaphors Influence Perceived Temporal Distance](#)”, *Journal of Consumer Psychology*, vol. 34, issue 3 (2024), pp. 466–480.

time perception and association between temporal distance and the metaphorical representation of time, the present research aimed to investigate the influence of SVAs on people's metaphorical perspectives on the movement of events in time. Based on the literature, it was hypothesized that SVAs (e.g., DouYin) should judge the distance to the future to be shorter, which in turn would result in a bias in favor of the time-moving perspective.







**THE FUTURE OF IMAGES  
IS THERE A VISUAL TURN?**



*Cynthia Freeland*

## **New Histories for Instant Fashion Futures**

The word “fashion” conjures up images of models sashaying in luxe outfits down runways in Paris, Milan, or New York, admired by socialites and film stars as flashbulbs pop. But the “fashion ecosystem” includes much more than this. The biggest fashion conglomerate, LVMH (Louis Vuitton Moët Hennessy), not only owns major fashion houses like Dior and Chanel but associated ventures in cosmetics, perfume, accessories, yachts, spirits, and wines.<sup>1</sup> It should be no surprise that large fashion firms invest heavily in R&D, online marketing, and many new sorts of AI research. For example, AI facilitates research into materials that are literally space-age, in that they were developed for the use of astronauts on spacewalks.<sup>2</sup> AI is already being used to assist not only in all stages of design creation up to and including catwalks and fashion competitions, but in all other aspects of the fashion economy: shipping, marketing, distribution, and retail.

Most central for my purposes here is how electronic social media sustain what is at fashion’s very heart: the cultivation and satisfaction of consumer desires. Fashion is quintessentially about the new, and AI is now directed toward better forecasting of trends. Unfortunately, as social media stars provide instantaneous fashion coverage, they also contribute to climate change. If the sought-after new products arrive a moment too late to the retail market they will get passed over, leading to markdowns, resales, and all too often, land-

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<sup>1</sup> “[Biggest Fashion Brands, by value in US\\$.](#)” – “[LVMH](#) controls around 60 subsidiaries that manage 75 luxury brands. In addition to Louis Vuitton and Moët Hennessy, LVMH’s portfolio includes Dior, Givenchy, Fendi, Celine, Kenzo, Tiffany, Bulgari, Loewe, TAG Heuer, Marc Jacobs, Stella McCartney, Sephora, Loro Piana and Princess Yachts.”

<sup>2</sup> Axiom Space, “[Prada Unveil Spacesuit Design for Moon Return](#)” (October 16, 2024).

fills.<sup>3</sup> “Fast fashion” has made the fashion ecosystem [one of the worst culprits](#) in the unfolding [climate disaster](#).

For more than a century fashion was disseminated through print media in magazines like *Harper’s Bazaar*, *Cosmopolitan*, and *Vogue*. I remember as a teenager in the 1960s eagerly anticipating *Seventeen* magazine each month. Today no teen needs to wait more than a minute for fashion updates. They can open the TikTok, Snapchat, or Instagram apps on their phones to see the latest. Herein lies the paradox: what can be seen “NOW” has an expiring time limit on its moment of being cutting-edge. (This is worse than Andy Warhol’s 15 minutes of fame; hence my title, “Instant Fashion Futures.”) Some designers have sought to stop this rapid erosion of novelty by blocking social media PR, as the Olsen Twins did for their show for The Row in March, 2024. They required all attendees to drop off their phones before admittance. But such efforts seem doomed to failure.<sup>4</sup> Almost all design houses depend crucially on direct advertisement to consumers via the use of social media Influencers, some of whom garner millions of followers. This has led to the parasitic related (and lucrative) career of being a *manager* of social media Influencers. These new experts are matchmakers who put together the “talent” (the social media stars) with appropriate companies, those who want to promote their latest product, negotiating for fees that are set in terms of “price per view”.<sup>5</sup>

These entrepreneurial “Influencer-Managers” may soon, like so many others, lose their jobs to AI bots that can find exactly what advertisers need. This is done, of course, via specialized verbal instructions to LLMs to search through the vast archives of social media posts to derive particular types of specified content. One example of an AI trend focusing firm, Heuritech, founded in 2013, claims to be able to forecast trends to a 90% level of accuracy, and it is reg-

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<sup>3</sup> Manuel Bojorquez and Kerry Breen, “[Inside the landfill of fast-fashion: “These clothes don’t even come from here”](#)” CBS News, Dec. 16, 2023.

<sup>4</sup> Chloe MacDonnell, “[“No pictures, please’: What the Olsen twins’ social media blackout says about privacy”](#)”, *The Guardian*, March 8, 2024.

<sup>5</sup> For one example, see <https://www.reddit.com/r/influencermarketing/>.

ularly consulted by today's most prestigious fashion firms.<sup>6</sup> Ironically, the AI searchers who pore over all the garbage we put out there on social media sites must somehow begin their tasks of predicting by locating key influencers, i.e., those who set the trends. Their Mission Impossible is thus to pinpoint the most Influential Influencers: the right ones to forecast the future. We are in a Borges story in which instantaneity closes (or short-circuits) the desire-satisfaction nexus of the fashion universe.

Let us backtrack to try to understand the role of trends and the new in fashion. Past attempts to forecast trends in fashion have been so bad as to be comical, as best seen in science fiction films. We all laugh now at “futuristic” fashions of the original *Star Trek* TV show: the mini-skirts, big hair (on women), and makeup styles of the 1960s. Arthur Danto made a relevant point in his essay “The End of Art” about the conceptual limitations of picturing the future:

Nothing so much belongs to its own time as an age's glimpses into the future: Buck Rogers carries the decorative idioms of the 1930s into the twenty-first century ... the science fiction novels of the 1950s project the sexual morality of the Eisenhower era... The future is a kind of mirror in which we can show only ourselves, though it seems to us a window through which we may see things to come.<sup>7</sup>

One interesting exception to this general rule is the styling of the original (1982) film *Blade Runner*, which has been said to be effective because it was “retro-futurist”. That is, stylists weirdly created its futuristic scenes by revisiting fashions from the past in crafting looks for major characters like the beautiful android heroine

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<sup>6</sup>An excellent source of information on this, as well as other fashion AI innovations, is <https://www.youtube.com/watch?v=WTEgizB-oyU&t=73s>. The writer is not identified by name, but maintains both a Youtube channel and Patreon page under the label “Threaducation”.

<sup>7</sup> Arthur Danto, “The End of Art”, in *The Philosophical Disenfranchisement of Art*, New York: Columbia University Press, 1986/2005, p. 83.

Rachel (Sean Young). She stunned viewers both then and now in clothes and hair that vaguely evoked the glamour of 1940's movie stars.<sup>8</sup>

Academic explanations for the persistent human desire for novelty in fashion are multiple and varied. Theories are offered from the fields of economics, feminism, evolutionary psychology, sociology, anthropology – and of course, philosophy.<sup>9</sup> Perhaps paradoxically, fashion also respects its past. The cult of the new co-exists with the worship of “Old Masters”. Major art museums like the Metropolitan or Victoria and Albert have staged exhibits of work by famous designers like Yves Saint Laurent, Oscar de la Renta, and Alexander McQueen. These greats are thereby baptized as “artists” whose works ascend into a timeless fashion heaven.<sup>10</sup>

Given fashion's emphasis on being cutting-edge or avant-garde, it is no surprise that there have been many collaborations between fashion designers and artists from ballet, stage, music, painting, and more. In the present time such collaborations occur especially with film stars. Think of Margot Robbie, from the *Barbie* movie, seen everywhere last summer wearing human-sized recreations of actual outfits from the famous doll's closet, typically in pink. Inevitably, “Barbiecore” has faded away; pink is passé. Out-of-trend fashion gets cruel treatment from reporters and bloggers: it is “stale” and

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<sup>8</sup> Farah Joan Fard, “[From Blade Runner to The Force Awakens, How Sci-Fi Influences Fashion](#)”, *Vanity Fair*, October 5, 2017.

<sup>9</sup> See for example Annette Lynch and Mitchell D. Strauss, *Changing Fashion: A Critical Introduction to Trend Analysis and Meaning*, Oxford and New York: Berg, 2007; Malcolm Barnard, *Fashion as Communication*, Second Edition, London and New York: Routledge, 2002; and Christopher Breward, *Fashion*, Oxford History of Art series, Oxford and New York: Oxford University Press, 2003.

<sup>10</sup> I am obviously being cynical here. Truth to tell, some of the museums did offer astute critical analysis, particularly of the McQueen show: “Mr. McQueen challenged and expanded the understanding of fashion beyond utility to a conceptual expression of culture, politics, and identity. His iconic designs constitute the work of an artist whose medium of expression was fashion.” (Exhibition [Savage Beauty](#)).

“dated”. I read recently on a major fashion blog that someone’s outfit “reeked of the aughts” (i.e., of the early 2000s).<sup>11</sup>

We may justifiably wonder whether change in either fashion or art is “progress”. Art historians like E. H. Gombrich in *Art and Illusion* gave voice to a Hegelian view of art as a progressive enterprise inherently aiming at specific goals, such as verisimilitude in visual representation.<sup>12</sup> Certain art movements or artists, like Dada or Pop, that did not clearly fit into this trajectory were treated as deviations from the “primary path” of art. The role of the avant-garde in making it possible for art to “advance” was explicated in Clement Greenberg’s famous 1939 article, “Avant-Garde vs. Kitsch”.<sup>13</sup> Greenberg’s general view was that certain artists drive art forward by articulating the “true nature” of their medium. Thus, Pollock’s paintings made it plain that a painting is a flat surface with paint applied to it.

But Hegelian teleological views of art were challenged in the 1980s by philosopher Arthur Danto and art historian Hans Belting. Danto spoke of the end of art as the end of a “master narrative” of what art must be, such that now, “There is no special way works of art have to be.” Danto tried to acknowledge Hegel’s historicism but reconcile it with socio-cultural shifts by holding that an artwork is something with an embodied meaning created within a historical context that permits it to be seen as art (an “artworld”).<sup>14</sup> Arguments against master narratives of art were also typical of the postmodernists of the late 1980s. Belting’s book was about the end of art *history*, not of art itself, but he too discussed major figures who employed

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<sup>11</sup> The comments were on the blog [tomandlorenzo.com](http://tomandlorenzo.com); I do not have the exact reference ready to hand.

<sup>12</sup> E. H. Gombrich, *Art and Illusion: A Study in the Psychology of Pictorial Representation*, London: Phaidon, 1960.

<sup>13</sup> Clement Greenberg, “[Avant Garde and Kitsch](#)”, in *The Partisan Review* (1939). There is also of course an important political dimension to Greenberg’s article, since kitsch represents bourgeois taste, that I cannot deal with here; I will at least revert to a political issue briefly near the end of this talk.

<sup>14</sup> Arthur Danto, *After the End of Art: Contemporary Art and the Pale of History*, Princeton: Princeton University Press, 1988.

progressive models of art history: Vasari, Winckelmann, and Hegel.<sup>15</sup> On Hegel's progressivism, once art becomes highly theoretical it more or less reaches its fulfillment, and thus ends.<sup>16</sup>

Now that we have reached the third decade of the 21st century, and both Danto and Belting have died, we don't hear so much any more about either postmodernism or the end of art. Instead, a few philosophers of art have proposed approaches to defining art that are more localized and piecemeal. In his book *Beyond Art* (20014), Dominic Lopes suggests dropping the search for any one definition of art in favor of various *theories* of the arts, differentiating arts from non-arts and focusing on what counts as art in diverse fields, such as photography, sculpture, pottery, painting, etc.<sup>17</sup> These arts have their own histories, practices, and norms for creation and appreciation.<sup>18</sup> In a related vein, Sonia Sedivy's 2016 book *Beauty and the End of Art* also criticizes Danto for an "essentialist" approach that mistakenly sought some one definition of art. She too calls for more specialization or localization, although this is alternatively grounded in a Wittgensteinian account of art as a "form of life".<sup>19</sup>

Returning to the fashion and "progress" question, we might try to borrow from these recent philosophical developments and apply them to the general realm of fashion. One could easily distinguish localized types of fashion that adhere to distinct norms and values: fashion for business, the street, cowboys, athletes, K-pop stars, etc. (Along these lines, it is worth noting that the theme of the next Met

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<sup>15</sup> Hans Belting, *The End of the History of Art?* Translated by Christopher J. Wood, Chicago: University of Chicago Press, 1987.

<sup>16</sup> For a fuller account of Hegelian teleology in art history, see James Elkins, *Stories of Art*, New York and London: Routledge, 2002.

<sup>17</sup> Dominic McIver Lopes, *Beyond Art*, Oxford and New York: Oxford University Press, 2014.

<sup>18</sup> I offered criticisms of how this would work for the medium of photography in my response to Lopes, "Four Thoughts about Four Arts of Photography", included in Lopes's book, *Four Arts of Photography: An Essay in Philosophy*, Malden, MA: Wiley, 2015, pp. 147–156.

<sup>19</sup> Sonia Sedivy, *Beauty and the End of Art: Wittgenstein, Plurality and Perception*, London: Bloomsbury Academic, 2016.



Gala in 2025 will be “The Black Dandy”.) Globalism is another factor that should be considered in trying to define either art or fashion in our century.<sup>20</sup> There are no doubt local values for the high-fashion designers based in India, Japan, or China, and distinct norms for small-scale creators in Africa or in indigenous North American cultures promoting sustainability in stages of fabric production and creative design.

While there may be some explanatory potential in my sketchy analogy between art and fashion as creative human endeavors, any purely aesthetic approach will be limited by ignoring the key factor of Money. Far more than art, fashion is fetishized as a commodity product of late-stage capitalism. To ignore the ugly truths at this lily’s dirty roots, such as worker exploitation and climate destruction, would be badly misguided. Some people might assuage their moral qualms by trying to “opt out” of fashion – by, say, spinning wool and weaving their own clothes, adopting a uniform like Steve Jobs’ black turtleneck, or donning the famous Mao jacket. The latter garment succeeded at some levels in erasing differences of class and gender, celebrating national heritage, and symbolically expressing cultural values. But even the Mao suit itself had status variations in fabric and number of pockets.<sup>21</sup> Moral purity seems at odds with our human tastes and desires to stand out; fast fashion continues to outrun us.

On the next page see:

### **Appendix: Images for Instant Fashion Futures**

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<sup>20</sup> Elkins also discusses this as a factor in *Stories of Art, op. cit.*

<sup>21</sup> Clarissa Sebag Montefiore, “[From Red Guards to Bond villains: Why the Mao suit endures](#)”, Nov. 2, 2015.

## Appendix: Images for Instant Fashion Futures

[Giorgi Armani Fashion Show](#), New York, October 2024

(Photos by Jonas Gustavsson for *The Washington Post*), October 18, 2024.



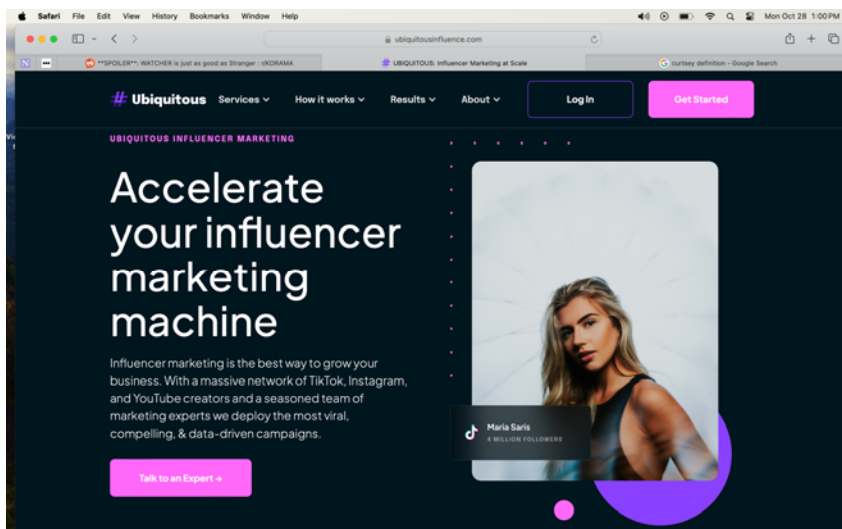
[Illegal landfill in Chile of discarded clothing](#)



## Prada-designed spacesuit for the moon

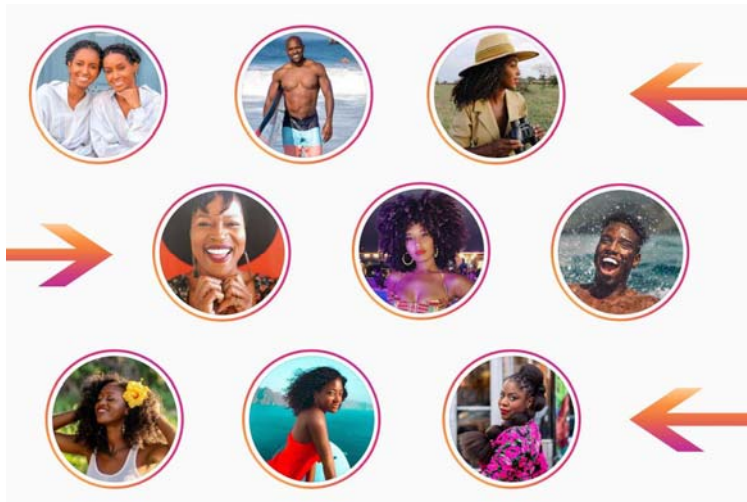


## Ubiquitous Influence Marketing (screenshot)

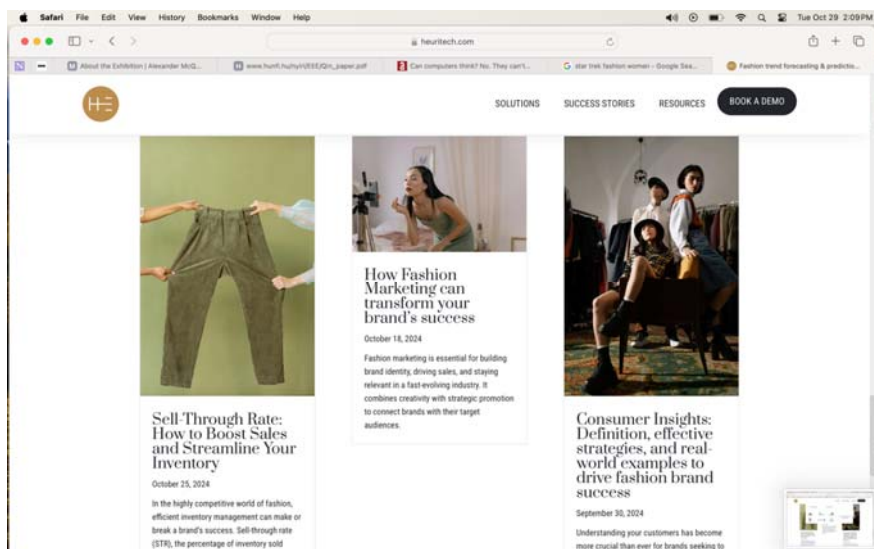


## Finding the Most Influential Influencers

[16 Black Travel Influencers to Follow on Instagram Now](#)  
*Travel and Leisure*, June 2020.



## [Heuritech Fashion Marketing](#) (Screenshot)



Yves St Laurent exhibit, *The Perfection of Style*  
Seattle Art Museum, November 2016, photo by Cynthia Freeland



[“The Glamour and Romance of Oscar de la Renta”](#), Museum of Fine Arts, Houston, Oct 2017; photos by Cynthia Freeland



De la Renta with Joshua Reynolds, Houston, photo by Cynthia Freeland



Alexander McQueen, *Savage Beauty*, May-August 2011; Metropolitan Museum of Art



Alexander McQueen, "*Savage Beauty*", Victoria and Albert Museum, March-August 2015



Margot Robbie promoting *Barbie*, film directed by Greta Gerwig, Summer 2023





Grace Lee Whitney (above) and Nichelle Nichols (below) in [costumes](#) from the original *Star Trek* television series, created by Gene Roddenberry, 1966–1969



Sean Young as Rachael in *Blade Runner*, 1982, directed by Ridley Scott



Steve Jobs in his iconic turtleneck (designed by Issey Miyake)



Chinese president Xi Jinping wears a Mao suit to an event with the Dutch royal family in 2014





*Orsolya Endrődy*

## **The Boy and the Heron as a Possible End-of-History Scenario**

A portion of Japanese anime films are artistic-philosophical artworks, including *The Boy and the Heron* (2023), which might even provide the basis for the presentation of a childhood narrative and, on the other hand, a possible world-end scenario. The film itself is a very complex symbol. It refers to several Buddhist, Shinto, and Confucianist traditions and Japanese traditional metaphoric meanings of certain animals (e.g. heron – as a messenger of Gods and a helper in transition, self-development). On the other hand, it's considered Hayao Miyazaki's final and summarising movie, a synthesis of his previous works.

Hayao Miyazaki is often hailed as the father of Japanese feature-length anime films. His works primarily focus on the world of children (traditional Japanese and contemporary global perspectives), the terrors of war, and the much-desired world peace achievable if war is avoided.<sup>1</sup> He has created films specifically for children and ones more suitable for viewers over 16 years old.

The movie follows the journey of a young boy named Mahito, who enters a dream world by stepping into a ruined tower that bridges life and death. The narrative is set against the backdrop of the Second World War, a significant event in Japanese history that profoundly influenced the country's culture and society. After losing his mum, Mahito and his father moved to the countryside, where his father remarried the deceased former wife's sister.

The term *postmodern* "designates the state of our culture following the transformations which, since the end of the nineteenth

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<sup>1</sup> Dani Cavalarro, [The animé art of Hayao Miyazaki](#) (online), Jefferson, NC: McFarland & Company Inc.

century, have altered the game rules for science, literature, and the arts”.<sup>2</sup> Postmodern artifacts often play with time or place deconstructing the existence of certain eras or spaces. In the context of *The Boy and the Heron*, this postmodern influence can be seen in the narrative’s non-linear structure and the blending of traditional Japanese and contemporary global perspectives.

The question may arise as to why visuals are effective considering abstract concepts such as world-ending scenarios or depicting narratives of childhood. Before we state possible answers, let us take a closer look at the Japanese animated movies.

War and postapocalyptic scenarios are core topics in Japanese anime, in which influential people are ready to give their lives to save humanity; in most cases, they are young or children and have specific supernatural talents or a tool with which they can foresee future and protect anyone, like Pazu and Sheeta the main characters of *Laputa, Castle in the Sky*. In *Boy and the Heron*, Mahito is a hero. With its heron, they are ready to save or, after collapsing, recreate the world from elements by connecting toy building blocks. War is described and depicted as self-destructive, passionate, and absurd – e.g. in *Grave of Fireflies* (1988).

Most filmmakers, including Miyazaki, were just four years old when the atomic bombs fell on Japan. Symbolically, they are also the recreators of modern Japan, as evidenced in their films. They stand as the first pacifist activists, turning their horror experiences into powerful visual narratives that recreate life and explore the concept of world-end. Their works often depict Japan as both an executor and a victim, shedding light on the complex narrative of the country’s post-war identity.<sup>3</sup>

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<sup>2</sup> Jean-François Lyotard, *La condition postmoderne: rapport sur le savoir*, Paris: Minuit, 1979. I am quoting from the English translation: [The Postmodern Condition: A Report on Knowledge](#), Minneapolis: University of Minnesota Press, 1984, p. xxiii.

<sup>3</sup> Nathalie Bittinger, [Anime Through the Looking Glass – Treasures of Japanese Animation](#), Munich: Prestel, 2023, pp. 12 f.

Anime, with its ability to depict metamorphoses, is a powerful medium for storytelling. It describes Japan's rise from the ashes after the Second World War, portraying the country as a newcomer to the globalised world. Animated movies can be considered a new means of communication.<sup>4</sup> In this case, it is clear that *Boy and the Heron* is still trying to come to terms with Miyazaki's traumatised childhood and the negative perceptions of the Japanese national consciousness on historic matters.

By examining the symbols deeper, we might be able to understand the core message of this complex movie. So, the most obvious is to study the grey heron first. As Park states in Japanese ukiyo-e, woodblock print kacho-e is a type of picture that focuses on the nature, namely depictions of birds and changes of the seasons.<sup>5</sup> They are symbols of happiness and sadness that can disappear at any moment, of the moment, of constant change.

As the film unfolds, we understand more and more the complexity of the heron symbol and the essence of the ultimate message of the film. Although the bird may seem to devour the child, this process leads to transformation, to growing up and saying goodbye to the past. It can also be the crucial message that when something overcomes us, there is always a way out and a solution and that destruction and the end of the world are always the beginning of something else. Symbolically, the earth and our inner world can be demolished up to the level of the building blocks at the end of the film, but this is also necessarily the beginning of a new world. The building blocks are handed over to Makihito, the symbol of the latest generation, by Miyazaki himself, perhaps the figure who symbolises the creator in the film, to do with as he will. Perhaps it would be best if this crumbling world could really fall apart and the new generation could start building from its elements, the film says.

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<sup>4</sup> *Ibid.*, p. 126.

<sup>5</sup> R. Park, [Representations of Herons in Ohara Shōson and Hashimoto Koei's Japanese Woodblock Prints](#), Connecticut College, Editor's Pick, Exhibition, 2021.

So, when we come back to why visuality can be one of the best arenas for depictions of the end of the world, consider the messages this film carries. It shows the senseless devastation of war and the emptying of human relationships, but also the possibility of a new beginning after the clearing of the rubble and the cleansing of hearts after the devastation. The imagery of all this can have a powerful effect on emotions, attitudes and internalisation. A good example is sitting in the cinema on the screening day. All you could hear was stunned silence and sniffing among the many Japanese people. As people automatically translate the message, they think not only of the departure of the filmmaker but also of the dangerous processes going on in the world and the message of a burdened past. What happens now? Will the next generation realise the significance of their actions? Is it aware of the responsibility that falls on it? Whether we are talking about the generational change of a significant cartoon studio or the peaceful construction of the future, we are left to ponder this naturalistic, often simplistic, yet profoundly emotional representation, the animated cartoon and, in particular, the animated film *The Boy and the Heron*.



## **Enhancing Visuality in Korean Variety Shows (예능)\***

This paper examines the distinctive use of visual elements in Korean variety shows compared to Western media. While Western media typically employs minimalistic closed captioning for accessibility, Korean variety shows utilize colorful and stylized captions and on-screen animations to enhance dialogue clarity, emphasize key moments, convey emotions, and incorporate cultural elements. This approach not only makes content more engaging and understandable but also has implications for cultural learning and education. The paper explores the role of Hangul (Korean) and technological advances, the impact of social media, and the potential educational applications of this visual style.

The presentation and consumption of television content vary significantly across cultures, with notable differences in the use of visual elements. This paper explores the unique visual style of Korean variety shows, its cultural significance, and its potential implications for education. By comparing the visual styles of Western and Korean media, we aim to understand how these differences affect viewer engagement and cultural transmission.

In Western media, closed captioning is primarily used as an accessibility tool for individuals with hearing impairments or difficulty following spoken dialogue. These captions are typically straightforward and minimalistic, focusing on clarity and functionality. The primary goal is to ensure that viewers can follow the content without distraction, maintaining a focus on the spoken dialogue.



*Western interview show with added subtitles.  
(Source: The Graham Norton Show Pinterest page.)*

Korean variety shows, in contrast, have developed a vibrant and playful visual style that extends beyond mere transcription.

This approach serves several purposes:

1. Clarification and emphasis – colorful and stylized captions help clarify dialogue and emphasize key moments, ensuring viewers do not miss important information or comedic punchlines. For example, in “Journey to the West 5”, the cast members were made to guess what some acronyms stand for captions bolded the characters that make up Korean acronyms, reflecting the guessing game played by the cast.



*Korean TV show unedited.*  
(Source: Journey to the West 5 - “If you’re not a fan leave”)

2. Emotional expression – visual cues effectively convey emotions, enhancing the viewer’s connection to the content and providing a richer viewing experience. In “Infinite Challenge”, fiery captions signal anger, enriching the viewer’s understanding of the scene.



*Korean TV show unedited.*  
(Source: Infinite Challenge- “Are you still sleeping?”)

3. Cultural integration – captions and animations often include culturally specific elements, making the content more relatable and engaging for Korean audiences. In “Journey to the West 8”, non-grammatically correct captioning reflects the dialect of a cast member, ensuring the tone is accurately conveyed.



*Korean TV show unedited.*  
(Source: Journey to the West 8 - “Not happy”)

4. Comedic enhancement – the playful use of visuals adds a layer of humor, making the shows more entertaining and memorable. In “Radio Show”, captions emphasize the speaker’s desperation, with animations adding to the comedic effect.



*Korean interview show unedited.*  
(Source: Radio Show - “You guys have to laugh for my youngest daughter to learn piano”)

The Korean writing system, Hangul (Korean), plays a crucial role in this visual style. Its iconographic elements lend themselves well to creative and expressive visual representation. Additionally, technological advances in the 1990s facilitated the incorporation of these elements into television production, setting the stage for the current era of visually rich programming.

The popularity of this visual style has surged in the age of social media. Korean variety shows are easily captured and shared online, allowing viewers to convey context and jokes instantly. Unlike Western shows, which often require third-party transcription and editing before sharing, Korean shows can be shared as-is, preserving the original intent and humor. This ease of sharing has contributed to the global spread of Korean culture and entertainment.

The visuality in Korean variety shows has implications beyond entertainment. It highlights the importance of emotional engagement in learning and cultural transmission. By making content more engaging and relatable, these visual elements can enhance the learning experience in more formal educational settings. They demonstrate how emotional and cultural context can be effectively communicated through visual media, offering insights into new methods of teaching and learning.

The visual style of Korean variety shows represents a unique cultural phenomenon that contrasts sharply with the minimalistic approach of Western media. By enhancing dialogue clarity, conveying emotions, and incorporating cultural elements, these shows offer a rich and engaging viewing experience. The implications of this approach extend beyond entertainment, offering valuable lessons for cultural learning and education. As media continues to evolve, the Korean model provides a compelling example of how visuality can enhance both understanding and enjoyment.

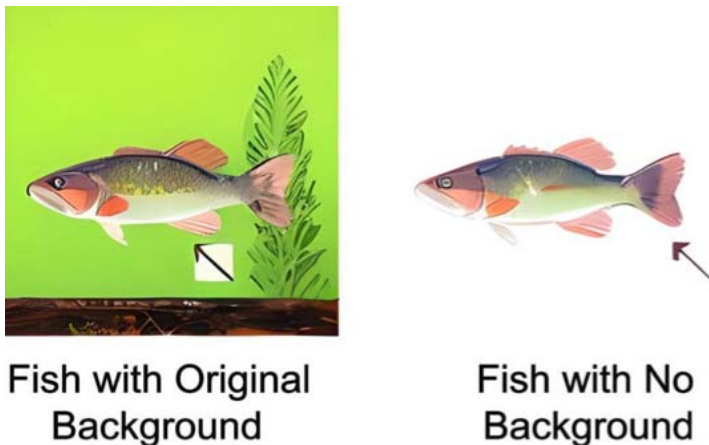
**\* (예능) is the Korean expression for “Variety Shows”.**



## **Selective Permeability and Multicultural Visuality**

Originally used to demonstrate how a single urban setting is accessible, restricted, safe or dangerous to different individuals, we extend the concept of “selective permeability” to visual learning in multicultural classrooms. Though focusing primarily on Eastern and Western students, our findings have broader implications for teaching diverse groups.

Let’s begin by examining three experiments from cultural psychology. In the first, Takahiko Masuda and Richard Nisbett showed students fish pictures. East Asian students had better recall when the scene included a background, Westerners when it did not (Figure 1).



*Figure 1*

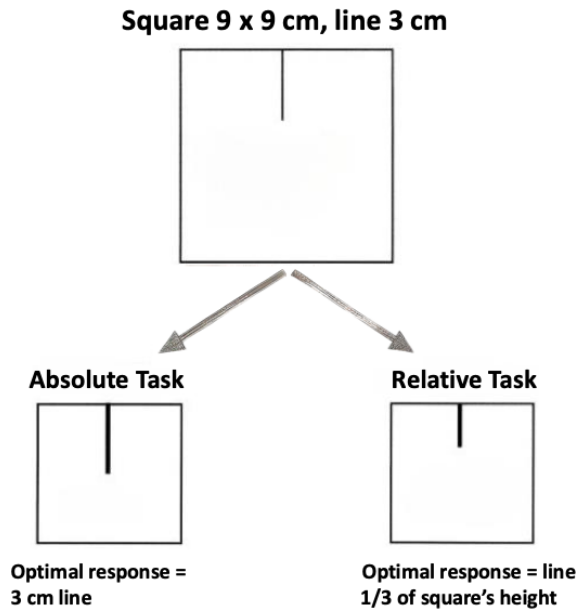
The second experiment, by Liang-Hwan Chiu, asked students to pair items. Chinese pupils typically focused on relationships (e.g., the cow eats the grass), Americans on discrete classifications (e.g., cows and chickens are both animals, see Figure 2).



*Figure 2: Does the chicken or grass go with the cow?*

The third experiment, conducted by Shinobu Kitayama's research team, found that Japanese students excelled at drawing lines in proportion to different-sized shapes, Americans at reproducing absolute lengths (Figure 3).





*Figure 3*

In his book, *The Geography of Thought*, Nisbett notes that East Asians often situate personality traits (e.g., “I’m fun-loving at parties”), whereas Westerners incline towards absolute expressions (e.g., “I’m fun-loving”). From this and the earlier studies, such as the one with fish scenes, we might expect Westerners, when asked about their perception of Figure 4, to respond, “I see a yield sign”, Easterners to remark, “I see a yield sign on a country road”.



*Figure 4*

While there are differences both between and within cohorts from countries like China, Japan, and Korea, psychologists' findings generally align with regional philosophical traditions. Eastern ontologies often emphasize the relational nature of social and physical realities, as with the Daoist characterization of a valley as a unity of absence and presence. Such ideas have been echoed by non-classical physicists who assert, for instance, that an object's length is only determinable relative to the observer's velocity. In contrast, and with exceptions like process philosophy, Western traditions have historically focused on individual entities as the fundamental units of reality.

These Eastern outlooks are reflected in the arts from those regions. However, it's also possible that these philosophical traditions partly mirror local environments. Consider two views of a South Korean neighborhood, captured from the rooftop of one of the authors of this piece (Figure 5). The buildings are jumbled at different levels and tightly packed in non-aligned directions. Mist rolls down the mountain, altering the landscape's appearance in short intervals. These environments are complex with few focal points, and while similar settings can be found in the West, they are less common there for a reason: Asia tends to be mountainous and densely populated, largely compelling some of the design choices.



*Figure 5*

Whatever the reasons, relational or contextualized perspectives seem central to East Asian visual culture. The situated versus focal-oriented photos of the Eastern and Western authors of this piece (shown in Figure 6) exemplify this. There is variation within each culture; for example, most of the Western authors' profile pictures are contextually oriented. The next figure, however, provides further explanation.



*Figure 6*

Even for contextualized Western vs. Eastern profile pics, differences are often there. For Figure 7, guess which photographer is Dutch and which is Korean. Though Westerners may increasingly pose in front of splendid backdrops (maybe partly as an offshoot of selfie culture), the Dutch photographer (right) emphasizes the woman as a protruding focal point, whereas the Korean photographer (left) blends the woman harmoniously into the scene – harmony being a key East Asian virtue and a contextually oriented one.



*Figure 7*

Similar to the above, Eastern cinema is often – but not always – more layered and less oriented around focal points (see Figure 8). This is in addition to having more camera movement and motion within the frame.



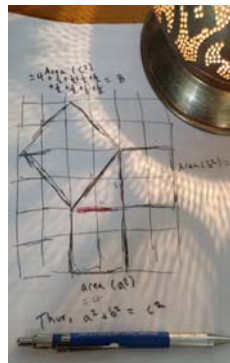
*Figure 8: Stills from Chariots of Fire (1981) and Farewell My Concubine (1993)*

Our next illustration is an episode in *Casablanca* (1942) where characters perform “La Marseillaise” (Figure 9). Anglo-Europeans are usually moved by this reaction to the Nazi occupation of French territories. North Africans often find the scene less powerful since the territory in question was in that region and brutally colonized by the French. (Moroccan Jews may have mixed feelings). An example like this encourages perspective pluralism, helping students appreciate that varying contexts reveal an assortment of legitimate values.



*Figure 9: A French character from Casablanca emotionally singing “La Marseillaise” in Rick’s Café.*

A last example relates to a finding documented by the education theorist Jo Boaler, who suggests that girls/women get more frustrated than boys/men when taught mathematical question-answering proficiency without explanations of the underlying reasoning. Here, it can help to visually demonstrate claims, such as  $A^2 + B^2 = C^2$ , as in Figure 10.



*Figure 10*

Here we see that the Pythagorean theorem literally expresses that the area of two squares (as in the shapes) adds up to the area of a third larger square.

This chapter is obviously short and just scratching the surface of visuality, culture and how the two can intersect to limit or enhance the learning of some students. But we hope to have highlighted the intricacies of visual learning in today's multicultural classrooms.

*Justin Parsons*

## **The Priority of Images in Model-Based Anticipation**

The development of the proto-literary, oracular apparatus, uniquely preserved in the Canonical Classic of Chinese culture, the *Yijing*, or the Book of Changes, at the dawn of written culture in China and continuously from the Bronze Age into the present era, represents an alternative aspect upon the priority of images for abductive, diagrammatical reasoning and perception that is antecedent to the canonically reductive, critically secondary function of words in the form of scripture. Latterly, by the Medieval Song Dynasty (960–1279 CE), this dichotomeric dynamic between images and words, no less than in the West but inverted away from a dialogical onus, and explicitly toward the speculative faculty of images to reify and tokenize abstractions,<sup>1</sup> became codified in what I refer to as the “Hermeneutic Tetrad”: *Xiangshu Yili*, or Images & Numbers [*xiang* & *shu*] and Meaning & Principle [*yi* & *li*].<sup>2</sup> The oracular kernel of the *Yijing* emerged prior to writing in China, and then developed adjacent and in parallel, wrought within the context of ritual sacrifice, as a networked meta-diagram of 64 simple, binary diagrams, to which texts were gradually and eventually accreted in stages over the course of centuries by anonymous shamanic practitioners. Images & Numbers is a codified reference to the proto-textual manipulation of the

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<sup>1</sup> [“Notational systems do not merely represent abstractions, they discover and then tokenize them.”](#) Or as Paul Klee expressed it: “Art does not reproduce the visible; rather, it makes visible.” (Paul Klee, “Creative Confession, 1920”, in *Creative Confession and other writings*, ed. by Matthew Gale, London: Tate Publishing, 2013, p. 4.

<sup>2</sup> The most comprehensive introduction to the early history of the *Yijing* is Edward L. Shaughnessy, *The Origin and Early Development of the Zhou Changes*, Leiden – Boston: Brill, 2022. Also illuminating is S. J. Marshall, *The Mandate of Heaven: Hidden History in the Book of Changes*, New York: Routledge, 2015.

diagrammatical notation according to oracular operations, incorporating both stochastic and numerological, as well as geometric syntaxes.<sup>3</sup> “Numerological” is an important distinction, as the hexagram notation, albeit clearly morphologically contingent upon binary-numeric and even exponential principles of combinatoric aggregation, was never employed as representative of anything other than oracular (geometric, scalar, symmetric and differential, or comparative) operations: neither of ideographic phonemes, nor of the common numerical elements of arithmetical operations. The representation of difference codified within such a complex syntax of nested binary heuristics was invented to discover or anticipate “Change” with utmost diagrammatical economy, demonstrating the principle of emergent complexity from simple rules; but number per se remained as a secondary property to binary and geometric, and therefore visual interpretation, epiphenomenally contingent upon comparative alterity, antinomial interstition, and stochastic-isomorphic, scalar variability.

The interpretations of Meaning & Principle emerged in the Song Dynasty mostly as a critical reaction to a Scholastic calcification of the original Image & Number corpus into a static orthodoxy. *Yili* quickly became the dominant genre-perspective upon the *Yijing*, oldest of the Confucian scriptural Canon, by which *Yili* endured as the critical standard into the present, almost entirely subsuming *Xiangshu* interpretation. Comparatively speaking, *Yili* interpreted the *Yijing* as a “book of wisdom” rather than an oracle; it differentiated itself from *Xiangshu* by ignoring the binary notation of the hexagrams entirely, in favor of strictly textual interpretation; thus *Yili* was characterized as literalistic, moralistic, and rationalistic.<sup>4</sup>

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<sup>3</sup> Cf. Bent Nielsen, *A Companion to Yi Jing Numerology and Cosmology: Chinese Studies of Images and Numbers from Han 漢 (202 BCE – 220 CE) to Song 宋 (960–1279 CE)*, London: Routledge Curzon, 2003.

<sup>4</sup> *Yili* or Meaning & Principle commentary is commonly understood to have begun with the interpretation of Wang Bi (226–249 CE), cf. Richard John Lynn, transl., *The Classic of Changes: A New Translation of the I Ching as Interpreted by Wang Bi*, New York: Columbia University Press, 2004. *Xiangshu* or Images &



The two perspectives formed a critical binary heuristic with which to fuel a syncretic Neo-Confucian diversification of scholarship as a whole, which in turn revitalized the long-standing meritocratic scholar-bureaucracy driving and sustaining the Imperial State. Developed in the exclusive context of the *Yijing*, *Xiangshu Yili* offers a key to seminal germs of distinction for the development of Chinese “philosophy”, for many commentators have remarked that the dialectical tradition of Greco-Roman philosophy as such did not develop in China.<sup>5</sup> *Xiangshu Yili* however, did, based upon and interpreting respectively the original institution of images relative to the diagrammatical notation of the hexagrams, and the words of the texts subsequently appended to and adumbrating the dynamic articulations of the hexagrams in turn.

To interpret *Xiangshu Yili* through a dialogical lens is at once both to turn the recursive frame of self–other identification and reference, developed in the Western Humanities tradition, onto the image/word contingency-distinction, and to suspend and deconstruct the Hermeneutic Tetrad and thereby render it into heretofore untried terms of an interpretative frame of its own with which to reflect upon the dialogical tradition of the Humanities in turn. Granting the predicative and speculative precedence of Images and Numbers in-

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Numbers interpretation was somewhat redeemed in comparative terms, single-handedly, with the revelation of new interpretative diagrams by Shao Yong (1011–1077 CE), cf. Bent Nielsen, *A Companion to Yi Jing Numerology and Cosmology: Chinese Studies of Images and Numbers from Han 漢 (202 BCE – 220 CE) to Song 宋 (960–1279 CE)*, London: Routledge Curzon, 2003, p. 352. An interesting discussion of the hermeneutic “dispute” between *Xiangshu* and *Yili* occurs in Ming Dong Gu, *Chinese Theories of Reading and Writing: A Route to Hermeneutics and Open Poetics*, Albany: State University of New York Press, 2005, cf. Ch. 3, “The *Zhouyi* and Open Representation”, p. 81.

<sup>5</sup> Cf. Yuk Hui, *The Question Concerning Technology in China: An Essay in Cosmotechnics*, Falmouth: Urbanomic Media LTD, 2022; François Jullien, *Figures de l'immanence: Pour une lecture philosophique du Yi king*, Éditions Grasset & Fasquelle, 1993; also, François Jullien, *From Being to Living (De l'Être au Vire): A Euro-Chinese Lexicon of Thought*, M. Richardson & K. Fijalkowski transl., London: SAGE Publications Ltd, 2020.

icated in the Hermeneutic Tetrad in implicit terms, the comparative exercise of rendering Meaning and Principle in dialogical terms yields to my interpretation, “Hermeneutics” for Meaning, and “Metaphysics” for Principle. Explicated further in combinatorial terms, *Yili* is predicated upon *Xiangshu*; Image is to Number as *Xiangshu* is to *Yili*; and Meaning, or Hermeneutics, is to Principle, or Metaphysics, as Image is to Number. Which is to say that, according to the cosmological model articulated within the Hermeneutic Tetrad, Metaphysics, as it regards “being”, is predicated, and therefore contingent upon, Hermeneutics, or interpretation.

To conclude, the anticipatory, image-based model of the *Yi-jing*, maturely expressed through the dimensions of the Hermeneutic Tetrad, articulates a Post-Structuralist interpretation of Human experience of ontological events.<sup>6</sup> An analogous genealogy in the West is found cradled in the Greek adaptation of the Phoenecian alphabet,<sup>7</sup>

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<sup>6</sup> Let me suggest that this is the aggregate thrust of the body of François Jullien’s work, in particular *Figures de l’immanence*, which establishes Jullien’s early oeuvre, and *From Being to Living*, which provides a comprehensive capstone to his thought. Combined with Media Philosophical approaches to the mutual contingency-implications relative to images and words at the crux of a perceptual-representational axis and a phenomenological-anthropological axis, the interpretative frame of the Hermeneutic Tetrad accedes to the comparative model of Continental Philosophy, more specifically understood as Philosophical Hermeneutics or Critical Aesthetics. Developed within a long genealogy beginning with Philological categorization, and implicitly involving the protocultural evolution of the Humanities as such, that is, as the deep and continuous context for scientific exceptionalism, Philosophical Hermeneutics takes a long view counter to deterministic reduction. Cf. also Iain McGilchrist, *The Matter With Things: Our Brains, Our Delusions and the Unmaking of the World*, London: Perspectiva Press, 2021; Jana S. Rošker, “Relational Thinking and the Cultural Conditionality of Human Understanding”, in *Brain, Decision Making and Mental Health*, ed. by Nima Rezaei, Cham: Springer Nature Switzerland AG, 2023; Jana S. Rošker, “Re-inventing Chinese Philosophy through the Method of Sublation: Introducing a New Methodology for Research in Chinese Philosophy from the Perspective of Transcultural Comparisons”, in *Asian Studies*, XII (XXVIII), 2 (2024), pp. 245–270.

<sup>7</sup> Cf. Barry B. Powell, *Homer and the Origin of the Greek Alphabet*, Cambridge: Cambridge University Press, 1996; also, Andrei V. Lebedev, “The Metaphor of liber naturae and the Alphabet Analogy in Heraclitus’ logos-Fragments (with

into the development of Philology as a comparative substrate for Philosophy,<sup>8</sup> and through the *Ars Inveniendi* of Ibn al-Haytham,<sup>9</sup> then Ramon Llull,<sup>10</sup> and finally Gottfried Wilhelm Leibniz.<sup>11</sup> The

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some remarks on Plato's "dream theory" and the origin of the concept of elements", in *Heraklit im Kontext*, ed. by Enrica Fantino, Ulrike Muss, Charlotte Schubert & Kurt Sier, Berlin: De Gruyter, 2017; Johanna Drucker, *Inventing the Alphabet: the origins of letters from antiquity to the present*, Chicago: University of Chicago Press, 2020; Juan Acevedo, *Alphanumeric Cosmology From Greek into Arabic: the Idea of Stoicheia Through the Medieval Mediterranean*, Tübingen: Mohr Siebeck, 2020; Carlo Rovelli, *Anaximander and the Birth of Science*, M.L. Rosenberg transl., New York: Riverhead Books, 2023; Andrei V. Lebedev, "I. Greek philosophy as a reform and therapy of the ordinary language. II. Heraclitus' experiments with language, grammar and style", in *INDO-EUROPEAN LINGUISTICS AND CLASSICAL PHILOLOGY XXVII (2) Proceedings of the 27th Conference in Memory of Professor Joseph M. Tronsky June 26–28, 2023*, ed. by Nikolai N. Kazansky, St. Petersburg: Institute for Linguistic Studies, RAS, pp. 705–756.

<sup>8</sup> Cf. James Turner, *Philology: The Forgotten Origins of the Modern Humanities*, Princeton: Princeton University Press, 2014.

<sup>9</sup> Cf. Roshdi Rashed, *Ibn al-Haytham's Geometrical Methods and the Philosophy of Mathematics*, J. V. Field transl., London; New York: Routledge, 2017.

<sup>10</sup> Cf. Alexander Fidora & Carles Sierra (eds.), [\*Ramon Llull: From the Ars Magna to Artificial Intelligence\*](#), Barcelona: Artificial Intelligence Institute, IIIA, 2011; also, Amador Vega, Peter Weibel & Siegfried Zielinski (eds.), *DIA—LOGOS: Ramon Llull's Method of Thought and Artistic Practice*, Minneapolis: University of Minnesota Press, 2018.

<sup>11</sup> Cf. John R. Welch, "Llull and Leibniz: The Logic of Discovery", in *Catalan Review* IV, nos. 1-2 (July–December 1990), pp. 75–83; also, Stefanie Buchenau, *The Founding of Aesthetics in the German Enlightenment: The Art of Invention and the Invention of Art*, Cambridge; New York: Cambridge University Press, 2013; Massimo Mugnai, "Leibniz's mereology in the essays on logical calculus of 1686-90", in "Für unser Glück oder das Glück Anderer" – *Vorträge des X. Internationalen Leibniz Kongresses*, ed. by Von Wnechao Li in connection with Ute Beckmann, Sven Erdner, Esther Maria Errulat, Jürgen Herbst, Helena Iwasinski and Simona Noreik, Hildesheim–Zürich–New York: 2017, vol. VI, pp. 175–194; also, Massimo Mugnai, "Ars Characteristica, Logical Calculus, and Natural Languages", in *The Oxford Handbook of Leibniz*, ed. by Maria Rosa Antognazza, New York: Oxford University Press, 2018.

Modeling Relation driving the field of Anticipation Studies<sup>12</sup> in our own era, predicated upon Peircean Diagrammatical Thought<sup>13</sup> and the recent meta-mathematical articulation of Category Theory<sup>14</sup> represents the persistence of a geometrical legacy and speculative tradition that is indigenous to the West as well.

That the clearest throughline for the development of Chinese culture as a whole traces a direct channel from the oracular, speculative, and visual articulations of a particular dynamic meta-diagram of binary and thus of the utmost economical proportions is anomalous enough. But what is more fundamentally arresting is the way that an artifact emergent from within the origin of recorded history in China could so uniquely and faithfully anticipate the binary basis of genetic code, of digital programming, and the superpositional probabilities prior to the collapse of the wave function: all conceptual models that define the exponentiating rapidity of change with respect to what it means to be Human in the 21st Century. That is, in the vanishingly realizable or relatable terms of an Electrified Present, predicated in a ceaseless downward spiral of instant gratification and planned obsolescence. Although held in common with the processes of “deep learning” used in the training of Artificial Intelligence,<sup>15</sup> abductive inference as a contingent, relational, and improvisational method,

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<sup>12</sup> Cf. Roberto Poli ed., *Handbook of Anticipation*, Springer International Publishing AG, 2019; also, James Bryan Lennox, *Robert Rosen and Relational System Theory: An Overview*, Cham: Springer Nature Switzerland AG, 2024.

<sup>13</sup> Cf. Frederik Stjernfelt, “Moving Pictures of Thought: Diagrams as Centerpiece of Peircean Epistemology”, in Frederik Stjernfelt, *Diagrammatology: An Investigation in Phenomenology, Ontology, and Semiotics*, Dordrecht: Springer Verlag, 2007, pp. 89–116; also, Rocco Gangle, *Diagrammatic Immanence: Category Theory and Philosophy*, Edinburgh: Edinburgh University Press, 2016; Marcel Danesi, *Pi (π) in Nature, Art, and Culture Geometry as a Hermeneutic Science*, Leiden: Brill, 2021; Ahti-Veikko Pietarinen, “Peirce’s Diagrammatic Reasoning and Abduction”, in *Handbook of Abductive Cognition*, Cham: Springer Nature Switzerland AG, 2022; Frederik Stjernfelt, *Sheets, Diagrams, and Realism in Peirce*, Berlin: De Gruyter, 2022.

<sup>14</sup> Cf. Rocco Gangle, *op. cit.*; also, Eugenia Cheng, *The Joy of Abstraction: An Exploration of Math, Category Theory, and Life*, Cambridge: Cambridge University Press, 2023; David Ellerman, “[How Category Theory Works: The Elements & Distinctions Analysis of the Morphisms, Duality, and Universal Constructions in Sets](https://arxiv.org/abs/2007.05733)”, July 11, 2020, but cf. also <https://arxiv.org/abs/2007.05733>.

<sup>15</sup> Cf. Brian Christian, *The Alignment Problem: Machine Learning and Human Values*, New York: W.W. Norton & Company Ltd., 2020.

epiphenomenally emergent within model-based anticipation,<sup>16</sup> requires the self-knowledge of Sentient Fictions more than anything else in order to meaningfully adapt to matters of concern.<sup>17</sup>

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<sup>16</sup> Cf. Fritz Zwicky, *Discovery, Invention, Research: Through the Morphological Approach*, Toronto: The Macmillan Company, 1969; also, Thomas A. Sebeok & Marcel Danesi, *The Forms of Meaning: Modeling Systems Theory and Semiotic Analysis*, Berlin; New York: Mouton deGruyter, 2000; Sami Paavola, “[Diagrams, Iconicity, and Abductive Discovery](#)”, in *Semiotica*, vol. 186, no. 1/4, pp. 297–314; Lorenzo Magnani, *The Abductive Structure of Scientific Creativity: An Essay on the Ecology of Cognition*, Cham: Springer International Publishing AG, 2017; Lorenzo Magnani, “Creative Model-Based Diagrammatic Cognition”, in *Model-Based Reasoning in Science and Technology: Inferential Models for Logic, Language, Cognition and Computation*, ed. by Ángel Nepomuceno-Fernández, Lorenzo Magnani, Francisco J. Salguero-Lamillar, Cristina Barés-Gómez & Matthieu Fontaine, Cham: Springer Nature Switzerland AG, 2019; Ahti-Veikko Pietarinen & Majid D. Beni, “[Active Inference and Abduction](#)”, in *Biosemiotics*, vol. 14 (2021), pp. 499–517; Ahti-Vieikko Pietarinen & Francesco Bellucci, “Imagination, Cognition, and Methods of Science in Peircean Abduction”, in *Handbook of Abductive Cognition*, ed. by Lorenzo Magnani, Cham: Springer Nature Switzerland, 2022, pp. 229–244; also, Lorenzo Magnani, *Discoverability: The Urgent Need of an Ecology of Human Creativity*, Cham: Springer Nature Switzerland, 2022.

<sup>17</sup> Addressed directly in Bruno Latour, “What is the Style of Matters of Concern?”, in *The Lure of Whitehead*, ed. by Nicholas Gaskill & A.J. Nocek, Minnesota: University of Minnesota Press, 2014, pp. 92–125; however, cf. also Bruno Latour, *We Have Never Been Modern*, transl. by Catherine Porter, Cambridge: Harvard University Press, 1993; also, Bruno Latour, *Iconoclasm*, Cambridge: MIT Press, 2002; also, Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory*, Oxford: Oxford University Press, 2005; also, Bruno Latour, *An inquiry into modes of existence: an anthropology of the moderns*, transl. by Catherine Porter, Cambridge: Harvard University Press, 2013.



*Michalle Gal*

## **Visualism and Rationalism: The Disillusionment Brought by the Visual Turn**

Looking at the future of theories of human nature, one cannot help but see the urgent need to reevaluate two of the major philosophical models: the first is the rationalist, whose demise we are facing; the second is what I call the “visualist”, which may serve as an alternative theory in the framework of the current visual turn. For some time now, we have seen critiques of rationalism and insights into decision-making biases from thinkers like Daniel Kahneman in his *Thinking, Fast and Slow* from 2013 who disputes the “dogmatic assumption ... that the human mind is rational and logical” and the notion that “people are generally rational, and their thinking is normally sound”.<sup>1</sup> We have also seen the evident worrying fragility of regimes that rely on the citizens’ exercise of rationality when required. These are tied with the continuous growth of AI image generators, interfaces, social media, screens, and the overall intense, unpredictable and sometimes messy, effect of the visual sphere. Philosophy, therefore, is encouraged to move away from the characterization of us as rational beings, and accordingly from terms like rational coherence, intentionality, and functional optimization. Instead, a shift toward recognizing our visualist nature, and to concepts like visual affordance and emergent properties is suggested by visualism.

A phenomenon that I find paradigmatic in this controversy is design, which is omnipresent and dominant in our intimate and public visual environments. Curiously, while rationalist theories dominate the field, design actually proves our visualist nature, brings the rationalist illusion to the fore, and helps us advance the visual turn

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<sup>1</sup> Daniel Kahneman, *Thinking, Fast and Slow*, New York: Farrar, Straus and Giroux, 2013, pp. 8–9.

propositions. It does so mainly by exposing our relations with artifacts, which are based on artifact's visual affordances, namely, their diverse aesthetic forms and the creative ways that users engage with them thanks to their visual appearances – rather than instrumental rational plans. Rationalist philosophy of design, usually employing instrumental rationalism, assumes that human beings are primarily rational creatures. It operates under the illusion that design is a linear process, starting with a designer's instrumental intention, advancing to an object that embodies it, and ending with the user following those intentions precisely. However, as we'll see, this rationalist framework overlooks the complexity and unpredictability of human interaction with design, and the general fact that human beings do not always act in predictable, rational ways – an idea that Kahneman has explored in depth. This tension between rationalist and visualist approaches touches on the philosophical debate about human nature itself. Are we primarily rational beings, driven by efficiency and goal-oriented reasoning, or are we more visual and aesthetic beings, engaging with the world through sensory and emotional experiences? The visualist approach, supported by the current visual age, suggests the latter.

Two closely related design structures provide useful insights for the analysis of the relationship between design and rationalism: the many visual forms for a single function, and the many uses of a single visual form. For example, chairs come in a wide range of forms, but they all serve the primary function of sitting (Figure 1). In parallel, the single form of a chair affords various unintended uses, such as a makeshift ladder, an exercise tool, a clothes stand, a symbol of status or authority, or even aesthetic contemplation (Figure 2). Similarly, objects that were not designed for sitting, such as fences, are often used as seats (Figure 3).





Hamburger Armchair . Studio Seletti, 2017



Banana Chair , Zjedzony, Wam House, 2005



Armchair, Tollmans Dot, 2021



Grand Confort, Sans Confort, Dommage à Corbu, Stefan Zwicky 1980

Figure 1: Variety of armchair: variety of form for one function



Erwin Warm, Away from Home. 2023 Photo by Michael Keidar



Figure 2: Variety of uses of chairs: variety of uses of one form.



Figure 3: Fences used for seating.

The emergent uses and properties bypass the conceptual model of the designer which is rooted in logic and reason. These ubiquitous phenomena frequently go unnoticed, *but should be taken seriously by philosophy*. They question the core assumptions of rationalism by uncovering the illusion of the predetermined rational plan of the designer, efficiency, and optimization, shifting the focus to the form, appearance, and affordances of the object itself which invites emergent interactions that go beyond its intended function.

“Affordance”, a term coined by James Gibson, refers to the space of possible uses and engagements allowed by an object, or environment. Gibson, a prominent theoretician of the visual sphere, introduced the term in *The Senses Considered as Perceptual Systems* (1966) and extended its definition in *The Ecological Approach to Visual Perception* (1979). The term is now re-introduced in the literature, because it is logically related to our visual era and aligns well with the visualist philosophy of design. Affordance is conditioned on visuality, which enables emergent properties and relations with the

object that could not be pre-planned. In the case of a chair, its visual structure allows, even invites, various uses. It may range from the back of the chair inviting a coat to hang, to the entire chair being transformed with a glass top to serve as a coffee table, as demonstrated by Enrico Salis in his piece *Archetype* (2012, Figure 4).



Figure 4: Enrico Salis, *Archetype*, coffee table.

*Archetype* is described in *Social Design Magazine* as follows: “The objective that Enrico Salis tried to achieve with this table is to break the link between the object and its archetype. Salis intends to awaken the observer’s imagination from the daily routine.” Gibson indeed claimed that “the observer and his environment are complementary. So are the set of observers and their common environment”.<sup>2</sup> He speculates that the affordance theory may advance from the perception of the visuality of surfaces to the perception of what the surfaces afford: “How do we go from surfaces to affordances? Perhaps the composition and layout of surfaces *constitute* what they afford. If so, to perceive them is to perceive what they afford.”<sup>3</sup> Applying the theory of affordance to design, we see that, being visual creatures, our interactions with objects are motivated by visual experiences rather than rational thought. In this view, design is not limited to rational plans or conceptual models but is deeply embedded in the visual experience of the object.

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<sup>2</sup> James J. Gibson, [\*The Ecological Approach to Visual Perception: Classic Edition\*](#). 1st edition, New York – London: Psychology Press, 2014, p. 11.

<sup>3</sup> *Ibid.*, p. 119.

Nevertheless, most of the design definitions are rationalist. The authors of *Rationality in Design* from 2009 declare that “rationality plays a significant role in design processes, not only at the level of the organization of design processes, but also at the level of the design of products”.<sup>4</sup> In his 1938 *Principles of Art*, R. G. Collingwood defined craft (and design) as “the power to produce a preconceived result by means of consciously controlled and directed action”.<sup>5</sup> A similar proposition was offered in 2015 by Glenn Parsons in *The Philosophy of Design*. He defines design as “the intentional solution of a problem, by the creation of plans for a new sort of thing”, and associates rationalist intentionality with “a practical or utilitarian nature”,<sup>6</sup> where affordance, unintentional or unplanned uses, and various unforeseen effects or results are not part of design’s ontology. Similarly, Jane Forsey presents a rationalist intentionalism in *Aesthetics of Design* from 2013 claiming that every design object “is meant to be used in a specific way: the planes flown, the shoes worn, the office chairs sat in”.<sup>7</sup> Donald Norman also suggests that the goal of design is to produce efficient, predictable, and rational outcomes. For Norman, a successful design creates a clear conceptual model, which allows prediction and control of the users’ (proper) interactions with the object. His concept of “natural design” emphasizes the seamless communication of function and usability. This approach is emblematic of a rationalist philosophy where form should serve function directly, with no ambiguity, creativity in interaction, or open affordance.

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<sup>4</sup> Peter Kroes et al., “Rationality in Design”, in Dov Gabbay – Paul Thagard – John Woods – Anthonie Meijers (eds.), *Philosophy of Technology and Engineering Sciences*, 1. ed., *Handbook of the Philosophy of Science* 9, Amsterdam – Heidelberg: Elsevier, 2009, p. 565.

<sup>5</sup> R. G. Collingwood, *The Principles of Art*, Oxford – New York: Oxford University Press, 1968, p. 15.

<sup>6</sup> Glenn Parsons, *The Philosophy of Design*, Cambridge: Polity Press, 2015, pp. 11 and 22.

<sup>7</sup> Jane Forsey, *Aesthetics of Design*, Oxford: Oxford University Press, 2013, p. 30.

Conversely, Visualism acknowledges the complexity and messiness of human interaction with design objects. Visualists such as David Pye and Henry Petroski point to the richness of forms that design takes, that often evolve in ways that defy rational explanation. Pye claims that a stable controlled function is an illusion, and function is actually determined by the user every time anew. Petroski, in his *The Evolution of Useful Things*, argues that the evolution of objects – like utensils or tools – is driven by the appeal of form, and “whatever its intended function, an object’s form alone often suggests new and more imaginative forms”. Form even has the potential to lead to the development of function. The paper clip is one of Petroski’s examples of the “almost limitless functions to which a single form can lead”. A study on paper clips, he informs us, found that only one in ten paper clips was ever used to hold papers together.<sup>8</sup> Similarly, Pye reminds us that human beings expend an immense effort on the useless visual parts of design objects. This points to the aesthetic and visual dimensions of design as central to understanding the relationship between form and rational plans of functions. Rather than simply following the designer’s intended use, users often repurpose objects based on their visual affordances. Along this line, Victor Margolin refers to Massimo Vignelli’s aesthetic appreciation of Ludwig Mies van der Rohe’s Brno chair. While Vignelli admits the chair’s discomfort, he praises its aesthetic “class”. Margolin’s distinction between “operative” and “reflective” parameters highlights this duality.

This point illustrates how design’s impact transcends mere utility, incorporating layers of visibility. The rationalist approach, which seeks to control and predict these interactions, often falls short in capturing this complexity. Kahneman’s insight into the human tendency to seek coherence and predictability mirrors the rationalist desire to impose order on the chaotic and multifaceted ways people

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<sup>8</sup> Henry Petroski, *The Evolution of Useful Things: How Everyday Artifacts – From Forks and Pins to Paper Clips and Zippers – Came to Be as They Are*, New York: Vintage, 1994, pp. 51 f.

use and experience design. However, as Kahneman points out, this illusion of control can be misleading. Through the lens of visualism, we can see that our interactions with design objects are far more dynamic and fluid than rationalist models allow, and that visual experiences are central to shaping both our understanding of design and our understanding of ourselves.







**SOCIAL MEDIA  
SCIENCE AND REALITY**



Gábor Szécsi

## The Mediatization of Identity-shaping Narratives

In digital culture, the stories conveyed by the media become an integral part of autobiographical narratives that shape the identity and self-image of media consumers and determine the individual's relationship to traditional values. This, in turn, fundamentally changes an individual's perception of the community and society. For the person who navigates the world of narratives mediated by new communication technologies, who builds relationships and shapes their self-image, the boundaries between different social contexts become symbolically blurred. He can become a member of many communities, even simultaneously, through the use of different communication technologies, and he can leave many communities as nomads of the new media space, whose internal relations, norms, and conventions have become unacceptable to him.<sup>1</sup> The everyday communicative ac-

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<sup>1</sup> It is the communal bonds, reinforced by a sense of individual freedom, that make mediatized, hybrid communities the ideal forms of community that create a synthesis of virtual and physical communities in the way suggested by M. Castells (*The Information Age*, vol. I: *Rise of Network Society*, Malden, MA: Blackwell, 2000), A. Etzioni (*The Monochrome Society*, Princeton, NJ: Princeton University Press, 2001), H. Rheingold (*Smarts Mobs*, Cambridge, MA: Perseus, 2002), J. Katz – R. Rice (*Social Consequences of Internet Use: Access, Involvement and Interaction*, Cambridge, MA: MIT Press, 2002), M. Poster (*What's the Matter with Internet?*, Minneapolis, MN: University of Minnesota Press, 2001), C. Haythornthwaite – L. Kendall ("[Internet and Community](#)", *American Behavioral Scientist*, vol. 53, issue 8 (2010), pp. 1083–1094). As Karen A. Cerulo suggests in her paper "[Identity Construction: New Issues, New Directions](#)" (*Annual Review of Sociology*, vol. 23 [1997], pp. 385-409), we are correct to conceive of social interaction and social bonding in the information age as the social cooperation of individuals freely weaving their social relations and the specific emotional support within groups engaged in electronic discourse. This corresponds best to the everyday experience and life management of electronically communicating persons who are less aware of the boundaries between virtual and physical communities. This is the conclusion reached by Katz and colleagues in their work

tivity of individuals who feel a sense of ownership of virtual communities, defined by direct face-to-face relationships, both physical and based on communication relationships that are mainly mediated electronically, is increasingly blurring the boundaries of these communities. His roles in different communities interact to influence his self-image, individuality, and attachment to each form of community. Thus, the notion of the community of the electronically communicating person, who often receives and transmits the explicit and implicit narratives of the media as elements of his personal stories, is born at the intersection of the conceptualization of different forms of community, drawing on a range of physical and virtual experiences of the community. Physical and virtual communities interact with each other at the level of individual conceptual representations, and become the source of the dual identities of individuals who may be simultaneously present in such communities.<sup>2</sup>

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on the relationship between mediated communication and the notion of community (J. E. Katz – R. E. Rice – S. Acord – K. Dasgupta – K. David, [“Personal Mediated Communication and the Concept of Community in Theory and Practice”](#), *Communication and Community: Communication Yearbook*, vol. 28, issue 1, Mahwah, NJ: Erlbaum, 2004, pp. 315–371), emphasizing that the synthesis in question is embodied most clearly in mobile communication today.

<sup>2</sup> The notion of community, which stems from the complex, multi-layered identity of electronically communicating human beings, prompts us to reconsider the notion of community based on socio-communal, virtual-physical distinctions. In his book *What’s the Matter with the Internet?*, Poster therefore proposes the introduction of a unified concept of community, rather than a virtual-physical distinction, which would allow us to approach communities mediatized by the use of new communication technologies as real communities (Poster, *op. cit.*). And it is for the same reason that Manuel Castells stresses the need for a conceptual synthesis of virtual and physical communities in his *The Information Age* (*op. cit.*), without which we would be unable to make sense of our everyday experience of the social network. In other words, to understand how a social network works, it is necessary to unify our experiences of the physical and virtual worlds, which is unthinkable without the synthesis of concepts of physical and virtual communities. We have entered a culture of virtuality made real, Castells argues, in which, with the development of mass media, the one-way communication practice of mass communication is being replaced by a new, interactive, personalized communication of information and culture. New

The rapid and continuous flow of information through electronic communication implies not only the simultaneity of interpretations of community roles but also the simultaneity of these roles. The networked individual, who builds communities in the spirit of the narratives mediated by new communication technologies, is less able to separate their real and virtual community roles because of the rapid and continuous changes in communication technologies. For example, when he communicates as a member of a local community based on physical, direct human relations, he does so in accordance with his virtual community roles linked to electronic communication contexts, that is, in the sense of media narratives that shape his self-image and identity. Thus, the age of electronic communication can also become the age of mediatized communities. With the rise of mediatized communication, community relations are also mediatized in this way.<sup>3</sup> Through the interaction of the narratives, electronic communication mediates, virtualizes, and incorporates the criteria of community into the communication process, thus contributing to the intertwining of our real and virtual roles. As a result, people in the information age reinterpret their physical and virtual community ties, relationships,

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technologies that provide ever higher quality, faster internet connections, and personalized forms of broadcasting are making the synthesis of our perceptions of physical and virtual communities an everyday experience.

<sup>3</sup> The mediatization of communities, however, is not only understood as the impact of mass media content on community life, values, conventions, and language use habits but also as a social process that leads to the emergence of hitherto unknown forms of community through the strengthening of virtual communities organized through the use of new (social) media and physical communities based on interpersonal relationships in a given place. As a result of mediatization based on the transmission and reception of mass media narratives interwoven with personal stories, the boundaries between virtual and physical communities are increasingly blurred; new hybrid (virtual-physical) communities are being organized on the pillars of traditional community relations. Thus, the mediatization of communities is essentially nothing other than the emergence and consolidation of hybrid forms of community linked to the use of new communication technologies. For a detailed explanation of the topic, see e.g. my article "Self, Community, Narrative in the Information Age" (*Empedocles: European Journal for the Philosophy of Communication*, 2021/2, pp. 167–181).

and roles in light of community criteria and relations mediatized in media narratives.

In the age of electronically mediatized communication, individuals are freed from traditional social bonds. The notion of the central self, defined by the norms and internal interests of a particular society or community, has been replaced by a multidimensional self shaped by different community roles. Through the use of mobile phones, the internet, and specific linguistic and visual tools, senders can easily move from one community to another, forming new emotional bonds alongside their existing immediate social ties. The electronically communicating person becomes part of a transcontinental network of relationships defined by explicit and implicit media narratives, and thus becomes committed to a series of relationships, plans, and desires that determine his or her self-image and individuality. The essence of being a community can therefore be captured as a kind of relational existence in which people who use new technologies and are increasingly conscious of their community roles are free to choose their own communities from among possible groups. This process does not entail the disappearance of the desire to be a community with a deeply human attachment to community ties. The interpenetration of the boundaries between traditional and new forms of community does not mean the loss of the community itself, but merely the removal of its physical limits, of the traditional bonds of interpersonal relationships in a common place. For late modern man, the community is increasingly becoming a symbolic process of both direct and indirect human interaction, determined by media narratives, which ultimately implies a constant and conscious reflection on the norms, values, and risks of belonging to a community in the context of an efficient and rapid flow of information. It is precisely this conscious reflection that creates a new experience of community and a hitherto unknown sense of community that makes attachment to the communities of one's choice so powerful.

At the same time, we must see that, among the identity-forming stories of people using new communication technologies to receive and transmit narratives at different levels, the narratives of mass media, which have been considered the "institutionalized story-

teller” of society since the advent and spread of television, are playing an increasingly important role.<sup>4</sup> At the same time, the emergence of new channels of mass communication, the growing popularity of the internet, and the new communication platforms offered by various social networking sites have led to an unprecedented offensive of media narratives, mediated by images, sound, and written texts, in the everyday lives of users. The mindset and language of people using new tools are fully attuned to the need to effectively absorb and transmit increasing amounts of data and information. The changes in their mental world, their conceptual apparatus, and the structure of their language may enable them to select the most important information from the increased amount of information they receive every day to make it part of their knowledge and communicate it.<sup>5</sup> Consequently, the selection of those media in their everyday cognitive processes that convey the information in question to them in the framework of narratives that best suit their thinking and values is becoming increasingly important. In other words, they are increasingly looking for media whose framework narratives can be aligned with their own autobiographical narratives, which are based on their early experiences with the community and social metanarratives, opinions, and values that determine their behavior. In the new media age, this selective process of reception is becoming increasingly dominant in the practice of communicating with the media as the speed of information flow and the amount of information to be processed increase by leaps and bounds. In the flood of information and stimuli associated with new media use, the attention of recipients has become increasingly fragmented and the duration of active attention is reduced. They tend to take in facts and data in a disoriented way, quickly, and in small doses, without any particular interest, but they are also critical of them.

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<sup>4</sup> In this regard, see e.g. G. Gerbner – L. Gross, “[Living with Television: the Violence Profile](#)”, *Journal of Communication*, vol. 26, issue 2 (1976), pp. 172–199.

<sup>5</sup> For a detailed explanation of the topic, see e.g. G. Szécsi, “Self, Community, Narrative in the Information Age” (*op. cit.*).

As a result of communication with the mass media, people using new communication technologies affirm their sense of identity at the intersection of their own stories, community metanarratives and media narratives, in a “continuous dialogue”.<sup>6</sup> In other words, it is also important for his sense of identity that he receives as much information as possible from the media, which he regards as his partner, in a world of accelerating change and radically increasing information that reinforces his values, perceptions, and opinions. It is not by chance that many media researchers conclude that people in digital culture treat television or new media as if they were a social communication partner, a real person with whom they could engage in continuous interpersonal communication in a real place to reinforce their self-image and identity.<sup>7</sup> This also serves to reinforce a sense of community among networked individuals through the acceptance of a set of values cultivated by the media and implied in its frame narratives.<sup>8</sup>

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<sup>6</sup> In this regard, see e.g. D. Dayan – E. Katz, *Media Events: The Live Broadcasting of History*, Cambridge, MA: Harvard University Press, 1992.

<sup>7</sup> See B. Reeves – C. Nass, *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places*, Cambridge University Press, 1996.

<sup>8</sup> It seems that in order to resolve the conflicts of values, which are intensifying in the context of the changing notions of community and tradition, the audience expects and receives more stories from mass media. Stories that organize the information they have acquired into easily remembered and transferable knowledge offer useful interpretative support for understanding increasingly complex social and cultural processes. However, these stories appear in a broader narrative framework of media communication. All stories communicated by the mass media are part of a narrative framework in which the media are constantly “telling” to their target audiences about themselves, their values, the moral, cultural, political, etc., that define their operation. It is based on these framework narratives that recipients choose media that are closest to their values and are therefore considered credible from an ever-increasing range of media. These framework narratives, which function as implicit narratives, are used to convey mass media stories to the target groups and to reinforce their openness to the values of the mass media. While the stories kept on the agenda by the media influence the explicit narratives of networked individuals who interact with each other on the communication platforms offered by new media because of media



The explicit and implicit narratives conveyed by news are intended to consolidate this communal consciousness, which stems from the acceptance of a common set of values.<sup>9</sup> The explicit nar-

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convergence, the frame narratives that convey mass media values in a hidden form have a continuous impact on the implicit narratives of media users. News and fake news, for example, are not just a set of true or false information but also elementary narratives that represent the media's frame stories about themselves in a form that can be recognized and processed by the target audience. The information presented by the news is permanently fixed in the minds of the recipients and has an impact on their opinions, emotions, and attitudes if embedded in stories that reinforce their values, opinions, and belonging to a community of people who share similar values and opinions. Daily news consumption thus becomes a kind of ritual, whereby news consumers reinforce, day by day, their interaction with the media that are closest to their values, and are therefore considered partners in their daily communication.

<sup>9</sup> The starting point of this conception is the general assumption that the stories told by individuals using digital technologies are increasingly filled with the content and form of the stories mediated by mass media. The topics of their explicit narratives often correspond to topics on the agenda of the mass media. Their implicit narratives, which reflect their general attitudes towards specific issues, are increasingly influenced by frame narratives representing the values of mass media. In the new media environment, personal, community, and social narratives conveyed through electronic communication are fully intertwined with mass media narratives. This phenomenon forms the basis for mediatization. Explicit narratives communicated by the media, that is, narratives relating to specific personal, community, social, economic, and cultural problems and their solutions, and implicit narratives that interact between the mass media's own values and the general attitudes of the people communicating through the media can thus contribute to the mediatization of the communities of the receiving groups. The mediatization of communities, however, is not only understood as the impact of mass media content on community life, values, conventions, and language use habits but also as a social process that leads to the emergence of hitherto unknown forms of community through the strengthening of virtual communities organized through the use of new (social) media and physical communities based on interpersonal relationships in a given place. As a result of mediatization based on the transmission and reception of mass media narratives interwoven with personal stories, the boundaries between virtual and physical communities are increasingly blurred; new hybrid (virtual-physical) communities are being organized on the pillars of traditional community relations. Thus, the mediatization of communities is essentially nothing other than the emergence and consolidation of hybrid forms of community linked to the use of new communication technologies.

ratives that facilitate the reception of information present in mass media content are directly linked to a specific problem. Implicit or framework narratives represent the general values that determine the functioning of a given medium. This daily ritual, the continuity of narrative communication, is necessary for people in digital culture, since these stories, which also consolidate their self-image, offer important points of reference for interpretation in the accelerating flow of news. In their absence, they become confused and uncertain, and drift inexorably toward fragmentation and loneliness. The mass media, faced with increasing competition in the media market, are forced to constantly tell stories for which news, or in its absence, fake news, is the most obvious tool. News as narrative structures are thus themselves part of a complex narrative, the media's story itself, and thus present two narratives, one explicit and one implicit, to the receiver at the same time. Together, these two narratives illuminate the communicative intent behind news. News is received by members of the target groups in light of this understood intention. In other words, they understand what the sender wants to achieve and communicate with them. Recognition of this intention is a prerequisite for accepting or rejecting the narratives presented by news in the selective reception process.

The expansion of new media and the continuous mediatization of people's everyday lives using new technologies entails significant changes in the way information is processed and transmitted. The mindset and language of the individual who builds networked relationships in digital culture is fully attuned to the need to effectively receive and transmit an ever-increasing amount of data and informa-

tion. The changes in his mental world, his conceptual apparatus, and his use of language may enable him to select from the increased amount of information he receives every day, integrate it into his knowledge, and communicate the most relevant information. As a consequence of this process, he is also becoming increasingly aware of news sources and media that convey the information in question to him in the context of narratives that best suit his way of thinking and values. In other words, he is increasingly looking for media whose framework narratives can align with his personal and community narratives, opinions, and values.<sup>10</sup>

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<sup>10</sup> This is how the well-known media science model, known as “selective perception” since the 1960s, is now confirmed. One of the most important proponents of this theory, Joseph Klapper in his *The Effects of Mass Communication* (New York: Free Press, 1960) points out that, when selecting information from the media, recipients primarily seek messages that confirm their opinions and reject or avoid narratives that contradict them. This increasingly conscious selection, according to Klapper, develops at three levels: (1) recipients do not follow media that present opinions and narratives that are contrary to their own values and perceptions; (2) even if they unwittingly encounter such messages – which are contrary to their values – they ignore them; (3) if they encounter such messages and remember them, they forget some of them relatively quickly. According to Klapper, the basic reason for this phenomenon is that people avoid dissonant situations and keep away from information and opinions that might lead them to rethink their values and worldview. This would require considerable mental energy, which simply cannot be done in the face of the ever-faster flow of information. Therefore, the impact of the media is more likely to be to reinforce rather than to change the opinions of the recipients. In the new media age, the selective process of reception is playing an increasingly important role in the practice of communicating with the media, as the speed of information flow and the amount of information to be processed increase by leaps and bounds. In the flood of information and stimuli associated with new media use, the attention of recipients becomes increasingly fragmented and the duration of active attention is reduced. They tend to take in facts and data in a disoriented way, quickly and in small doses, without any particular interest, but they are also critical of them. This has a significant impact on the interpretation of news. As the volume and variety of news becomes unmanageable, recipients try to exclude as much as possible news that is of no interest to them; they actively and consciously try to protect themselves by selecting, filtering and blocking the information that keeps coming in. This media consumption behaviour is reinforced by the increasing choice

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offered by multichannel communication. It is becoming increasingly possible for individual target groups to find media in the system that offer narratives that correspond to their specific values and reinforce their opinions and positions, and that offer them a secure point of reference for understanding and evaluating increasingly complex social, political and economic processes. In an accelerating flow of information, members of the target groups lack the opportunity and capacity to change their narratives that help them to process and evaluate the facts. Therefore, they stick to the media that convey the framework narratives they have come to know and accept, and expect the media to reinforce their beliefs, opinions and opinions with material, news and related stories that conform to the accepted values of the preferred media.

*Szilvia Finta*

## **A World without Empathy? The Impact of Social Media on Emotional Intelligence**

The term emotional intelligence (EQ or EI) first appeared in an article written by Peter Salovey and John Mayer (*Emotional Intelligence*)<sup>1</sup> in 1990 and became widely known by Daniel Goleman's famous book *Emotional Intelligence* (1995)<sup>2</sup>. The discovery is based on the fact that our behaviour, our decisions, our relationship to reality and our fellow human beings are fundamentally driven by our emotions, and therefore it makes a difference whether we are able to recognise, identify, interpret, apply and manage our own and others' emotions. Goleman recently distinguishes four domains of emotional intelligence: 1. self-awareness (emotional self-awareness); 2. self-management (emotional self-control, adaptability, achievement orientation, positivity); 3. social awareness (empathy, organizational awareness); and 4. relationship management (influence, coach and mentor, conflict management, teamwork, inspirational leadership).<sup>3</sup>

In the last decades, our society has undergone huge changes: we live much of our lives in a world of digital, internet, smartphones, social media. Research shows that this has changed people's attitudes and interpersonal relationships. There is also a growing body of research on the relationship between EQ and the internet / social media. Research among American college students shows that com-

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<sup>1</sup> Peter Salovey – John D. Mayer, "[Emotional Intelligence](#)", *Imagination, Cognition and Personality*, vol. 9, issue 3 (March 1990), pp. 185–211.

<sup>2</sup> Daniel Goleman, *Emotional Intelligence*, New York: Bantam Books, 1995.

<sup>3</sup> Daniel Goleman – Richard E. Boyatzis, "[Emotional Intelligence Has 12 Elements: Which Do You Need to Work On?](#)", *Harvard Business Review* (February 6, 2017). For charts and graphs see Leslie Riopel, "[Emotional Intelligence Frameworks, Charts, Diagrams & Graphs](#)" (March 12, 2019).

ponents of EQ such as “well-being”, “self-control” and “emotional-ity” have significantly decreased.<sup>4</sup> Another study<sup>5</sup> concludes that internet addiction leads to lower levels of understanding and regulation of emotions, while a study among U.S. college students<sup>6</sup> finds that those who use social media more intensively show lower levels of empathy and increased symptoms of narcissism and alexithymia (when someone is unable to relate to their emotions). These last two problems are also associated with low empathy.<sup>7</sup> But earlier data already show a marked decline in empathy among U.S. college students.<sup>8</sup> Since certain emotions are also so-called moral emotions – e.g. empathy, compassion, gratitude, shame, guilt, etc. – the decline in emotional intelligence also affects moral emotions and thus moral judgements.<sup>9</sup> Moral emotions are meant to show us what is right and

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<sup>4</sup> Mahreen Khan – Amirali Minbashian – Carolyn MacCann, “[College Students in the Western World are Becoming Less Emotionally Intelligent: A Cross-Temporal Meta-Analysis of Trait Emotional Intelligence](#)”, *Journal of Personality*, vol. 89, issue 6 (2021), pp. 1176–1190.

<sup>5</sup> Elena Fernández-Martínez – Elena Sutil-Rodríguez – Cristina Liébana-Presa, “[Internet Addiction and Emotional Intelligence in University Nursing Students: A Cross-sectional Study](#)”, *Heliyon*, vol. 9, issue 9 (September 2023).

<sup>6</sup> A. J. Martingano – S. Konrath – S. Zarins – A. A. Okaomee, “[Empathy, Narcissism, Alexithymia, and Social Media Use](#)”, *Psychology of Popular Media*, vol. 11, issue 4 (2022), pp. 413–422.

<sup>7</sup> However, the same article found that in Turkey, for example, the use of social media did not lead to reduced empathy. One reason for this may be that Americans use social media to focus on themselves, their achievements and their individuality, while people from other countries do so less (Martingano *et. al.*, *op. cit.*).

<sup>8</sup> Research also looked at U.S. college students between 1979 and 2009, and this study also found a decline in empathy, especially in post-2000 samples: Sara H. Konrath – Edward H. O’Brien – Courtney Hsing, “[Changes in Dispositional Empathy in American College Students Over Time: A Meta-Analysis](#)”, *Personality and Social Psychology Review*, vol. 15, issue 2 (2010), pp. 180–198.

<sup>9</sup> Cf. for example Divine Nyamori, “[Exploring the Relationship between Moral Decision-Making and Emotional Intelligence](#)”, *International Journal of Philosophy*, vol. 3, no. 1 (2024), pp. 13–24.

wrong, good and bad, what is appropriate and what must be done,<sup>10</sup> so not recognizing our own and others' moral emotions can, in my opinion, lead to a morally worse world. (The situation is exacerbated by the massive amount of fake news and fake pictures, which can lead to a distorted view of reality, false empathy and misjudgement of the facts.) It is important to know, however, that emotional intelligence – and thus the ability to access moral emotions and empathy – can be developed,<sup>11</sup> and it is therefore in our common interest as individuals to make a conscious effort to ensure that, while we make use of the opportunities offered by the digital world, we do not lose our humanity and our capacity for good moral judgement.

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<sup>10</sup> About moral emotions see Éva Bányai – Katalin Varga (eds.), *Affektív pszichológia: Az emberi késztetések és érzelmek világa*, Budapest: Medicina, 2014. See also Jesse J. Prinz – Shaun Nichols, “[Moral Emotions](#)”, in John M. Doris ([The Moral Psychology Research Group](#)), *The Moral Psychology Handbook*, Oxford: Oxford University Press, 2010, pp. 111–146.

<sup>11</sup> See for example Marc Brackett, *Permission to Feel: Unlocking the Power of Emotions to Help Our Kids, Ourselves and Our Society Thrive*, New York, NY: Celadon Books, 2019; Ann Gazzard, “[Emotional Intelligence: Does Philosophy Have a Part to Play?](#)”, *Analytic Teaching and Philosophical Praxis*, vol. 21, no. 2 (2002), pp. 140–150.





*Márta B. Erdős*

## **Loss of Meaning – Entrapped in a Liminal Hotspot**

We attach meanings to our lived experiences to move forward from the domain of the pre-reflective and chaotic to the more reflective and integrated forms. These adaptive steps in identity reconstruction can be temporarily paralyzed. Our evolving stories can be silenced by the dominant culture or – as it is with highly traumatizing experiences – remain in the domain of not-(yet)-said because of the dissociation the trauma causes. Such impairments in communication will isolate the individual from their relationships and may lead to (self)destructive behaviours. Therefore, transforming lived experiences into reflected and integrated contents is vital during major transitions in life.

Rittel and Webber<sup>1</sup> distinguished between tame versus wicked problems. Wicked problems challenge the traditional ways of problem resolution, are hard to define, tend to recur and require reflexivity. These problems are characteristic of complex adaptive systems like humans and their communities. Transitions between the different identity states and social positions are a specific type of wicked problems.<sup>2</sup>

Such problems, involving moral aspects and requiring systems thinking, were traditionally re-solved in rites of transition, facilitating community participation and support, but delimiting the individual's free choice concerning their potential identity constructs.<sup>3</sup> In late modernity, more alternatives are available when experiencing the transition, but there are no guarantees for timely re-

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<sup>1</sup> Horst W. J. Rittel – Melvin M. Webber, “[Dilemmas in a General Theory of Planning](#)”, *Policy Sciences*, vol. 4, no. 2 (1973), pp. 155–169.

<sup>2</sup> Monica Greco – Paul Stenner, “[From Paradox to Pattern Shift: Conceptualising Liminal Hotspots and Their Affective Dynamics](#)”, *Theory & Psychology*, vol. 27, issue 2 (2017), pp. 147–166.

<sup>3</sup> Arnold van Gennep, *The Rites of Passage*, Chicago: University of Chicago Press, 1960.

integration. Liminality is extended, and the individual might be entrapped in a liminal hotspot characterized by chaos, unpredictability, high affectivity and suggestibility.<sup>4</sup> Minimally liminal hotspots as the results of competing, simultaneous events, are often a product of today's communication technologies, enmeshing the previously existing boundaries, and can be resolved through spatial or temporal rearrangements.<sup>5</sup> Hotspots related to traumatizing events are characterized by high-level risks and affectivity, and rearrangements require deep changes in human relationships. Technology-driven hotspots extend to these more serious cases of “troubled becoming”, rendering the co-construction of meaning and integration of personal experiences more difficult.<sup>6</sup> Examples include:

- data handling: beyond the well-known security threats, digitalization may lead to hyperbanalization<sup>7</sup>: increasing bureaucracy and the emergence of obsessive-compulsive patterns in administration,
- access to potentially traumatizing and “dark” contents strengthening (self)destructive patterns,
- “eternal” information on the social media, shadowing the individual and paralyzing identity development processes,
- excessive control and unerasable mistakes (e.g., a social credit system<sup>8</sup>), the use of computer-generated influencers – the emergence of nonhuman role models for identity con-

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<sup>4</sup> Greco – Stenner, *op. cit.*; Paul Stenner, *Liminality and Experience: A Transdisciplinary Approach to the Psychosocial*, London: Palgrave Macmillan, 2017; Árpád Szokolczai, “Permanent (Trickster) Liminality: The Reasons of the Heart and of the Mind”, *Theory & Psychology*, vol. 27, issue 2 (2017) pp. 231–248.

<sup>5</sup> Greco – Stenner, *op. cit.*

<sup>6</sup> *Ibid.* – See also Annamária Tari, “Manipulált képek és videók lélektana – a valóság kitégítése, avagy az illúziók valóságba emelése?”, in *Deepfake: a valótlan valóság*, ed. by Petra Aczél – Ágnes Veszelszki, Budapest: Gondolat Kiadó, 2023, pp. 233–252.

<sup>7</sup> Keith J. Hayward, *City Limits: Crime, Consumer Culture and the Urban Experience*, New York: The Glass House Press, 2004.

<sup>8</sup> György Csepeli, *Ember 2.0. A mesterséges intelligencia gazdasági és társadalmi hatásai*, Budapest – Kőszeg: Kossuth Kiadó - Felsőbbfokú Tanulmányok Intézete, 2020

struction.<sup>9</sup> The rise of false ideal selves (avatars in video-games)<sup>10</sup>,

- personality rights of deceased persons: e.g., writers' or artists' computer-generated "resurrection"<sup>11</sup>,
- being always online while at work (burnout and acute tensions between the identity components that people could previously compartmentalize),
- psychological consequences of false relational feedback ("likes"; "selfitis" etc.)<sup>12</sup>.

Rethinking technological development from the point of troubled becoming and research on liminal phenomena could contribute to preventing the adverse impacts of e-communication on human wellbeing.

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<sup>9</sup> Ádám Guld, "A deepfake és CGI-technológia az influencer marketing szolgálatában: így formálják át a digitális karakterek az ismertségipar működését", in *Deepfake: a valótlan valóság*, ed. by Petra Aczél – Ágnes Veszelszki, *op. cit.*

<sup>10</sup> Susan A. Greenfield, *Identitás a XXI. században*, Budapest: HVG Könyvek.

<sup>11</sup> Ágnes Veszelszki, "Deepfake: kételkedés a kételyben", in *Deepfake: a valótlan valóság*, ed. by Petra Aczél -- Ágnes Veszelszki, *op. cit.*

<sup>12</sup> Annamária Tari, *op. cit.*



*Matthew Crippen*

## **Deepfakes, AI and Media Literacy** **A Need for Old Ways of Critical Engagement**

Deepfakes use artificial intelligence to predict how people might appear from different angles or performing actions not originally recorded, often merging visual and audio samples from various sources to create convincing but false representations. Moreover, deepfakes can now be produced cheaply by non-experts. In our already visually driven culture, especially in the TV and internet age, this undeniably introduces new avenues for bullying and harassment, as images can be more damaging than words. However, does this signal the onset of the post-truth “infocalypse” that some foresee, where counterfeit videos are easily made, and bad actors can dismiss legitimate, incriminating footage? Such a conclusion is premature, especially if we engage with media using the same critical thinking we applied before photography’s invention.

Before the photographic age, written and pictorial accounts were not considered definitive proof of the events they conveyed. We should have maintained this critical perspective, as photographs and video recordings can also be misleading.

U.S. war propaganda offers an example. During the 1991 Gulf War, under George H. Bush’s leadership, American news audiences frequently saw videos of Patriot missiles launching, accompanied by narratives from reporters or military officials claiming the final blast marked the destruction of Iraqi Scud rockets. However, while the launches and detonations were real, the explosions seldom indicated a successful interception. Instead, they were often caused by premature detonations (see Figure 1). Today, deepfaked images of a Patriot destroying an incoming missile might be created, but they would likely be less convincing than the 90s videos, as the latter were bolstered by eyewitnesses unable to detect the deception.



*Figure 1: The first two stills show the trajectory of a Patriot missile, but does this third image show it intercepting a Scud?*

In the lead-up to the Gulf War, a widely circulated video featured a young woman identified as “Nayirah” emotionally recounting Iraqi atrocities to the United States Congressional Human Rights Caucus. Though the video itself was genuine, the woman was later revealed to be the Kuwaiti Ambassador’s daughter, and her story was fabricated (Figure 2).



*Figure 2*

Roughly a decade later, under the leadership of George W. Bush, the U.S. commenced another invasion of Iraq. There was testimony, including alleged photographic evidence, claiming that Iraq possessed weapons of mass destruction (see Figure 3). Yet these weapons were never found after the invasion.



*Figure 3*

Another example is the 2003 toppling of Saddam Hussein’s statue in Iraq (see Figure 4). The video footage (and photographic stills) of the event were genuine, showing Iraqis seemingly welcoming U.S.-led forces as liberators. However, misleading techniques were used that weren’t clear to viewers. U.S. military personnel helped topple the statue and provided props to the crowd. Camera operators used tight shots to make the crowd seem larger and more celebratory. The video was edited (and as filmmakers know, editing can create impressions or narratives not in the raw footage). Thus, whether in the era of deep-fakes or not, skepticism toward images – both still and moving – was and remains warranted.



*Figure 4*

Images from the deepfake era, then, require critical scrutiny but this remains the case even when photographs are genuine. One case is a photo retweeted by Yair Netanyahu, Benjamin Netanyahu's son, which purportedly showed a large turnout of Arab voters with the clear intention of getting right-leaning Israeli Jews to cast their ballots. However, the photograph was from Turkey (Figure 5). Another instance involved an image of a camp, released by Israeli officials, intended to depict well-cared-for Palestinian (Gazan) refugees. It was later revealed that the photo was from the Moldova-Ukraine border (Figure 6). Israeli officials later clarified that the image was used for "illustrative purposes".



*Figures 5 and 6*

Again, these last two photos were not deepfakes, but their impact would have been similar if they were, as the intent was still to deceive through imagery. The rise of deepfakes, therefore, does not necessarily herald the onset of a post-truth "infocalypse". Instead, if the increasing prevalence of deepfakes makes us more cautious about accepting images at face value, their proliferation may actually serve as a corrective, challenging our previously uncritical assumptions about photograph-like images.



*Natalia Tomashpolskaia*

## **Predictive World**

In the contemporary world, the scientific model of reality has become prognostic and predictive. Scientists make predictions based on facts, research, and experiments. These predictions create a new picture of reality and have a great impact on people's behavior and decision-making. For instance, we can observe a vivid manifestation of this phenomenon in modern medicine. Prognosis replaces diagnoses, and diagnoses and vital decisions begin to be based on a prognosis. However, not only sciences, but the mass-media news industry also has become prognostic. Nowadays, the prevailing part of all news consists not of facts but of predictions and prognoses (economic, political, societal, environmental, medical, etc.). All types of analysts and prognosticators in all spheres have become in demand. To sum up, nowadays we do not live here and now but we are living in constant stress awaiting negative events based on some prognosis we have believed in and these beliefs condition our current behaviour.

This scientific evolution has led to a paradigm where predictions increasingly replace diagnoses, particularly in the medical field. Notably, Ivan Illich's influential work, *Medical Nemesis* (1974), critiques the medical establishment for its overreliance on technology and preventive medicine, suggesting that society has become morbidly inclined toward the consumption of medical services rather than holistic health. In brief, his idea was that medical prognostic models encourage people to become consumers of so-called *preventive medicine*. Illich's arguments highlight a troubling trend where guidelines – such as those issued by the European Society of Cardiology – label significant portions of the population as “at increased risk”, further perpetuating the predictive model.<sup>1</sup> This creates a society predisposed to medical interventions, even when such actions may not be warranted, thus raising ethical questions surrounding medical practices and

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<sup>1</sup> Linn Getz – Anna Luise Kirkengen – Irene Hetlevik – Solfrid Romundstad – Johann Sigurdsson, “[Ethical dilemmas arising from implementation of the European guidelines on cardiovascular disease prevention in clinical practice. A descriptive epidemiological study](#)”, *Scandinavian Journal of Primary Health Care*, vol. 22, no. 4, December 2004, pp. 202–208.

the societal implications of labeling individuals as “at risk”.<sup>2</sup> In tandem with this medical focus, Giorgio Agamben, influenced by Illich, refers to a form of “techno-medical despotism”, where the predictive nature of modern healthcare becomes a tool of social control, further alienating individuals from their well-being.<sup>3</sup> “Everything was getting too big, too out of control, too inhuman.”<sup>4</sup>

As predictive analytics gains traction, it becomes clear that the implications of predictive sciences extend beyond mere statistics; they embody a philosophical and ethical shift in how we navigate our world. A notable critique emerges from Eric Siegel’s book *Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die*,<sup>5</sup> who asserts that while predictive analytics offers powerful insights, it is crucial to exercise caution in its application. He argues that predictive models are inherently amoral, possessing the capacity to be utilized for both beneficial and harmful ends. The ethical dilemma arises in balancing the advantages of predictive technology with the potential for misuse, for instance, in juridical practice.<sup>6</sup> Siegel notes that predictive analytics are increasingly utilised by police departments, including those in Los Angeles and Santa Clara, CA, to guide patrol assignments and enhance crime prevention efforts. While this raises the spectre of the anticipatory (and occasionally misdirected) “murder prevention” arrests portrayed in the 2002 movie “Minority Report”<sup>7</sup> – concerns about the current approaches to “predictive policing” are relevant enough. Based on a story by renowned science fiction writer Philip K. Dick (1928–1982), the film *Minority Report* is an action-detective thriller set in Washington, D.C., in 2054, depicting a future in which police employ psychic technology to apprehend and convict individuals for crimes before they occur.<sup>8</sup> Tom Cruise portrays the head of the Precrime

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<sup>2</sup> Ivan Illich, *Medical Nemesis: The Expropriation of Health*, New York: Pantheon Books, 1974.

<sup>3</sup> Giorgio Agamben, *State of Exception*, Chicago: University of Chicago Press, 2005.

<sup>4</sup> *Ibid.*

<sup>5</sup> Eric Siegel, *Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die*, New Jersey: Wiley, 2016.

<sup>6</sup> UCL (2016-10-24): “[AI predicts outcomes of human rights trials](#)”, *UCL News*.

<sup>7</sup> For the storyline see [https://www.imdb.com/title/tt0181689/?ref=tturv\\_ov\\_i](https://www.imdb.com/title/tt0181689/?ref=tturv_ov_i).

<sup>8</sup> See Philip K. Dick, *The Minority Report*, vol. 4 of *The Collected Stories of Philip K. Dick*, Secaucus, NJ: Citadel Twilight, 1991.

unit, who becomes accused of a future murder involving a man he has yet to meet. Siegel observes in his book that such predictive approaches have the potential to be applied in ways that may cause harm. “With great power comes great responsibility”. he notes in quoting Spider-Man.<sup>9</sup> The implication is that society must exercise caution in the application of predictive models to ensure their responsible use and to safeguard the potential benefits they offer. Like other powerful technologies or disruptive innovations, predictive analytics is inherently amoral and can be directed toward either beneficial or harmful ends. To prevent harmful applications, it is essential to develop a thorough understanding of the capabilities and limitations of predictive analytics – a goal that further study of this subject can facilitate.<sup>10</sup> “Compelled to grow and propelled to the mainstream, predictive technology is commonplace and affects everyone, every day. It impacts your experiences in undetectable ways as you drive, shop, study, vote, see the doctor, communicate, watch TV, earn, borrow, or even steal.”<sup>11</sup>

The inherent limitations of predictive analytics stem from its reliance on historical data, which often assumes a stable environment. But the use of predictions, changes “the world that predictions inhabit”.<sup>12</sup> However, the very act of making predictions can alter the landscape in which these predictions are made. As Mackenzie noted, predictions can influence behaviors in ways that are not easily foreseeable.<sup>13</sup> The “paradox of prediction” illustrates this phenomenon, i.e., predictions shape present actions, potentially leading to self-fulfilling prophecies, where the mere act of predicting influences outcomes.<sup>14</sup> Anticipatory knowledge is not trying to represent reality but to produce a desired future. As Elena Esposito

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<sup>9</sup> Siegel, *op. cit.*

<sup>10</sup> See Daniel Innerarity, “[Predicting the Past: A Philosophical Critique of Predictive Analytics](#)”, *IDP: Journal promoted by the Department of Law and Political Science*, no. 39, November, 2023, pp. 1–12.

<sup>11</sup> Siegel, *op. cit.*, p. 3.

<sup>12</sup> Adrian Mackenzie, “[The Production of Prediction: What Does Machine Learning Want?](#)”, *European Journal of Cultural Studies*, vol. 18, issue 4–5 (2015), p. 441.

<sup>13</sup> *Ibid.*, pp. 429–445.

<sup>14</sup> Helga Nowotny, [In AI We Trust: Power, Illusion and Control of Predictive Algorithms](#), Cambridge: Polity Press, p. 5.

claimed, present futures will shape the future present.<sup>15</sup> We do not know where knowledge of the world ends and where the transformation of it begins. “Because algorithms intervene in social realities, it becomes unclear to which extent they analyse or produce a certain reality.”<sup>16</sup> This anticipated future is the incentive for adopting immediate preventive actions that change the course of reality, and this is why the anticipated event never takes place. “The prediction is right when it prevents what it had foreseen from taking place. In this new world order, the truth has a retro-active nature. Anticipatory logic attempts to identify the causes of the threat and sets in motion the procedures to prevent it from taking place.”<sup>17</sup> But a prediction, for example, can stimulate change or discourage it completely. An algorithm can facilitate the occurrence of predicted outcomes, not due to the inherent likelihood of those outcomes materializing independently of the prediction, but rather because human behavior sometimes aligns with the prediction itself. This is the famous “self-fulfilling prophecy” that Robert Merton formulated many years ago (1948).<sup>18</sup> Thus, the predictive model not only reflects past patterns but also actively participates in structuring future behaviour, with serious implications for human autonomy.

This ethical puzzle becomes even more complex when considering the biases that can arise in predictive modeling. Machine learning algorithms, which form the backbone of many predictive systems, analyze data to identify patterns. However, these patterns are not always reflective of reality. As the algorithms focus on statistical relationships, they may overlook individual nuances, leading to unjust generalisations and perpetuating systemic inequalities.<sup>19</sup> The case is that the discriminations that arise in the configuration of patterns are not “bugs” but properties of the Big Data

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<sup>15</sup> Elena Esposito, [\*The Future of Futures: The Time of Money in Financing and Society\*](#), Cheltenham: Edward Elgar, 2011, p. 168.

<sup>16</sup> Ingrid Schneider, “[Bringing the state back in Big-data based capitalism, disruption and novel regulatory approaches in Europe](#)”, in *The Politics and Policies of Big Data*, ed. by Ann Rudinow Sætnan, Ingrid Schneider and Nicola Green, New York: Routledge, 2018, p. 137.

<sup>17</sup> Innerarity, *op. cit.*, p. 3.

<sup>18</sup> Robert K. Merton, “[The Self-fulfilling Prophecy](#)”, in *The Antioch Review*, vol. 8, no. 2, Summer 1948, pp. 193–210.

<sup>19</sup> Cathy O’Neil, [\*Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy\*](#), New York: Crown Publishing Group, 2016.

methodology, which means that the solution cannot be to eliminate the data that are susceptible to discrimination from the procedure, but to develop a hermeneutics that is conscious of these properties and their limitations.<sup>20</sup> Moreover, as Matzner provocatively suggests, prediction is a generalised bias.<sup>21</sup> The very act of prediction is shaped by the biases inherent in the methodology of Big Data, which generalises from specific examples, often implicitly reproducing the normative judgments embedded in historical records. In other words, predictive analytics, by relying on patterns in historical data, reproduces the biases of the past, presenting them as “objective” trends without reflecting on the social, historical, and cultural assumptions underlying them. Far from being neutral, predictive models carry with them a set of values and assumptions that are rarely made explicit. The problem is that any prediction is not neutral and it serves to drive decisions.

Furthermore, the reliance on predictive analytics can foster a culture of surveillance, where individuals are monitored and categorised based on predictive models (returning to the “Minority Report” example). The problem is that many algorithms attempt to predict the future behaviour of people (who will buy, get sick, or commit a terrorist act), which means using the characteristics or current behaviour of a person to predict what he or she has not become or done yet.<sup>22</sup> The result is a society where personal autonomy is compromised, and individuals are often reduced to mere data points within larger systems.<sup>23</sup> But the lives of human beings are not identified simply by causalities, but possibilities. “Propensity” is a statistical concept that reflects the likelihood that an individual within a specific category will exhibit a certain behavior; it is not grounded in the individual’s actual behavior.<sup>24</sup> Critics argue that the foundational assumption of stability in predictive models is problematic. As society becomes increasingly complex and dynamic, relying on historical data to forecast future behav-

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<sup>20</sup> Siegel, *op. cit.*

<sup>21</sup> Tobias Matzner, “[Surveillance as a critical paradigm for Big Data](#)”, in *The Politics and Policies of Big Data*, ed. by Ann Rudinow Sætnan, Ingrid Schneider and Nicola Green, New York: Routledge, 2018.

<sup>22</sup> Siegel, *op. cit.*

<sup>23</sup> Shoshana Zuboff, [The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power](#), PublicAffairs, 2019.

<sup>24</sup> Mark Andrejevic, [Infoglut: Now Too Much Information is Changing the Way We Think and Know](#), New York: Routledge, 2013.

iors may lead to misleading conclusions.<sup>25</sup> The notion of “pre-emption” also raises concerns about the deterministic nature of predictive analytics. By anticipating outcomes without identifying causes, predictive models can create a self-reinforcing cycle where behaviors align with predictions, further perpetuating biases and marginalisation. This approach often fails to account for the unpredictability inherent in human behavior and societal dynamics.<sup>26</sup> Additionally, there is a growing recognition of the limitations of Big Data in predicting individual actions. While algorithms can reveal trends and correlations, they cannot account for the nuanced motivations and circumstances that shape human behavior. Data analysis is a useful instrument to discover interrelations and correlations, but it will not eliminate the unpredictable part of human behaviour. Data analysis “suggests possibilities by presenting probabilities. These possibilities are thus not factual, they do not present causal relations per se, and it should be kept in mind that the frame constructed based on this information can also have an impact in itself.”<sup>27</sup> The risk lies in treating predictive analytics as a definitive guide, neglecting the importance of context and individual agency. We must ensure a space of indeterminism and chance, which means reflecting on the elements of uncertainty and freedom that exist in every action. The implications of predictive analytics extend into the realm of political discourse. The techniques of artificial intelligence compensate for our lack of knowledge of the future by working with probability; they do not provide us with knowledge of the future, but they foresee the probability of a certain future happening. The probability has to do with the idea we make of the future and how we configure it, questions that constitute precisely our perspective of the political.<sup>28</sup> As predictive models gain prominence, there is a tendency to reduce complex human experiences to mere data points, undermining the richness of individual narratives. This shift can lead to a

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<sup>25</sup> Reuben Binns, “[Fairness in Machine Learning: Lessons from Political Philosophy](#)”, in *Proceedings of the 2018 Conference on Fairness, Accountability, and Transparency*, ed. by Sorelle A. Friedler and Christo Wilson, vol. 81, New York: PMLR, 2018, pp. 149–158.

<sup>26</sup> Zachary Chase Lipton, “[The Mythos of Model Interpretability](#)”, in *Communications of the ACM*, vol. 61, no. 10, October 2016, pp. 36–43.

<sup>27</sup> Stefan Strauss, “[Datafication and the Seductive Power of Uncertainty – A Critical Exploration of Big Data](#)”, *Information*, no. 6 (2015), pp. 836–847, the quoted passage on p. 843.

<sup>28</sup> Innerarity, *op. cit.*

depoliticisation of social issues, as decisions are increasingly guided by algorithms rather than human empathy and understanding.<sup>29</sup>

It is essential to navigate the future of predictive analytics with a critical eye. As predictive analytics continues to evolve and expand its influence, it is crucial to critically examine its implications for individual agency, social justice, and ethical governance. However, I believe that the problem is more profound. In Esposito's words, predictive analytics in all spheres of human life returns us to living in a "prophetic world".<sup>30</sup> Predictive algorithms are not a continuation of administrative statistics but of fortune-telling. The perpetuation of ancient prophetic practices reveals the assumption that the future can be known ahead of time. Moreover, algorithms privilege regularities over deviations and surprises. In this way, a new type of social order is configured. Everything that deviates from the predictive norm becomes marginalised. "The hope of an apolitical use of data will never be anything more than a technocratic dream."<sup>31</sup>

To conclude, I would emphasise that predictive modelling has a substantial influence on human life nowadays. Most of all political, societal, medical, and personal decisions are made due to a prognostic model based on past patterns. Metaphysically, we exist in a fascinating paradox, often disregarding our present reality as we live and act in alignment with beliefs about anticipated future trends and events. We accept probabilistic models as though they represent absolute truth, treating them as real even before they materialise. I would suggest that we inhabit an unreal world that has supplanted our immediate, present reality. We live, behave, and make decisions based on the assumptions of predictive models, many of which envision apocalyptic scenarios – such as catastrophic climate change, global conflict, nuclear attacks, and deadly pandemics. Notably, most current global models focus on negative scenarios, emphasizing the worst-case probabilities. Historically, there has been a significant shift – from the optimism of 20th-century futurists and utopian science fiction writers, who envisioned a bright future for humanity, to the predominantly pessimistic and apocalyptic projections that characterise the early 21st century.

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<sup>29</sup> Safiya Umoja Noble, [\*Algorithms of Oppression: How Search Engines Reinforce Racism\*](#), New York: New York University Press, 2018.

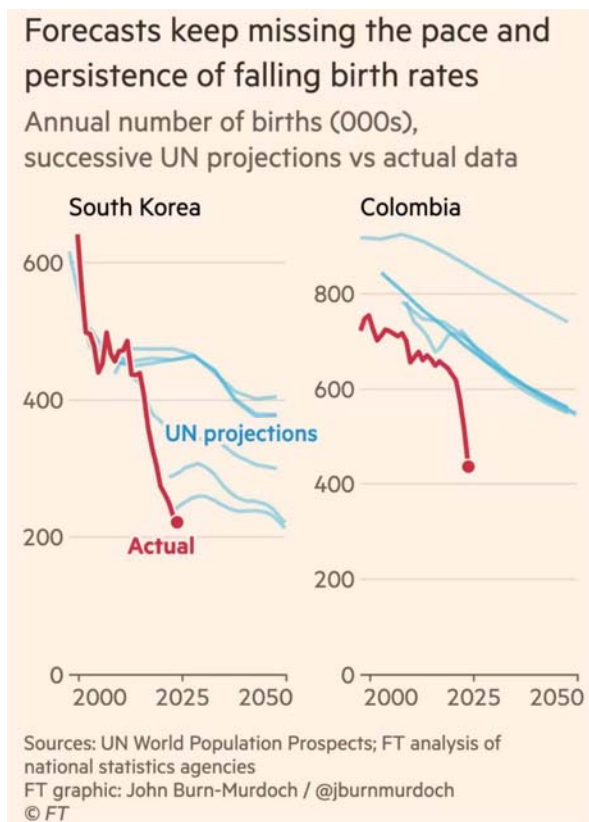
<sup>30</sup> Esposito, *op. cit.*

<sup>31</sup> Innerarity, *op. cit.*, p. 9.

## Appendix

An example of the fallibility of predictive modelling which explicitly influences political behaviour from [a recent \*Financial Times\* article](#) entitled “Peak population may be coming sooner than we think. Birth rates keep coming in below the forecasts – the models may need an overhaul.”

The author of this article finishes his paper rather ironically with the caution: “But perhaps the next edition of projections should come with a health warning: these estimates are extremely fuzzy and based on frameworks that were true in the past but may not be today. Use them with caution, and probably err on the low side.”





*Eörs Szathmáry*

## **Science in the 21st Century**

In this essay I present my personal view in which directions and how science might develop in this century. This venture hinges on the hidden assumption that there will be significant scientific practice also, say, in 2073. This is far from certain. Our civilization is facing an unprecedented test of our ability to cooperate for common global goals. I see no guarantee that we shall succeed. The climate emergency, anthropogenic mass extinction of species, emerging infectious diseases and the rise of irresponsible politicians all point in the direction of failure, not to mention the new threat posed by the possibility of evolvable AI.

Nevertheless, let me adopt for a change a more optimistic view and assume that the scientific enquiry will continue. I briefly consider three different questions: first, what seem to be the outstanding scientific goals that we could realistically reach; second, the science-based development of major tech applications and, third, what science as a practice could look like as this century elapses.

I am aware that the link between basic science and application is stronger than decades ago, and that the TECH industries benefit a great deal from this. Still, I begin with some fundamental issues.

### **Some Major Tasks for Fundamental Science**

Before delving into concrete goals, let me emphasize that in my view basic science is as important as ever. The view expressed by Flexner in his remarkable 1939 essay “The Usefulness of Useless Knowledge”<sup>1</sup> is still valid. In a recent echo a chemist writes:

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<sup>1</sup> Abraham Flexner, “[The Usefulness of Useless Knowledge](#)”, *Harpers*, issue 179, pp. 544–552.

New knowledge is generated when researchers are driven by the desire to understand, a desire that can only be acted on when intellectual pursuit is liberated from the constraints of concrete applications and tightly set targets... Basic research – like writing an opera – is first of all a cultural undertaking, not a luxury, and certainly essential. Moreover, the promotion of research requires patience and perseverance. The principle of trusting people rather than trusting a monitoring system based on distrust has proved its worth, and the principle of funding people rather than projects has withstood the test of time.<sup>2</sup>

In physics a major unsolved problem is the unification of quantum mechanics and general relativity. There are various formulations of the problem, one of them being the following: in general relativity there is a link between spacetime geometry (curvature) and mass. Quantum mechanics teaches us that mass (matter) is quantized. But how would one quantize geometry? There are various suggestions regarding the direction of possible solutions, one that I like is that gravity remains classical at the price of two necessary modifications: there is some uncertainty of spacetime itself, and the wave function collapses automatically when the uncertainty becomes sufficiently large.<sup>3</sup> This approach could neatly explain the transition from the behaviour of particles to that of macroscopic bodies. It seems that such a theory is testable. Whether this, or any alternative approach will be successful I do not know, but I have the feeling that the problem can be solved in this century.

In chemistry we can make a major step forward if we succeed in constructing algorithms whereby large reaction networks can be generated and analysed *in silico*. Such a leap forward would also ben-

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<sup>2</sup> Helmut Schwarz, “[On the Usefulness of Useless Knowledge](#)”, *Nature Reviews Chemistry*, 2017, no. 1.

<sup>3</sup> Frigyes Károlyházy, “[Gravitation and the Quantum Mechanics of Macroscopic objects](#)”, *Individual Nuovo Cimento A*, vol. 42 (2016), pp. 390–402; Jonathan Oppenheim et al., “[Gravitationally Induced Decoherence vs Space-Time Diffusion: Testing the Quantum Nature of Gravity](#)”, *Nature Communications*, vol. 14 (2023), article number 7910.

efit research on the origin of life. Scenarios of prebiotic chemical evolution could be tested without expensive laboratory experiments first, followed by experiments with the promising candidate networks. Whether quantum computation will develop significantly to aid this process we shall see.

Another goal for computational chemistry is the prediction of 3D RNA structures. Many researchers think that the role of RNA in the earliest phase of biological evolution was very prominent as it was performing both genetic and catalytic functions. The latter job is mostly done by protein enzymes in contemporary living systems. The 3D structure of proteins can now better be predicted than ever before, thanks to the AI called AlphaFold that earned this year's Nobel Prize in chemistry for its developers. For such algorithms a large training set is needed. In case of proteins that set has been populated with examples thanks to several decades of tedious lab work and structure determination. The snag is that we do not have a large enough training set for RNA molecules. It is a realistic, even if expensive, goal to set up a “knowledge factory” to fill this gap. Once there are enough determined RNA structures, a kind of “BetaFold” seems to be possible for structure prediction. Achieving this goal would do invaluable service to research in the origin of life field.

As we see already from the previous examples, research relevant for the origin of life is likely to continue.<sup>4</sup> The goal is, of course, to create life from inanimate matter. There are two ways of achieving this: by mimicking prebiotic chemical evolution and by synthesizing artificial minimalist living organizations. It is unlikely that we shall ever be able to re-run life-producing chemical evolution *in toto*, simply because there will be not enough time for this. What we might realistically achieve in this century is testing key phases of different scenarios for chemical complexification (generative *in silico* chemistry could, as discussed above, greatly promote the construction of such

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<sup>4</sup> Paul Adamski et al., “From Self-Replication to Replicator Systems En Route to De Novo Life”, *Nature Reviews Chemistry*, vol. 4 (2020), pp. 386–403; Heng Lu et al., “Small-Molecule Autocatalysis Drives Compartment Growth, Competition and Reproduction”, *Nature Chemistry*, vol. 16 (2024), pp. 70–78.

scenarios). Two statements by the late great chemist Albert Eschenmoser to the point: “The greatest minds in chemistry should tackle the origin-of-life problem”, and “We shall never know how it happened, but we can arrive at a consensus how it *could have* happened”.

Bottom-up construction of chemical supersystems that can qualify as minimal living systems is another profitable research direction. To my mind the best prescription to realize this goal rests on two insights: one is that life is rooted in autocatalytic chemistry (an autocatalyst is a compound or network that can catalyse its own formation), the other is that we need three different kinds of autocatalytic component systems: (1) a metabolic “engine”, (2) some hereditary replicator and (3) a boundary system that keeps the constituents together.<sup>5</sup> Present-day bacteria of course fit these criteria, but they are too complex to have originated directly from chemistry or to be synthesized *de novo* from molecules. Minimalist chemical versions of the required components seem to be realizable. It is not improbable that we shall be able to construct the first artificial living systems in the first half of this century.<sup>6</sup>

Search for extraterrestrial life. Whether we will catch an interstellar message or artifacts is highly uncertain. Search for alien life in the solar system is a realistic aim. In this century we are likely to learn whether there was or is life on Mars, and whether there exist life forms on those moons of Jupiter and Saturn that have a subsurface ocean. Investigating those icy moons is of paramount importance because if they harbour life then it will have originated independently from our biosphere and therefore would qualify as an “independent experiment”, helping us to assess what is “necessary” and what is “accidental” for the phenomenon of life. The search for earth-like planets in our galactic neighbourhood will speed up. Being able to determine the chemical composition of the atmosphere of planets is a primary aim, since out-of-equilibrium compositions can

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<sup>5</sup> Tibor Gánti, *The Principles of Life*, Oxford University Press, 2003. First published in Hungarian in 1971.

<sup>6</sup> Adamski et al., *op. cit.*

be strongly suggestive of life. Nevertheless, it might turn out to be the that truly earth-like planets are very rare.

It is uncertain how far we shall be able to advance in our understanding of multispecies ecological stability and, in the applied dimension, in our ability to restore ecosystems. This area is more complex than brain research. It is equally full of nonlinear phenomena, but there is a huge difference: brains are integrated functional organs that have evolved under individual selection on organisms. Ecosystems rarely qualify as units of evolution, which explains the conceptual differences between brain and ecosystem functionality.

Huge efforts are being made to understand the functioning of complex brains, including ours. One major goal is to understand how the brain deals with natural language and how this capacity could have emerged.<sup>7</sup> Some regarded the latter as “the hardest problem of science”.<sup>8</sup> The now-popular large language models (LLMs) as they are offer no good guidance here, for three reasons: (i) humans are not trained on millions of documents, (ii) often we, unlike LLMs, abide by strict deterministic rules (2 plus 2 make not just very likely 4, but exactly 4), and (iii) we form our concepts by being grounded in physical reality. Progress in experimental and theoretical neuroscience is expected to provide a good understanding into the “language factory” of our brains. This would be necessary for understanding why other species cannot master complex syntax and how the language faculty could have evolved in the hominin lineage. It is likely that new techniques, including brain organoids and interfaces between computers and the nervous system will contribute to the required understanding.

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<sup>7</sup> Szabolcs Számadó – Eörs Szathmáry, “[Competing Selective Scenarios for the Emergence of Natural Language](#)”, *Trends in Ecology & Evolution*, vol. 21, issue 10 (2006) pp. 555–561; Anna Fedor – Péter Ittész – Eörs Szathmáry, “[The Biological Background of Syntax Evolution](#)”, in D. Bickerton – E. Szathmáry (eds.), *Biological Foundations and Origin of Syntax*, Cambridge, MA: MIT Press, 2009, pp. 15–39.

<sup>8</sup> Morten H. Christiansen – Simon Kirby, “Language Evolution: The Hardest Problem in Science?”, in Christiansen and Kirby (eds.), [Language Evolution](#), Oxford University Press, 2003, pp. 1–15.

The nature of consciousness will remain a hotly debated issue,<sup>9</sup> hopefully complemented by competent real research. I agree with those who think consciousness is a product of brains, and that birds, mammals and very possibly cephalopods can be regarded as conscious. However, I think that only we have secondary consciousness, namely, that we are conscious of being conscious. I guess for the latter you need the same apparatus in the brain that can master complex recursive syntax. This brings us to the fascinating question whether AI can ever become conscious. I am reasonably confident in suggesting that this goal is achievable, but only in physically grounded robots with complex enough “brains”. Once we get there, burning ethical issues will raise their heads.

## Major Tech Perspectives

There are three very powerful domains of technological development that have already delivered and will continue to offer disruptive innovations: the “trinity” of biotech, nanotech and info/neurotech, as foreseen remarkably clearly go by Stanislaw Lem in 1964.<sup>10</sup> I discuss them in turn.

**Biotech:** With the complete sequencing of the human genome at the turn of the century, a primary goal has been to understand genetic functions, interactions, and their roles in health and disease. CRISPR and other gene-editing tools are expected to enable us to not only treat genetic disorders but also potentially “enhance” human capabilities in the future. Advances in synthetic biology aim to enable the design of new organisms for specific purposes, such as creating bio-fuels, developing new medications, and even constructing organs for transplantation. The construction of entirely novel organisms will be

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<sup>9</sup> David J. Chalmers, “[The Singularity: A Philosophical Analysis](#)”, *Journal of Consciousness Studies*, vol. 17, nos. 9-10 (2010), pp. 7–65.

<sup>10</sup> Lem, *Summa Technologiae*, Minneapolis: University of Minnesota Press, 2014. First published in Polish in (1964).

within reach before the end of this century. Understanding the biology of aging could enable breakthroughs in longevity, including developing drugs or gene therapies to slow aging processes and prevent age-related diseases. There are strong biological reasons to believe, contrary to amateurish opinions,<sup>11</sup> that something like the doubling of the currently maximum human lifespan is unattainable.

**Nanotech:** Nanoscale drug carriers, such as liposomes or polymeric nanoparticles, can deliver medications directly to specific cells (e.g., cancer cells), reducing side effects and increasing efficacy. Tiny robotic devices could perform minimally invasive surgeries, repair tissues, or even diagnose conditions from within the body. Nanosensors and quantum dots are enabling high-resolution imaging and early disease detection. Quantum bits (qubits) derived from nanostructures could drastically improve computing power, enabling complex simulations and artificial intelligence breakthroughs. Nanotechnology could enable materials that repair themselves, extending the life of products from electronics to buildings.

**Info/NeurTech:** AI is poised to assist in diagnosis, drug discovery, and patient care. Experts predict that AI will not only make health-care more efficient but also open doors to new therapeutic techniques by analyzing vast amounts of health data. With the rise of digital tools and the massive accumulation of data, data-driven approaches are becoming central to scientific inquiry. Machine learning models will be playing a crucial role in fields as diverse as genomics, climate science, and materials discovery. Brain-machine interfaces (BMIs) allow for direct communication between the human brain and computers or prosthetic devices. These interfaces could enable enhanced physical capabilities, memory augmentation, and even new sensory experiences. Cyborg technology is already being applied in prosthetics, cochlear implants, and retinal implants. Future advancements

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<sup>11</sup> Yuval Noah Harari, [\*Homo Deus: A Brief History of Tomorrow\*](#), New York: Harper Perennial, 2018.

may enable wearable or implantable devices that monitor health in real-time, assist with rehabilitation, and even improve mental health.

While current AI lacks consciousness, some experts suggest that achieving a “conscious” AI might be possible if we could model our complex neural and information processing patterns in machines. Others argue that qualia and subjective experience might be unique to biological organisms, inherently linked to their physical structure. It seems likely that we would be able to ignite and recognize it more readily in AI implementations working in agents that can act on their own behalf and experience emotion. Beyond such “animal-like” machine consciousness, a “dry” kind of AI consciousness might arise without us being able to grasp it as such. Importantly, being able to act and decide does not require consciousness.<sup>12</sup>

The concept of downloading or “uploading” a human mind into a digital computer—also known as *mind uploading* or *whole brain emulation* – is one of the boldest ambitions in transhumanism.<sup>13</sup> It remains far from achievable in the early 21st century. Difficulties abound. Current initiatives like the Human Connectome Project aim to map neural connections, but they are still in early stages and lack the resolution needed to capture the entire network with the required precision. Even if we could perfectly simulate the brain’s structure and activity, it is unclear if this would result in *consciousness*. Although storage technology is advancing, storing a high-fidelity model of the human brain remains a technological challenge. Furthermore, processing power to continuously update and “run” this brain model is far beyond current computing capabilities.

## **Evolving Scientific Practice**

AI is increasingly used not only to analyze data but to generate hypotheses. Algorithms will be able to identify potential research direc-

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<sup>12</sup> Yuval Noah Harari, [\*Nexus: A Brief History of Information Networks from the Stone Age to AI\*](#), New York: Random House, 2024.

<sup>13</sup> Chalmers, *op. cit.*



tions and even design experiments to test them, accelerating scientific progress. Rather than replacing human scientists, AI might serve as a collaborative partner, generating novel insights, designing experiments, and identifying correlations in data that human researchers might overlook. Autonomous labs, equipped with robots controlled by AI, will be capable of conducting high-throughput experiments with minimal human intervention practices. Naturally, “easy” tasks will be automatized faster than “difficult ones”. The latter are likely to benefit from human input for a considerable time that lies ahead.



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## Notes on Contributors

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**PRE-CONFERENCE DISCUSSIONS /  
KONFERENCIA ELŐTTI VITÁK**



## *Envisioning an Electrifying Future, VLC11*

### ENVISIONING AN ELECTRIFYING FUTURE

#### 11th Budapest Visual Learning Conference

## Pre-conference discussions

Dear All, the structure of the conference is now complete, please see the

<http://www.hunfi.hu/nyiri/EEE/NK.pdf>

page. We encourage you to look at the uploaded abstracts (as well as at the full papers, as they gradually arrive), study how other topics connect to yours, and begin discussions you feel promising with authors you find interesting. When posting your comments, please include my address ([nyirik@gmail.com](mailto:nyirik@gmail.com)), so that I can upload the texts to this page. Our experience is that an online or partly online conference – given the say 12 time zones stretch and the thus limited time that can be exploited for discussions – will be successful only if it essentially happens before the event actually takes place. We can promise you that *this* conference will be a spectacularly successful one, indeed a turning point in the history of international conferences dealing with the digital future awaiting us.

Postscript Oct. 29, 2024: It turns out that colleagues who have not submitted papers, as well as members of the hoped-for broader audience, would be still be interested in taking part in the pre-conference discussions. Since their affiliation/position does not appear on the conference homepage, their name here will be followed by an appropriate indication.

**Kristóf Nyíri** –19.08.2024 16:34

Dear All, of course Nov. 13 is still far away, but I feel the time has arrived to begin our pre-conference discussions. Quite a number of papers are already uploaded to our homesite. And with the <http://>

[www.hunfi.hu/nyiri/EEE/LING\\_paper.pdf](http://www.hunfi.hu/nyiri/EEE/LING_paper.pdf), [http://www.hunfi.hu/nyiri/EEE/Fortunati\\_paper.pdf](http://www.hunfi.hu/nyiri/EEE/Fortunati_paper.pdf) and [http://www.hunfi.hu/nyiri/EEE/Sverak\\_paper.pdf](http://www.hunfi.hu/nyiri/EEE/Sverak_paper.pdf) papers uploaded, we can now see that the climate catastrophe has become one of the central themes of the conference. The organizers are proud of this in a way unexpected but crucially important development. As to my humble self, I would like to comment on Vojtěch Svěrák's paper. He shows, very convincingly, that big business corporations are responsible for the catastrophe. What I would like to remark here: The average people, the middle-class inhabitants of the globe, are responsible, too: global tourism absolutely adds to the problem, even the conference tourism engendered by the mass university and the publish or perish imperative along with the corrupt publishing industry. Can the scientific/scholarly world be reformed? Certainly not by politicians, themselves focusing on nothing but the next elections. But perhaps by exemplary intellectuals: this is what my own paper submitted to our conference is about: "[Towards a New Aristocracy](#)". Let the pre-conference discussions begin!

**Kristóf Nyíri** – 20/08/2024 13:34

I have just uploaded to our conference homesite Dóra Dergez-Rippl's highly interesting short paper "[The Phenomenology of Archetypes: On the Philosophical Basis and Psychological Use of Our Primordial Images](#)". And I am proud to note that it was possible to link her paper, on the <http://www.hunfi.hu/nyiri/EEE/NK.pdf> page, to the conference paper of my humble self, "[Towards a New Aristocracy](#)", the reason being that in the latter I too touch on the Jungian notion of archetypes, by referring to my essay [Forever Jung](#). In fact, if I may add, another essay of mine in fact carries the title "[Primordial Images](#)". The Nov. 13 conference turns out to be an unusually fortunate event for me, permitting to meet many kindred souls!

**Kristóf Nyíri** – 20/08/2024 15:34

As I here posted earlier, the climate catastrophe has become, somewhat unexpectedly, unhappily but importantly, one of the central top-

ics of our Nov. 13 conference. Another central topic of course is AI. Let me list the following URLs: [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/BS\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/BS_abstract.pdf) (Smith), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/PA\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/PA_abstract.pdf) (Aczél), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/SORGNER\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/SORGNER_abstract.pdf) (Sorgner), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/WEN\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/WEN_abstract.pdf) (Wen), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/BA\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/BA_abstract.pdf) (Benedek), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/KATZ\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/KATZ_abstract.pdf) (Katz), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Conway\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Conway_abstract.pdf) (Conway), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/EBB\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/EBB_abstract.pdf) (Erdélyi-Belle), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Farkas\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Farkas_abstract.pdf) (Farkas), [http://www.hunfi.hu/nyiri/EEE/Fortunati\\_paper.pdf](http://www.hunfi.hu/nyiri/EEE/Fortunati_paper.pdf) (Fortunati), [http://www.hunfi.hu/nyiri/EEE/LING\\_paper.pdf](http://www.hunfi.hu/nyiri/EEE/LING_paper.pdf) (Ling), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Golden\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Golden_abstract.pdf) (Golden), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Laki\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Laki_abstract.pdf) (Laki), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/ESz\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/ESz_abstract.pdf) (Szathmáry), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Zhao\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Zhao_abstract.pdf) (Zhao), [http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Zhong\\_abstract.pdf](http://www.hunfi.hu/nyiri/EEE/ABSTRACTS/Zhong_abstract.pdf) (Zhong) ← I hope I have not left out someone... Now you might say that today there are innumerable conferences the topic of which is AI, and our voices will not be heard. I am more, indeed radically, optimistic. Ours are excellent papers, they form a well-balanced whole, they are/will be visible on the web well before the event, and will be published online within days after the conference takes place. So what the contributors should do: draw attention worldwide to their papers and of course to the entire conference, and – I feel this might indeed be important – take part in the preliminary discussions.

**Gábor Szécsi** – 21/08/2024 17:16

The program and basic objective of this conference, an overall reflection on the problems of the 21st century from various points of view, is convincingly presented in Kristóf Nyíri's study on the new aristocracy. By outlining a wonderful arc of thought through Nietzsche, Burckhardt, Jung, Ortega and Lippmann, Professor Nyíri arrives at

the new intellectual aristocrat who is able to reflect on practical life problems in the light of his classical philosophical education and who has sufficient mobilizing power through the recognition of the social shaping role of communication technologies and the appropriate use of these technologies encompassing both the verbal and the pictorial dimensions. This new intellectual aristocrat knows exactly that, thanks to new technologies, in the age of mediatized communities, the unanimous acceptance of the possibility of choosing a community based on the efficient and fast flow of information, common interest, openness and trust becomes a community-shaping factor. Mediatized, hybrid, communities become a social network of people using old and new means of mediated communication, experienced as a kind of trust process. People using the internet and using mobile phones repeatedly cross the boundaries of virtual and physical communication situations and the communities that feed on them, and at the same time create their own social relations mediated by communication processes. These community relations are not arranged in sharply separated virtual and physical spheres, but shape the identity of the members of the communities as part of a social network that encompasses both virtual and physical relationships. When, for example, we look for the answer to the question of how a universalistic approach to social and natural values can become an increasingly general and unavoidable phenomenon among the generations who use new media and consume its stories, then of the social relations that determine the everyday decisions of the people of digital culture there are two special features we have to highlight. One is the social capital inherent in hybrid (virtual-physical) communities linked to the use of new communication technologies, and the other is the hitherto unknown level of interference of global and local community ties. The former development indicates that belonging to new types of communities based on mutual interest and interests has a previously unknown level of mobilizing power, which can be seen at both global and local levels. The members of these communities can be relatively quickly and effectively activated and involved in actions and movements at various levels along the topics conveyed by the new media and kept on the agenda – such is the problem of global

climate change. And the “glocal” way of thinking, resulting from the simultaneous validation of global and local aspects, makes the new generations perfectly capable of interpreting directly, locally perceived problems in global terms, and then turning them into a source of action; and *vice versa*, they should be able to effectively recognize and make the lessons learned about the local consequences of global processes a starting point for local actions. We, therefore, need intellectual aristocrats who are able to reflect on these processes and the moral aspects of perceived phenomena through their classical, “exemplary education”, their conceptual apparatus and their openness to the practical aspects of the issue, being at the same time well acquainted with, and applying, the language and communication technology through the mobilizing power of which they are able to argue in favor of what they consider to be the right lifestyles, “authentic lives”, and to stand at the forefront of social changes as the teachers of teachers.

**Kristóf Nyíri** – 1/09/2024 14:30

Two days ago our conference homesite has been enriched by the paper Márta KORPICS – Csilla HERENDY, “[Is Digital Literacy the Key Competence of the Future?](#)”. Here in the first paragraph we read: “A higher education institution can be considered successful if it prepares its students for the labour market.” I take the side of those who radically disagree with this view. Let me quote from Kieron O’Hara’s 2011 book [Conservatism](#) (London: Reaktion Books), definitely the best conservative work on conservatism published in recent decades. As O’Hara here writes:

university courses in outcome-based disciplines, like tourism studies, media studies, business studies or forensic science are of less importance (however popular they are with students) than a basic disciplinary training in the fundamental intellectual divisions that have been developed in the academy over a period of centuries, independently of brief fluctuations of demand and supply in the job market. Mathematics, chemistry, physics,

literature, music, theology, philosophy, economics, the various languages, sociology ... and so on are all more important... They will connect people (in work, leisure or public life) and will link them to respected intellectual traditions..." (pp. 137 f.)

In a talk given in 1999 in London, "[Towards a Philosophy of Virtual Education](#)", I have referred to Cardinal Newman's classic *The Idea of a University*, published in 1852. The book takes its point of departure from the statement that the university is "a place of *teaching universal knowledge*". With the modern notion of a *unity of knowledge* the university became associated with the notion of a type of comprehensive, all-embracing, knowledge, i.e. with the requirement of teaching a complete array of subjects. In the same talk I also mentioned Hastings Rashdall's famous work *The Universities of Europe in the Middle Ages* (1895). "Names are sometimes of more importance than is commonly supposed", Rashdall wrote, continuing:

Whether a particular institution should or should not be called a university may seem by itself to be a very small thing. But the name has got to be associated with education of the highest type: to degrade the name of a university is therefore to degrade our highest educational ideal. ... The two most essential functions which a true university has to perform are to make possible the life of study, whether for a few years or during a whole career, and to bring together during that period, face to face in living intercourse, teacher and teacher, teacher and student, student and student. It would be a fatal error to imagine that either the multiplication of books or the increased facilities of communication can ever remove the need of institutions which permit of such personal intercourse. A university, therefore, must have a local habitation.

I regret to note that in the concluding sections of my London talk I judged Newman and Rashdall to have become obsolete. Also, my 1997 paper "[Open and Distance Learning in an Historical Perspective](#)" I introduced by saying:



With multimedia computer networking becoming the dominant technology of communication, we are witnessing a gradual breakdown of traditional barriers in the domain of learning. Frontiers between practical and theoretical knowledge are disappearing. Training and education meet. Liberal arts and science education are becoming closer to professional and technical education...

Clearly, in the late 1990s, and say during the following two decades, I was fascinated by the global, by the virtual, by the pictorial. The turning point was my 2000 essay "[Back to the Roots – Conservatism Revindicated](#)", where I wrote: "the past century or so has led us into a blind alley... The task is to go back to the juncture where the blind alley was chosen. The sickness of our time consists in over-industrialization, overpopulation, extreme globalization, health-care aiming at prolonging age beyond any humanly reasonable point, and last but not least: the rise of the mass university. ... The road back fundamentally involves a new localism, with the resurrection of research universities that have a brick-and-mortar basis even while exploiting all the wonderful potentials of online communication and the web."

**Kristóf Nyíri** – 5/09/2024 11:42

I have recently uploaded to our homesite Yutian Qin's fascinating brief paper "[Short on Time: How Watching Short-Form Videos Relates to People's Metaphorical Perspectives on Time](#)". I find it a blessing the way this planned conference (with the abstracts and papers becoming available online well before the event) brings together kindred souls and minds: in this case a talented young scholar casting new light – definitely new for me – on a subject I was interested in quite some years ago, see e.g. my "[Time and Communication](#)" (2006), "[Film, Metaphor, and the Reality of Time](#)" (2008), or "[Image and Time in the Theory of Gestures](#)". Thank you, Yutian!

Zsuzsanna Schnell – 1/11/2024 11:51

Zsuzsanna Schnell is Associate Professor at the University of Pécs, and takes part in organizing the ENVISIONING AN ELECTRIFYING FUTURE conference. She has questions to put to Cynthia Freeland, author of the “[New Histories for Instant Fashion Futures](#)”:

*First question:* What purpose do space-age materials serve beyond the conceptual notion of being futuristic? Can “future fashion” be confined to space-appropriate materials or will it also include a futuristic style? What are the Author’s thoughts, predictions, visions on this? – *Second question:* Can “Green fashion”, a more organic material-based initiative, be considered as another futuristic trend where awareness is going to be higher in society by promoting clothing which does not aggravate climate change issues? – *Third question:* Is Green fashion the opposite of fast fashion or both go hand-in-hand and are equally modern hip trends today? (In other words: Is Green the new black?) – *Fourth question:* AI is popular but I also see an increasingly powerful trend where we tend to cling on to man-made design (including fashion), man-made art, painting, music, where real humane feelings come across and not AI generated art is what we get. Recently I came across an interesting picture by Joanna Maciejewska, saying: “*I want AI to do my laundry and dishes so that I can do art and writing, not for AI to do my art and writing so that I can do my laundry and dishes.*” What are the Author’s thoughts on this?



**Cynthia Freeland** – 1/11/2024 20:48

Responses to questions from Zsuzsanna Schnell

*Thanks for these, they were fun to think about!*

Question 1: “What might be some purposes of space-age materials and their relevance to future fashions; will there be a futuristic style as well as futuristic materials?”

If you look at the details on the Prada Axiom website about spacesuits and new materials, or related pages, you will find a lot of very interesting things. Suits for spacewalks need materials that will protect against both extreme cold and extreme heat; previous such materials have led to innovations in, for example, “athleisure” wear which does a better job at wicking moisture away from the body to the surface. This has shown up already in sleek and stretchy designs for, say, bicycle racers. The new spacesuits for the moon will be designed to permit greater bodily diversity. The suits must be lightweight to facilitate motion. They are working on new kinds of jointing to facilitate leg and arm/hand motions, as well as cyber-facilitated add-ons such as inbuilt modes of network communication. Spacesuits thus might introduce new bodily devices we ordinary humans can also incorporate into our own clothing. Also, innovations in space style are relevant to creating prosthetic devices that can improve lives of non-space-goers who have disabilities. Some fashion designers have already focused on new styles for medical devices that will improve daily life for amputees, paraplegics, and cancer patients (for example, those who live with ostomy bags after surgery). A few good sources: [European Space Agency, Couture in Orbit: From Spacewalk to Catwalk](#). – [This Chinese Jewelry Brand Turned Prosthetics Into Wearable Art](#).

Questions 2 and 3: “Can ‘Green Fashion’ promote clothing which does not aggravate climate change? Or, is ‘Green Fashion’ just a complement to ‘Fast Fashion’ as something hip and trendy?”

The short answer is that Green Fashion is, so far, not accomplishing much of anything. Various national commitments have not been realized. Recycling seems like a nice idea, but most clothes now

are made from fabric blends that are not easily recycled. The “green” part requires attention as well to how materials for clothes are *grown* or *manufactured*, as this is a major part of the pollution caused by fashion. Natural materials like cotton or bamboo require pesticides, fertilizers, and/or processing with toxic materials, and while wool is “natural”, [raising sheep is quite environmentally harmful](#). Synthetic materials often involve plastic and shed microplastics.

I hear more these days about “Slow Fashion” than “Green Fashion”. This means buying fewer clothes but ones of a higher quality that you can wear and keep much longer so as to avoid the problem of waste. The problem is that such clothes tend to be very high-priced and out of reach for lower-income fashion consumers.

I’m tempted to say that the human push for novelty can only be stopped if we reach a critical mass somehow of horrified and frightened reactions to how bad climate change really is. The alternative could be something like the Mao suit, but that idea only worked due to the combined factors of poverty, political dictatorship, and a population inculcated into an Asian ethical background that emphasized community rather than a Western European tradition focused on individualism (I am to be sure speaking in vast generalities here!).

A positive example I can mention are the US clothing manufacturer [Eileen Fisher](#), which strives to use responsible sourcing and manufacturing. Since 2009 they have taken in their own items to recycle and announced in 2023 having taken back *two million items*. Some are resold and others are used to make decorative items like totes or wall hangings. Another bright spot is the clothing line Zuri, marketed as “Bold, Versatile, Ethical Fashion Made in Kenya”. All the clothing manufacture is done by small scale producers in Kenya, with some cotton fabrics handprinted in Ghana, and other items handloomed in, and using ethically sourced linen from, India. Source: [Ethical Fashion Made in Kenya](#).

Question 4: “AI is popular but I also see an increasingly powerful trend where we tend to cling to to man-made designs in art, dance, fashion, painting, etc.: things made with genuine human feelings. Any thoughts on this?”

I have mixed feelings on this. Not being an expert, I'm not sure about what could eventually be done with AI assistance or by AI on its own. From things I have read or talks I've attended, it seems that most types of art production now using AI, including fashion design, require considerable input from a human. They need quite specific initial instructions, followed by many stages of refinement, to reach something that looks good. Thus, the human element is still contributing quite a lot to the final result. I read on one site that fashion and design colleges will probably need to start teaching this kind of instructional skill as part of their curriculum (they may well be doing it by now). Also, of course, the machine models are all trained on human-created pre-existing contents, whether verbal, visual, or whatnot. I'm also wary of saying that we want art made with "genuine human feelings" because a lot of that kind of art is not really very good. There are already too many paintings, songs, films, etc. full of clichéd or kitschy human feelings. I confess to being romantically drawn to the idea from *Blade Runner* (the original) that the robots or replicants may surprise us with new kinds of perception and imagination.

**Kristóf Nyíri** – 2/11/2024 07:51

I am enchanted by Piotr Kozak's plenary paper "[Thinking in Images: Mental Space vs. Physical Space](#)", and am especially struck by the lines his paper begins with: "To anchor our analyses, let me start with a few examples. Firstly, consider a simple case of trying to answer how many windows are in your room. You can answer this question in at least two ways. You can form a mental image of the room and count windows. Alternatively, you can look at a photograph of the room, provided it was well-taken, and calculate the number of windows." Believe it or not, at the 6th Budapest Visual Learning Conference, Nov. 13, 2015, I gave a [paper](#) which started with a similar argument, but then took a somewhat different course: "Let me perform, in your virtual presence, an experiment. The task is to count the number of ground-floor level windows in the house I live in. Normally, I could just walk around the house, and count the windows. But if

I happen to be away, giving a conference talk, I cannot do that. What I can do is to close my eyes, imagine going round the house, and mentally count the windows. Having concluded the experiment, I come up with the number ten. Perhaps I have made a mistake. If I have, I can, once at home, correct myself by actually walking around and counting. Others are welcome to come to my place and repeat the counting. The result will, perhaps after some initial misunderstandings and explanations, turn out to be the same in every case... Would you be able to perform a similar experiment? Does everyone have vivid mental images? My understanding is that quite a few people claim not to experience such. And of course this is, famously, what Galton learnt in the 1880s, when sending out a questionnaire asking what kind of visual memories the addressee had of his or her breakfast table of that morning. Did they remember the layout of the items on the table? Did they remember colours? It was, mostly, well-educated adult males, having spent a lifetime with reading and writing, who replied that they had no visual recollections whatsoever, no visual mental images. Galton was baffled, and tried to find a solution to the problem: how do then these people manage to think at all? His solution:

the missing faculty seems to be replaced so serviceably by other modes of conception, chiefly, I believe, connected with the incipient motor sense, not of the eyeballs only but of the muscles generally, that men who declare themselves entirely deficient in the power of seeing mental pictures can nevertheless give life-like descriptions of what they have seen and can otherwise express themselves as if they were gifted with a vivid visual imagination. (Francis Galton, *Inquiries into Human Faculty and Its Development*, 1883, 2nd ed., London: J. M. Dent & Co., 1907, p. 61.)

Not only in the case of memory images, but more generally, too, there is the motor dimension beneath the visual one. Facial expressions and gestures precede words both in the evolution of mankind

and the development of the individual. This is an ancient insight, formulated by Plato already...”

**Petra Egri** – 6/11/2024 08:17

Petra Egri, PhD, is Fashion Theorist, University of Pécs. She too has questions to put to Cynthia Freeland, author of the “[New Histories for Instant Fashion Futures](#)”:

*First question:* As I understand it, you are considering fashion as a modeling ground for various arts. Fashion, with its ephemeral, present-centered (Barbara Vinken), desire-fulfilling character, perhaps models the way the arts (all arts? or only specific arts, such as film?) work. My question is whether this mode of operation can be identified with the often meaningless, i.e., non-Hegelian, creation that Debord called the spectacle. Is it possible that the spectacle is a process confined to a moment, embodied most clearly in the mode of fashion? The spectacle is a shimmering commodity, bound to the moment. But it can still have meaning. Is this new aesthetic the aesthetic of the spectacle? – *Second question:* Fashion shows such as McQueen’s performances once followed the aesthetics of the spectacle, but they created not only a commodity but also a flood of allegorical and metonymic imagery. That is, they had a depth of substance. It seems that in the world of high fashion, the productions of essential designers such as McQueen or even Elsa Schiaparelli mix the spectacle and the Hegelian appearance of the idea. Is that so? Can these designers be integrated into the logic and irrationality of the futures of instant fashion?

**Eunbin Lee** – 7/11/2024 11:41

Commenting on Parsons, “[The Priority of Images in Model-Based Anticipation](#)”: It is insightful that image-centric approaches can offer a more holistic understanding of dynamic systems with historical depth. It explains the history of model-based anticipation of Chinese practices, and this encourages a re-evaluation of how visual and symbolic reasoning could influence current and future cognitive science or AI development. Also, to me it is impressive to compare Eastern

and Western philosophical approaches to support the main idea, providing comparative cultural understanding. This can be a useful theoretical resource and logical literature background to develop digital learning methods for practitioners.

I would like to express my further interest and curiosity with a few following questions on your paper. *First question:* Could the comparison between Western perspective (focusing on text and linguistic logic) and Chinese perspective (emphasizing on essence through images and symbolic expressions) be related to the cultural differences in perception? Specifically, might this reflect a tendency in Eastern cultures to consider phenomena within their broader situational and contextual frameworks, as opposed to the Western cultures to focus on individual elements? *Second question:* It is interesting that the paper elaborates the connection between a model-based approach and modern technologies such as deep learning and AI. From my point of view, this approach based on image-centric perspective significantly has to do with the capacity to understand “context” through images and symbols. – However, given the current limitation of AI and deep learning in grasping the complex context of phenomena, are there any further discussions or ideas about the differences and existing gaps between model-based thinking and modern digital technology?

**Dana Jang – Mukazhanova Alua – 7/11/2024 23:51**

Some thoughts and mainly questions on the [Endrődy](#) paper: First, we'd like to compliment the author for an interesting and thought-provoking paper. One of us is Korean, and both of us are studying in Korea, so the movie and the message were very personal. We discussed and talked about the paper and had some overlapping comments, so we thought it would be more straightforward to consolidate them. *First question:* We were curious about how the movie narrative differs from most as you mentioned “traditional Japanese perspectives”. Does traditional Japanese media and movies try to minimize certain guilt or pain that came with the war or is it more about the portrayal of war and the aftermath, can you elaborate on what tradi-



tional Japanese perspective typically encompasses? *Second question:* As we rewatched the movie the opening sequence as well as the juxtaposing of the aftermath of the protagonist's mother's death struck us. These kinds of visuals set the tone at the beginning of the movie for us. Do you feel that the way the movie shows a peaceful rural area with a hidden secret mirrors Mahito's internal struggles, visually showcasing the turmoil he is experiencing? *Third question:* You mentioned "destruction and the end of the world is always the beginning of something else." Do you think that it is drawing on traditional thoughts such as Confucianism? Or any other traditional Japanese thoughts? Or something more "contemporary"? Both? – We also thought we'd mention: that when we rewatched the movie after reading our paper, when Mahito arrives at the new house and has a flashback of his mother, she kind of looks like a phoenix in the fire, an animal that rises from it's own ashes which we felt was very fitting!

**Matthew Crippen** – 8/11/2024 17:36

Questions to [Neville Li](#), "Technological Takeover in Education: Frankenstein or the Modern Prometheus?". *First question:* The author talks about monitoring technologies in Chinese classrooms, adding that their use is not guided by educational theory. While I agree with the author's criticisms of these technologies, is educational theory a guide we should really be turning to? One problem is that educational theory can generate some of the same problems as the technological arrangements the author describes. It operates around notions of statistical ideals for optimal students and teachers, but we all know of wildly unorthodox professors and students that could not fit into standard molds. So, is it possible that the technological arrangements the author describes are amplifying a bad situation that has long existed in educational systems? *Second question:* The author criticizes AI tech that measures facial expressions. Again, I agree, and have conducted experiments showing that context, temporal sequences, sound, etc., change how a face looks to us, and this is informationally meaningful. For example, a longing smile conveys important information depending on whether a middle-aged man directs

it at a buffet table or a 14-year-old teenager in a bikini (see Crippen, “Aesthetics and action: Situations, emotional perception, and the Kuleshov effect, 2021; Crippen & Rolla, “Faces and situational agency”, 2022). AI platforms that evaluate expression are often based on Ekman’s model (see, e.g., “Universals and cultural differences in facial expressions of emotion”, 1972; “Are there basic emotions?”, 1992; “What scientists who study emotion agree about”, 2016) that judges face in isolation, also alleging there are about six basic expressions with universal corresponding emotional states. The author justifiably criticizes monitoring technologies for being means of social control (similar to the social credit system in China). Leaving this aside, however, what is the author’s assessment of the capacity of AI to actually measure what it purports to measure?

**Matthew Crippen** – 8/11/2024 17:42

Commenting on [Qin](#), “Short on time”: I have some questions. *First question*: Csikszentmihalyi unfortunately passed away in 2021, but he was around to see the advent of TikTok, Douyin, etc. Did he see platforms like this in terms of flow? I ask because flow, according to what Csikszentmihalyi (e.g., “Play and intrinsic rewards”, 1975) says, is a borderline egoless state where self merges with tasks or world; critically, he also states that flow emerges when people are engaged in tasks that they have mastery over and that require almost full deployment of skills. Some of his examples include basketball, rock climbing, and dance (and I think chess and surgery too). From what you say, however, flow doesn’t involve a high level of mastery. Moreover, if people can experience flow while engaging with TikTok, then why not things like movies, comic books, novels, etc.? Is there a distinction to be made between aesthetic experiences (which often involve self-forgetfulness) and flow experiences? *Second question*: One interesting feature of TikTok and pretty much all motion arts (e.g., dance and film – was never silent but always at least accompanied by music) is that they involve sound. Sound is also critical to TikTok and Douyin. Additionally, while all art is temporal and, in a way, cinematic – as thinkers like Dewey (*Art as Experience*, 1934)

and Eisenstein (“Word and Image”, 1939) have argued (e.g., because the eye roves around a paint canvas) – what are conventionally classified as temporal arts (film, music, dance, etc.) are almost always sound arts (I have discussed this in my PhD dissertation, in 2010 ☺). Therefore, do you think that sound has an especially intimate connection with time?

**Yutian Qin** – 9/11/2024 09:43

Answering to Crippen: Thank you very much for your questions. I hope the brief answers will help. *Answer to your first question:* I am afraid I have no way of knowing whether Csikszentmihalyi had seen or interacted with platforms like Douyin or not. – As you correctly mentioned, people in a flow state often feel as if one is “in the zone” (Csikszentmihalyi, “Flow: The Psychology of Optimal Experience”, 1990). He developed the theory of flow based on the observation that painters can block out hunger, fatigue and various external disturbances when they are absorbed in their creations. To study the intrinsic motivation of this kind of behaviour, he proposed flow theory and performed a systematic study (C. Zheng, “[Research on the Flow Experience and Social Influences of Users of Short Online Videos: A Case Study of Douyin](#)”, 2023). The early research of Csikszentmihalyi mainly focused on the leisure field (e.g., athletes and artists, “Beyond Boredom and Anxiety”, 1975). Flow theory gradually evolved against the background of the rapid progress of information technology. Novak and Hoffman (“Measuring the Customer Experience in Online Environments: A Structural Modeling Approach”, 2000) were among the first scholars to apply the theory of flow to online learning. Research on internet behaviour based on flow theory has spanned across online consumer activity (M. Koufaris, “Applying the Technology Acceptance Model and Flow Theory to Online Consumer Behavior”, 2002), and mobile instant messaging (T. Zhou – Y. Lu, “Examining Mobile Instant Messaging User Loyalty from the Perspectives of Network Externalities and Flow Experience”, 2011). It can be argued that the basic factors of network flow experience may

be categorized as curiosity, control, internal interest and attention, which have been used to measure the flow experience behaviour of network users (M.-H. Huang, “Designing Website Attributes to Induce Experiential Encounters”, 2003). The flow state has been studied in diverse domains of human experience such as sport and athletics (C. Panebianco-Warrens, “Exploring the Dimensions of Flow and the Role of Music in Professional Ballet Dancers”, 2014), human-computer interaction (S. J. Barnes, – A. D. Pressey, “Cyber-Mavens and Online Flow Experiences: Evidence from Virtual Worlds”, 2016), as well as electronic gaming (N. Park et al., “Effects of Pre-Game Stories on Feelings of Presence and Evaluation of Computer Games”, 2010), among numerous others. Given these more recent research, it seems that the antecedents of flow include but are not limited to the balance of challenge and skills (or mastery). After all, the immediate momentary experience of flow is a cognitive-perceptual process that can be characterized by concentration on the task at hand and one of the consequences of flow is the distorted sense of time (P. A. Hancock et al., “A Meta-Analysis of Flow Effects and the Perception of Time” 2019). – The reason why short-form videos are singled out as the subject of study, as opposed to long-form films is primarily informed by the data published by the China Internet Network Information Centre (CNNIC), which shows that by December 2021, short video users in China numbered 934 million, with a usage rate of 90.5%. Compared to traditional films and television, short video platforms are dedicated to crafting a flow experience for users. – Personally, I think for one to be totally lost in the appreciation of an artwork, a certain degree of expertise is required. However, TikTok short videos cover a kaleidoscope of experiences that anyone may be tempted, regardless of educational training. — *Answer to your second question:* Definitely. Music has been shown to affect time perception (i.e., the estimation of time that has passed: Droit-Volet et al., “Music, Emotion, and Time Perception: The Influence of Subjective Emotional Valence and Arousal?”, 2013). More recently, music is found to influence time distance judgement to the future (K. Kim – G. Zauberman, “[The Effect of Music Tempo on Consumer Impatience in Intertemporal Deci-](#)

sions”, 2019). For example, I have studied the effects of music-induced emotions on intertemporal decision-making. The results showed that happy music (fast tempo + major mode) inclined listeners toward the smaller-sooner rewards, whereas sad music (slow tempo + minor mode) tilted listeners toward the larger-later rewards. Further experiments revealed that fast tempo heightened arousal that led to a longer perceived distance to the future, which accounted for people’s impatience.

**Neville Li** – 9/11/2024 15:58

Answering to Crippen’s questions. – Thank you very much for the questions. *Answer to the first question:* To start with, the mentioning of educational theories is to highlight the fact that the criteria of the Chinese monitoring system are widely unknown. Or using the metaphor that often comes up in the discussion of AI, the process of categorization teachers and their teaching styles is “inside a black box”. All we know is that teachers and students are subjected to the mercy of the algorithm that seemingly dehumanizes education at its core. – I agree that educational theory, to an extent, also sparks a similar discussion. Using VRAK learning styles as an example, while the authors put a strong emphasis that these learning styles only reflect the sensory preferences of students, many studies followed up and suggested that studying in alignment with students’ preferred learning styles would yield better preference. Yet recently, more experimental research has shown that there is no correlation between the two. I guess the lesson here is that even though many are tempted to adopt statistical optimization in education, open academic discussions certainly provide a certain degree of checks and balances (just like the discussions in this conference). The same could be not said when it comes to the algorithm in the black box, and yes, the Chinese experiment in classroom technology does amplify the problem by a fair margin. *Answer to the second question:* This appears to be a continuation of the first one. So far, the facial recognition used in the experimental classrooms is to identify the students based on their facial structures to build a personal profile of statistics. It also

tracks simple movements such as yawning and eye movements to measure their levels of engagement. While it certainly records the number of times that a student looks at his/her phone, the blackboard and the teacher, it does not recognize the emotions he/she conveys as far as I am aware. – That leads to an interesting exploration of whether emotions and other contextual information are considered meaningful in the design of the AI educational system. The AI trained in an inductive method requires as much quantitative data input as it can get in order to determine the correlation between multiple variables, e.g. how strong is the relationship between lecture teaching and student concentration level. However, the use of classroom AI in those Chinese experiments appears to be more in a deductive manner that assumes particular types of actions, e.g. yawning, are “bad”, and it is the AI’s job to record those actions and hand out a low score to deter “bad” behaviors (and thus my critics about the objective effect of social control and homogeneity). – This circles back to the black box problem discussed earlier and it is not only a problem of the unknown algorithm of AI, but also the lack of transparency and accountability of how these blanket judgments are made. For example, who decides that emotions are not taken into account in the tracking and evaluation of student’s learning progress? To sum up, the Chinese classroom tech appears to be measuring what it purports to measure quantitatively, yet the qualitative interpretations of these measurements are the elephant in the room that needs to be cautiously addressed.

**Orsolya Endrődy** – 11/11/2024 09:53

Answering to the Jang – Alue comments: Thank you for the intriguing questions; I will try to answer them all immediately. First, the traditional Japanese perspective would be based on the Shinto traditions, where we understand that all creatures have souls, such as the God of rivers, trees, etc. We have seen some examples of that perspective in the movie, especially all birds and even the sea seem to have souls; as the pelicans and herons are talking, the sea can help move around quickly or even slow down the characters. However, as

for the critical scene, by the end, we see an old creator of the World, who could be a typical monotheist God creature. Interestingly, the world view of the anime is touched by the Monotheistic religions, secondly about the Japanese in the war. It is possible that since people were highly traumatised, as in real everyday life, they never mentioned what their role was. However, in all of Ghibli's movies, we see this perspective – war creates a loss of nature, and all parties have lost their mind and faith in pointless fights. Lastly, about the Confucianist perspective. As many Asian countries – e.g. Korea, Vietnam, and Japan share these values, we must state that “wu lun”, which stands for the five ethically important Confucianist relations, could be seen in many metaphors in the movie, e.g. respect towards the father, husband or elderly. Interestingly, these relations are traditionally often symbolised with birds.

**Cynthia Freeland** – 11/11/2024 10.48

Responding to Petra Egri: These are interesting questions, and I am happy to hear from an expert in fashion! I want to clarify that my paper was considering the question “Does fashion have a history?”, along with the question “Where is fashion going now in the new electronic era?” I considered how the parallel questions have been asked and answered in the realm of art, where there has been a lot of discussion of whether art history does progress, what its aims might be, whether it has ended, etc. It remains an open question whether the parallel between fashion and art is an accurate or useful one. In the art realm, as I showed, more current theorists are arguing less for an overall aim or trajectory of art history and instead favor more piecemeal accounts of multiple types and “levels” of art (e.g., high and low, more museum-focused or street-focused, central or peripheral, etc.). – I am not sure that recognizing fashion as spectacle in Debord's sense fits well with the current fashion industry. Debord as a Marxist appeared to hold that there is still room “underneath” or “behind” the spectacle for some kind of material reality that fulfills authentic desires. My picture of things is more like that of Baudrillard, that now in the fashion world everything is simulation with

nothing behind, under, or grounding the images that “shimmer” (to use Petra’s nice word). As Baudrillard put it, “Fashion is more beautiful than beauty.” – There is an enormous contrast or mismatch between spectacle at the level of a McQueen show and the millions of minor spectacles created by TikTok users every day. I am curious too about who is the audience or consumer of the kinds of “allegorical and metonymic” meaning that an artist on McQueen’s level created. To try to make things short, I suppose I am answering that the most high fashion designers are actually not very well integrated into the instant fashion futures that seem to be entailed by the new era of social media influencers.



## MAGYAR NYELVŰ KONFERENCIA ELŐTTI VITÁK

Kedves Mindannyian, a konferencia szerkezete immár teljes, kérem tekintsenek rá a

<http://www.hunfi.hu/nyiri/EEE/NK.pdf>

oldalra. Minden résztvevőt arra bátorítunk, hogy tanulmányozzák a feltöltött rövidleteket (valamint a fokozatosan érkező teljes előadás-szövegeket), észleljék, hogy más témák miképp kötődnek a magukéhoz, és kezdjenek ígéretesnek remélt beszélgetéseket a számukra érdekesnek tartott szerzőkkel. Megjegyzéseiket kérem a [nyirik@gmail.com](mailto:nyirik@gmail.com) címre is másolják be, hogy azokat jelen oldalra feltölthessem. Sokéves tapasztalatunk szerint online vagy részben online konferenciák csak akkor lehetnek sikeresek, ha – gondoljunk a mondjuk 12 időzóna különbségre és az imígyen a viták számára kiaknázható igencsak korlátolt időtartamra – lényegében lezajlanak, mielőtt az esemény maga megtörténne. **A magyar résztvevők egymással az online konferencia-előtti szakaszban természetesen magyarul is vitatkozhatnak.** A konferencia mind jelenléti, mind online formában nyilvános, azaz a magyar közönség az online viták magyar nyelvű tartalmait teljes mértékben megismerheti az elkövetkezendő hetek–hónapok során. Miközben tehát a nov. 13-iki esemény angol nyelven zajlik, gondoskodunk arról, hogy a konferenciának magyar anyanyelvű vetülete is legyen.

Utóirat, 2024/10/29: A szervezők örömmel érzékelik, hogy a konferencia előtti vitákban nemcsak az előadók, hanem tágabb kör – a majdani reménybeli közönség tagjai – is részt szeretne venni. Esetükben – mivel hátterük/pozíciójuk a konferencia honlapján nem szerepel – azt hozzászólásuk elején külön feltüntetjük.

**Nyíri Kristóf** – 2024/10/16 16:09

KORPICS Márta – HERENDY Csilla “[Is Digital Literacy the Key Competence of the Future?](#)”c. rövid tanulmányuk első bekezdésében írják: “A higher education institution can be considered successful if

it prepares its students for the labour market.” Jómagam azok oldalán állok, akik ezt a nézetet tévesnek tartják. A hazai és nemzetközi szakirodalom számos vonatkozó érvének felsorolása helyett hadd idézzek csak Eötvös Lorándnak a Budapesti Királyi Tudományegyetem rektoraként 1892-ben tartott [ünnepi beszéd](#)éből, amelyre Szécsi Gábor hívta fel figyelmemet. Tehát: „A bölcsészeti karunkon képviselt tudományok hallgatói között vannak olyanok, a kik magukat valamely szakban tudósokká kívánják képezni, olyanok, kik azt mint segédtudományt tanulják s végre olyanok, kik avval csak általános műveltségük kiegészítése végett foglalkoznak. Méltán kívánhatja a hallgatóknak mind e három csoportja, hogy az egyetemen megtalálja azt, a mit keres; de azért ne gondoljuk, hogy mindegyikére nézve külön-külön intézkedések volnának szükségesek. Vezessük csak valamenynyit ugyanahhoz a forráshoz, a tiszta tudomány forrásához s legyünk azon, hogy e forrásból eredő folyónak mentén kedvvel kövessen ki-ki addig, a meddig azt ideje és ereje megengedi. ... Ritka még egyetemünkön az olyan tanuló, a kinek ne volna más vágya és ne volna más gondja, mint az, hogy tudóssá váljék. Ne gondoljuk azért, hogy a magyar ember tudományra nem való, nem fajunknak valami sajátos hibája okozza-e magában véve szomorú fogyatkozást, hanem csak is az, hogy a mi műveltségét illetve, még fiatal nemzetünk közvéleményében nem erősödött meg eddig az a meggyőződés, hogy a tudomány által gazdagabbá válik a gazdag, hatalmasabbá a hatalmas. Van a mi ifjaink között is elég olyan, a ki a tudományért lelkesedni tud, s ha sorsa nem engedi is meg, hogy gondtalanul csak avval foglalkozzék, örömmel választ legalább olyan életpályát, mely annak közelébe hozza.” Eötvös nem beszél tehát arról, hogy az egyetemnek a munkaerőpiac számára kellene munkaerőt gyártani. A tiszta tudományról beszél, s az egyetem által lehetővé tett olyan majdani életpályáról, amelyen haladva a hallgató a tudomány közelében maradhat. Szívveljünk meg Eötvös szavait!

**Ádám-Veress Laura** – 2024/10/31 11:51

Ádám-Veress Laura, az OTP Bank Bankbiztonsági Csoportirányítási Szakértője, a Metropolitan Egyetem Nemzetközi gazdálkodás mes-

terképzésének hallgatójának hozzászólása a Korpics–Herendy [“Is Digital Literacy the Key Competence of the Future?”](#) rövid tanulmányhoz:

Egyfelől felvetődik a kérdés, rögtön a tanulmány elején, hogy vajon tényleg a COVID alatt kellett egyik percről a másikra „átállni” a digitális és online oktatásra; vagy már akkor el kellett volna kezdeni ennek a módszertanát és struktúráját kialakítani (és korlátozni), amikor egyértelmű volt hogy az AI és az IT meg fogja határozni a fejlődést. (Tekintsünk el annak a kérdéskörétől, hogy az a fejlődés milyennek ítéltető). Hamar kiderülhet ennek a gondolatnak a mentén, hogy a COVID csak a gyakorlati követelménye volt annak a folyamatnak, amiről nem akart tudomást venni az oktatás – máshogy megközelítve, amire nem állt készen.

Ha a diplomák értékét a munkaerőpiacra való termeléshez kötjük, azzal azt is kijelenthetjük, hogy a felsőoktatási intézmény sikere és a diploma értéke nem hasonlítható össze önmaga alapján. Hiszen az ország különböző pontjain lévő adottságok és azok gazdasági jellemzői eltérőek. Turizmus, gyárak, borászatok, más-más iparágak dominanciája jellemzi a régiókat ebben a viszonyrendszerben. Ha emellett érvelünk, azzal elismerjük azt is, hogy a diplomáknak csak regionálisan értelmezhető az értéke; máshogyan megfogalmazva, hogy a turisztikára fókuszáló régióban szerzett mérnöki végzettség nem annyira értékes, mint pld. egy Győrben megszerzett mérnöki diploma. Az igazoló statisztikák reprezentálása önmagában számomra kérdéseket vet fel több aspektusban is. A digitális érettségtől kezdve. Hiszen pontosan az eltérő tulajdonságokból adódik, hogy a kérdőíves felmérések eredményének reprezentativitása nem megbízható IT vonatkozású és érintettségű kérdésekben. Ennek oka, hogy a generációs (elsősorban kommunikációs) különbségek miatt, nemes egyszerűséggel a feltett kérdés nem garantáltan azt jelenti a válaszadónak, mint amit a kérdezőjének.

Példának okáért azokat a tanulmányokat és kérdőíveket is elő kell venni ezeknek a válaszoknak az értelmezése során, amelyek alapvető kérdéseket tesznek fel. „Hiteles forrásokból tájékozódik?” „Milyen források ezek?” – utóbbi kérdés kapcsán a válaszok legtöbbször a Facebook-ra és egyéb social média platformokra történő uta-

lásokat is tartalmazni fogják. Innentől kezdve ugyanakkor a kutatás készítőjének érdemes új megközelítést is alkalmaznia, és felkészülni ezen akadályok befolyásoló erejére, és minden statisztikát kritikusan kezelnie. Nem győzött meg az írás arról, hogy ez maradéktalanul megtörtént.

Továbbá az sem hagyható figyelmen kívül, hogy az oktatás digitalizálása készségek segítségével nem garantáltan előremutató döntés. Noha a statisztika itt is érvnek tűnhet – felmerül a kérdés, hogy mihez képest történt a kiugróan magas százaléku növekedés. Tudvalevő, hogy látványos eredmények érhetők el abban az esetben is, ha a kezdeti állapot elmaradott. És ez csak tovább növeli a nyitott kérdéseket. Például, hogy milyen szempontok alapján és mihez viszonyítva történt a mérés. Mi volt a mérésben vett minimum és maximum állapot?

Ilyen értelemben nem tartom mélynek vagy átfogónak a tanulmányt, és nem tudnám jó ízzel elfogadni az állításait kérdések nélkül – ugyanakkor az írás mindenképpen provokatív.

**Bencsik Andrea** – 2024/10/31 15:09

Bencsik Andrea, közgazdász, MEDUK London Ltd CEO hozzászólása a Korpics–Herendy [“Is Digital Literacy the Key Competence of the Future?”](#) rövid tanulmányhoz:

Az írás azon állítása, miszerint egy egyetem minőségét elsősorban a kibocsátott munkaerő mennyiségével lehet mérni, túlzottan leszűkíti az egyetemek komplex társadalmi és kulturális szerepét.

Egy egyetemnek nemcsak a munkaerőpiac igényeire kell reagálnia, hanem szélesebb körű társadalmi funkciókat is be kell töltenie: elő kell segítenie a kritikai gondolkodást, az interkulturális kompetenciák kialakulását és támogatnia kell a szabad kutatást.

Ha az egyetemeket csupán munkaerő-termelő központként értékeljük, akkor a tudományos innováció és a társadalmi felelősségvállalás szerepe háttérbe szorul.

A COVID-19 járvány felgyorsította a már érő digitális átállást, amely az oktatásban régóta indokolt lett volna, az IT és az AI növekvő szerepének fényében. A tanulmány helyesen hangsúlyozza a digi-

tális kompetenciák fontosságát, ám nem tér ki részletesen arra, hogy ezek a készségek mennyire szükségesek a különböző tudományterületeken. A társadalomtudományok és a humán területek például másfajta készségeket igényelnek, mint a technológiaorientált szakok, ezért félrevezető lenne minden szakirányra egységes digitális követelményeket szabni.

Az írás a magyar hallgatók magas önértékelésére hivatkozik digitális készségeik terén, miközben a tanárok önértékelése alacsonyabb. Ezt az ellentmondást azonban nem tárgyalja alaposabban, így kérdéses, hogy a diákok valóban rendelkeznek-e ezekkel a készségekkel, vagy csupán önbizalommal közelítik meg a technológiát. Hiányzik továbbá a digitális készségek hosszú távú munkaerőpiaci hatásának elemzése, különösen annak fényében, hogy a munkaadók milyen konkrét kompetenciákat várnak el. Az oktatás valódi értéke nem a pillanatnyi piaci igények kielégítésében rejlik, hanem abban, hogy a diákokat a gyorsan változó globális világ kihívásaira készíti fel.

Összegzőképpen, egy egyetem értéke sokkal több tényezőtől tevődik össze, mint pusztán a kibocsátott munkaerőpiaci utánpótlás mennyisége. Az intézmények feladata, hogy a hallgatókat olyan átfogó tudással, kritikai gondolkodással és társadalmi felelősséggel ruházzák fel, amelyekkel nemcsak a jelenlegi munkaerőpiaci elvárásoknak tudnak megfelelni, hanem képesek lesznek reagálni a jövő kihívásaira is.

Egy valóban értékes egyetem olyan szakembereket nevel, akik a gazdaság és a társadalom különböző területein kreativitásukkal és innovatív szemléletükkel képesek új perspektívákat teremteni. Ezek az intézmények nem csupán a helyi gazdasági igények kielégítésére készítik fel hallgatóikat, hanem globális szemléletre is nevelnek, támogatva a nemzetközi kapcsolatok és a kulturális kompetenciák fejlődését. Így a végzett hallgatók nemcsak hatékony munkavállalók, hanem olyan felelősségteljes állampolgárok is, akik képesek hozzájárulni a társadalom hosszú távú fejlődéséhez és innovációjához.

Az egyetemek mércéjét tehát nem szabad leegyszerűsíteni: értékük abban rejlik, hogy képesek-e közösségeiket a tudomány, a kreatív gondolkodás és a globális felelősségtudat eszközeivel gazdagítani, és így maradandó hatást gyakorolni a világra.



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The present online volume contains the papers prepared for the 11th Budapest Visual Learning Conference – ENVISIONING AN ELECTRIFYING FUTURE – held in a physical-online blended form on Nov. 13, 2024, organized by the University of Pécs (represented by Prof. Gábor Szécsi, Dean, Faculty of Cultural Sciences, Education and Regional Development), and the Hungarian Academy of Sciences (represented by Prof. Kristóf Nyíri, Member of the Hungarian Academy of Sciences). The conference was an interdisciplinary encounter of communication and media theory, cultural sciences, sociology, psychology, philosophy, pedagogy, history, political science, picture theory, and other disciplines. We insisted on achieving new scholarly results. Especially with AI now complementing, or intruding into, the world of the internet, what image of the future can we conceive of, what new patterns of life and in particular forms of education should we strive to create?

Kristóf Nyíri (1944), PhD, Dr. h.c., Member of the Hungarian Academy of Sciences, is a retired philosophy professor. His main fields of research are Wittgenstein, the theory of conservatism, the theory of communication, the philosophy of images and the philosophy of time.

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