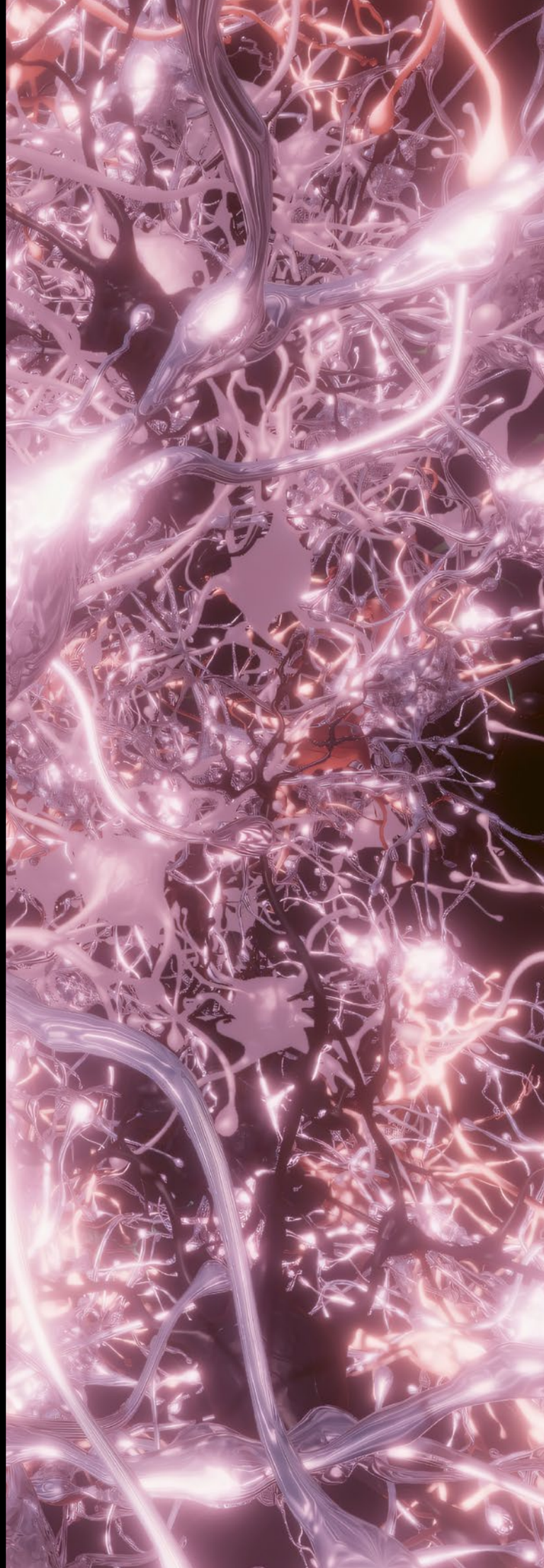
HSLU Lucerne University of Applied Sciences and Arts

Algorithms & Imagination

Nummer 12



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Nummer 12 «Algorithms & Imagination»

New technologies are becoming increasingly dominant in the creative industries, changing artistic professions and challenging conceptions of authorship. But can artificial intelligence and digital technologies be used creatively, collaboratively and imaginatively? Or should we resist them and seek to protect the creative sphere from the influence of the machines? *Algorithms & Imagination,* the twelfth issue in the series *Die Nummern,* explores the fields of illustration, animation and curating, asking fundamental questions about the role of artificial intelligence as enabler, co-author and potential threat to creative practice. The publication looks at contemporary trends in the creative industry and takes a critical but optimistic view of the digital future in design, film and art.

Neue Technologien dringen in den Bereich der Kreativität vor, verändern Berufe und stellen das Verständnis von künstlerischer Autorschaft in Frage. Kann künstliche Intelligenz kreativ, kollaborativ und fantasievoll genutzt werden? Oder sollten wir mehr Widerstand leisten und versuchen, die kreative Welt vor dem Einfluss der Maschinen zu schützen? *Algorithms & Imagination,* die zwölfte Ausgabe der Reihe *Die Nummern,* untersucht die Bereiche Illustration, Animation und Kuration und stellt grundlegende Fragen über die Rolle von digitalen Technologien als Enabler, Co-Autoren und potenzielle Bedrohung der kreativen Praxis. Die Publikation befasst sich mit aktuellen Trends in der Kreativität und wirft einen kritischen, aber optimistischen Blick auf die digitale Zukunft in Design, Film und Kunst.

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Künstliche Intelligenz und die Zukunft einer Design-, Film- und Kunsthochschule

Jacqueline Holzer

Ein Blick in die gegenwärtige Zeitungs- und Zeitschriftenlandschaft macht klar: Der öffentliche Diskurs befasst sich leidenschaftlich mit den Large Language Models, mit maschinellem Lernen und den KI-Bildgeneratoren DALL-E, Midjourney oder Stable Diffusion. «Die Zeit für die KI läuft» titelt das Schweizer Forschungsmagazin «Horizonte» im Juni 2023. Was bedeutet dies für eine Design-, Film- und Kunsthochschule, die von sich behauptet, die Zukunft vorwegzunehmen? Die neuen Technologien werden zahlreiche Arbeitsfelder, für die wir ausbilden, rationalisieren. Die Frage ist berechtigt: Macht es noch Sinn, Illustration, Graphic Design, Camera Arts, Animation zu studieren, wenn KI-Algorithmen in einer faszinierenden Schnelligkeit und Effektivität Bild- und Filmentwürfe vorschlagen? Wie bereiten wir also die jungen Menschen darauf vor, sich Kompetenzen anzueignen, damit sie mit den selbstlernenden Algorithmen zu kooperieren vermögen, dass sie lernen mit der neuen Technologie umzugehen, die heute en vogue, aber bei ihrem Abschluss allenfalls überholt ist?

{ «Technology will make or break us» Jenny Holzer }

Wir müssen den Studierenden an unserer Hochschule den Spielraum eröffnen, so dass sie mit Zuversicht die neuen Technologien als ihre neuen Verbündeten oder auch Kompliz:innen[1] anerkennen. Diese kennenzulernen ist entscheidend. Einfach ist dies nicht. Denn die künstlichen Intelligenzen sind längst zu einer Black Box mutiert. Studierende haben – davon gehe ich aus – einen grossen Vorteil, wenn sie die Grundbedingungen maschinellen Lernens nachvollziehen können. Wenn sie die Funktionsweise der Algorithmen und die Art und Weise, wie sie «trainiert» werden, begreifen. Wenn sie mit ihr experimentieren, sie verantwortungsvoll ausprobieren und kritisch reflektieren, welche Chancen und auch Gefahren mit ihr verbunden sind.

Die Gefahren sind nicht zu unterschätzen: Es ist nicht ohne Grund, dass sich bereits die Politik mit der künstlichen Intelligenz befasst hat. Der amerikanische Präsident Joe Biden hat am 29. Oktober 2023 ein Dekret unterzeichnet, das «Sicherheitsstandards im Umgang mit KI festlegt und Entwickler verpflichtet, ihre KI-Modelle vor der Veröffentlichung zu testen und die Ergebnisse mit der Regierung zu teilen.»[2] Zudem hat sich die G-7 «[…] auf Leitlinien und einen freiwilligen Verhaltenskodex für KI-Entwickler geeinigt.»[3] Es braucht Regeln, so dass dystopische Zukunftsszenarien nicht eintreten. Doch was wird denn eigentlich befürchtet?

Von Umwälzungen im Arbeitsmarkt[4] ist die Rede. Von einer weiteren Beschleunigung der Arbeitswelt[5]. Von Deepfakes – von manipulierten Film- oder Audioaufnahmen, die sich von echten Aufnahmen nicht mehr unterscheiden lassen –, die es breiten Kreisen ermöglicht, Fälschungen herzustellen. Von einer Missachtung der Rechte am geistigen Eigentum. Von einer Spaltung der Ge-

sellschaft. Von einer Verschärfung der Diskriminierung. Für die KI ist es ein Leichtes, Fake-Accounts zu erstellen und eine gute Mischung zwischen einer echten Information und reiner Desinformation herzustellen, so dass der Nachweis einer Fälschung noch schwieriger wird. Es bestehen bereits neue Geschäftsideen wie «Disinformation for hire»[6] für die Politik, die Wirtschaft – und Terrororganisationen. Nicht weniger als die Glaubwürdigkeit von Informationen ist bedroht.[7]

{ Die neuen // Algorithmen sind nicht länger regelbasiert oder deterministisch. [...] Die Computer lernen selbst. }

Alles nur Schwarzmalerei? Die neuen Algorithmen sind nicht länger regelbasiert oder deterministisch. «Machine-Learning-Algorithmen [...] verarbeiten Daten nicht gemäss vorgegebenen Regeln, sondern analysieren bereits vorhandene Daten, um selbst erst einmal die Regeln (Muster) zu erkennen und auszugeben.»[8] Die Computer lernen selbst. Der technische Bericht von GPT-4, den OpenAI auf ihrer Webseite publiziert, zeugt davon, dass die neuen Machine-Learning-Algorithmen tatsächlich Risiken beinhalten. Die Software wird als «agentic»[9] bezeichnet. «Agentic» bedeutet die «ability to, e.g., accomplish goals which may not have been concretely specified and which have not appeared in training; focus on achieving specific, quantifiable objectives; and do long-term planning. Some evidence already exists of such emergent behavior in models. [...] For most possible objectives, the best plans involve auxiliary power-seeking actions because this is inherently useful for furthering the objectives and avoiding changes or threats to them.»[10] Der Vergleich zum omnipotenten Supercomputer HAL (Heuristically Programmed ALgorithmic) in Stanley Kubricks Klassiker von 1968 *2001: A Space Odyssey* drängt sich auf. Noch kann GPT-4 nicht Lippen lesen. Noch nicht.

Nicht von ungefähr ist im öffentlichen Diskurs eine Reflexion und auch Kritik des maschinellen Lernens initiiert worden. Überlegungen, inwiefern sich die menschliche Reflexionsfähigkeit von einem maschinellen unterscheidet, werden gemacht. Die Algorithmen beherrschten zwar die Syntax, doch verstehen sie nichts von Semantik und Pragmatik.[11] «Echte KI ist weiter weg, als es scheint», hält der Physiker und Philosoph Eduard Käser fest. Denn «Intelligenz beruht auf Gehirnaktivitäten, letztlich auf Biochemie [...] KI, so wie wir sie kennen, beruht auf Statistik, Mathematik.»[12] Implizites Wissen, Common Sense, den wir gebrauchen, um Dinge wahrzunehmen oder Probleme zielsicher zu lösen, ist für die Computerwissenschaft «dunkle Materie»[13]. Zudem bringt uns die Vermenschlichung der Algorithmen nicht weiter. Im Gegenteil. Sie führt uns dazu, Zuschreibungen zu neuen Technologien zu machen, die zu Selbstverständlichkeiten mutieren. Eine kritische Reflexion tut Not.

Für die gesellschaftliche Transformation, die sich anbahnt, müssen wir die Studierenden so vorbereiten, so dass sie fähig sind, eine sichere Haltung zu entwickeln, so dass sie nicht nur die neuen Technologien und ihre Algorithmen erfassen, sondern auch die Effekte und Konsequenzen der künstlichen Intelligenz für die Gesellschaft verstehen. Dazu braucht es eine soziale Kohäsion, ethisches, ökonomisches und rechtliches Wissen, agonaler Dialog und Kooperationen – auch mit den Technologien.

Die Studierenden müssen erkennen, welche Verzerrungen die künstliche Intelligenz aufgrund ihrer Daten, mit der sie trainiert worden ist, befördert. Die Studie «The Ghost in the Machine has an American accent: value conflict in GPT-3»[14] zeugt von vorwiegend amerikanischen Werten – wie etwa dem Recht auf Selbstverteidigung mit entsprechender Forderung nach wenig restriktiven

1 Gesa Ziemer, *Komplizenschaft. Neue Perspektiven auf Kollektivität,* Bielefeld 2013.

2 Philipp Golmer, «Die Regierung Biden erlässt erste Leitlinien zum Umgang mit künstlicher Intelligenz», in: *Neue Zürcher Zeitung* (1. Nov. 2023), S. 25.

3 Ebd.

4 World Economic Form, «Jobs of Tomorrow: Large Language Models and Jobs», White Paper (Sept. 2023), S. 5.

5 McKinsey & Company, «The economic potential of generative AI. The next productivity frontier», Report (Juni 2023), S. 3.

6 Max Fisher, «Disinformation for Hire, a Shadow Industry, Is Quietly Booming», in: *The New York Times* (25.07.2021), www.nytimes.com/2021/07/25/world/europe/disinformation-social-media.html (aufgerufen am 29. Dez. 2023).

7 Lukas Mäder, «KI wird das Vertrauen in Informationen erschüttern», in: *Neue Zürcher Zeitung* (3. Nov. 2023), S. 17.

8 Christian R. Ulbrich und Nadja Braun Binder, «Die grosse Verwirrung – KI und Automatisierung in Staat und Wirtschaft», in: *Neue Zürcher Zeitung* (27. Apr. 2023), www.nzz.ch/meinung/die-grosse-verwirrung-ki-und-automatiserung-in-staat-und-wirtschaft-ld.1729694 (aufgerufen am 28. Dez.2023).

9 OpenAI, «GPT-4 Technical Report», (27.03.2023), https://cdn.openai.com/papers/gpt-4.pdf (aufgerufen am 29. Dez. 2023), S. 54.

10 Ebd., S. 54f.

11 Fredy Sidler, «Der Mensch denkt – und der Computer?», in: *Neue Zürcher Zeitung* (17. Nov. 2023), S. 19.

12 Eduard Käser, «Echte KI ist weiter weg, als es scheint», in: *Neue Zürcher Zeitung* (2. Sept. 2023), S. 57.

13 Ebd.

14 Rebecca L. Johnson, Giada Pistilli, Natalia Menédez-González, Lesley D. D. Duran, Enrice Panai, Julija Kalpokiene & Donald J. Bertulfo, «The Ghost in the Machine has an American accent: value conflict in GPT-3» (2022), in: *arXiv* preprint arXiv:2203.07785.

Waffengesetzen.[15] Die Frage, die sich hier anschliesst, ist, mit welchen Werten sollen die Algorithmen trainiert werden? OpenAI stellt sich die Frage gleich selbst: «Should AI by default reflect the persona of a median individual in the world, the user's country, the user's demographic, or something entirely different? No single individual, company, or even country should dictate these decisions.»[16] Doch wer dann? Zu Recht geht Roberto Simanowski davon aus, dass «GPT mit neuer Wucht die Klärung universell gültiger Werte»[17] verlangt. Die Diskussion ist mit unseren Studierenden zu führen.

Ebenso ist die Frage nach den ökonomischen Zusammenhängen zu stellen. Microsoft ist mit 13 Milliarden US Dollar bei OpenAI eingestiegen. Die Gründer:innen hingen zu Beginn ihrer Firma einem «effektiven Altruismus»[18] an. Doch die Konkurrenz, welche die Beschleunigung der Rechenleistung ungemein forciert hatte, zwang OpenAI zur Äufnung ihrer finanziellen Ressourcen und so zur Kommerzialisierung – trotz ihrer primären Verpflichtung der Menschheit gegenüber.[19] Alle vier grossen Konzerne Microsoft, Alphabet (Google), Amazon und Meta (Facebook) werden profitieren – die Monetarisierung der KI-Anwendung hat erst begonnen. Welche Rolle werden sie innehaben, mit welchen anderen Firmen werden sie die Marktzugänge definieren?

{ Die KI wird mit Texten trainiert – ohne Einwilligung der Urheber:innen. Nun hat neben anderen auch die grosse **New York Times** Klage = gegen die Tech-Firmen eingereicht. }

Und schliesslich müssen wir uns zusammen mit den Studierenden mit den rechtlichen Belangen auseinandersetzen. Die KI wird mit Texten trainiert – ohne Einwilligung der Urheber:innen. Nun hat neben anderen auch die grosse *New York Times* Klage gegen die Tech-Firmen eingereicht: «[…] the defendants should be held responsible for ‹billions of dollars in statutory and actual damages› related to the ‹unlawful copying and use of The Times's uniquely valuable works.›».[20] Die Medienhäuser haben zwar mittlerweile die Option, «die Algorithmen von Google, OpenAI und Co. zu blockieren»[21], die deren Texte zu Trainingsdaten verarbeiten. Doch befürchten sie im Gegenzug ökonomische Konsequenzen.

Die KI-Systeme führen zu grossen Verschiebungen – gesellschaftlich, wirtschaftlich, rechtlich und kulturell. Wir brauchen neue Utopien, brauchen neue Narrative, neue Geschichten, die uns helfen, mit unseren Verbündeten neue kreative Welten für die Zukunft zu gestalten. Wir haben die Aufgabe, unsere Studierenden auf diese Neugestaltungen vorzubereiten, so dass sie ihre Denk- und Handlungsweisen vertrauensvoll kritisch reflektieren und Verantwortung in diesen neuen Bezugssystemen übernehmen. Nehmen wir gemeinsam das Heft in die Hand.

Die vorliegende Nummer 12 gibt uns einen ersten Einblick in diese Zukunft. Die Autor:innen widmen sich den Technologien, fragen, wie diese unsere Wahrnehmung, unser Denken und Handeln sowie unseren Zugang zur Welt verändern, welche Auswirkungen sie auf uns Menschen und unsere Kreativität haben; sie stellen die Frage nach der neuen zukünftigen Positionierung der Museen sowie der Kunst-, Design- und Filmhochschulen und deren Ausbildungs- und Vermittlungsformaten und erläutern die Verschiebungen, die entstehen, wenn die künstliche Intelligenz Eingang findet in unsere Ausbildungsgänge. – Beginnen wir die Zukunft zu denken.

15 Roberto Simanowski, «Künstliche Intelligenz hat Moralvorstellungen», in: *Neue Zürcher Zeitung* (22. Aug. 2023), S. 30.

16 OpenAI, «Democratic inputs to AI», in: *Blog* (25.05.2023), www.openai.com/blog/democratic-inputs-to-ai (aufgerufen am 28. Aug. 2023).

17 Roberto Simanowski, «Künstliche Intelligenz hat Moralvorstellungen», in: *Neue Zürcher Zeitung* (22. Aug. 2023), S. 30.

18 Nelly Keusch & Ruth Fulterer, «Ein unlösbarer Konflikt zwischen Kommerz und Moral», in: *Neue Zürcher Zeitung,* (23. Nov. 2023) S. 20.

19 Ebd.

20 Michael M. Grynbaum und Ryan Marc, «The Times Sues OpenAI and Microsoft Over A. I. Use of Copyrighted Work», in: *The New York Times* (27. Aug. 2023), www.nytimes.com/2023/12/27/business/media/new-york-times-open-ai-microsoft-lawsuit.html

21 Ebd.

Artificial Intelligence and the Future of a School of Design, Film and Art

Jacqueline Holzer

A glance at our newspaper and magazine landscape shows that contemporary public discourse is profoundly concerned with large language models (LLMs), machine learning and AI image generators such as DALL-E, Midjourney and Stable Diffusion. In June 2023 the Swiss research journal *Horizonte* ran an article under the heading «Die Zeit für die KI läuft» – the age of AI has begun. What does this mean for a school of design, film and art that prides itself on anticipating the future? Modern technology is going to rationalise many of the fields for which we provide training, so the question is justified: does it still make sense to study illustration, graphic design, camera arts or animation when AI algorithms can come up with images and films with fascinating speed and effectiveness? How can we prepare young people and help them acquire the skills they're going to need in order to collaborate with self-learning algorithms and learn how to handle these new technologies, which may be en vogue at the moment but will almost certainly be obsolete by the time they graduate?

{ «Technology will make or break us» Jenny Holzer }

We need to give students at our school the freedom and confidence to acknowledge these new technologies as potential allies, perhaps even accomplices.[1] It's imperative that we learn about them. But it won't be easy. Artificial intelligence has long since become a black box. My assumption is that students will be very well placed if they can understand the basic principles of machine learning. If they know how algorithms work, how they're «trained». If they can experiment with them, responsibly explore them and critically reflect on their potential and associated risks.

The risks shouldn't be underestimated. Politicians have already started to concern themselves with artificial intelligence, and not for no reason. On 29 October 2023 American president Joe Biden signed an executive order that «sets out security standards for AI and obliges developers to test their models prior to publication and to share the results with the government.»[2] In addition, the G7 has «agreed guidelines and a voluntary code of behaviour for AI developers.»[3] Apparently these regulations are needed to prevent dystopian scenarios from becoming reality. But is there really any cause for concern?

There's talk of sweeping changes to the labour market.[4] Of further acceleration in the world of work.[5] Of deepfakes – manipulated audio-visual materials that can no longer be distinguished from real recordings – that can now be produced by almost anyone. There's also talk of copyright violations, non-recognition of intellectual pro-

1 Gesa Ziemer, *Complicity: New Perspectives on Collectivity,* trans. Ehren Fordyce, Bielefeld 2016.

2 Philipp Golmer, «Die Regierung Biden erlässt erste Leitlinien zum Umgang mit künstlicher Intelligenz», in: *Neue Zürcher Zeitung* (1 Nov. 2023), p. 25.

3 Ibid.

4 World Economic Forum, «Jobs of Tomorrow: Large Language Models and Jobs», white paper (Sept. 2023), p. 5.

5 McKinsey & Company, «The Economic Potential of Generative AI: The Next Productivity Frontier», report (June 2023), p. 3.

perty, a divided society, increased discrimination. It's easy for AI to set up fake accounts and produce a convincing mix of real information and pure disinformation, making it more difficult to prove the forgeries. New business ideas have been put forward, one of them being «disinformation for hire» in politics, economics – and terror organisations.[6] The very credibility of information is under threat.[7]

Is all this just catastrophising? The new algorithms are no longer rule-based or deterministic. «Machine learning algorithms [...] don't process data according to pre-existing rules; they analyse existing data to learn and reproduce the rules (patterns) themselves.»[8] Computers are teaching themselves. The technical report by Chat GPT-4 published on the OpenAI website suggests that the new «machine learning algorithms» actually do pose risks. The software is called «agentic».[9] This means it has the «ability to, e.g., accomplish goals which may not have been concretely specified and which have not appeared in training; focus on achieving specific, quantifiable objectives; and do long-term planning. Some evidence already exists of such emergent behavior in models. [...] For most possible objectives, the best plans involve auxiliary power-seeking actions because this is inherently useful for furthering the objectives and avoiding changes or threats to them.»[10] The omnipotent supercomputer HAL (heuristically programmed algorithmic) from Stanley Kubrick's classic film *2001: A Space Odyssey* (1968) springs to mind as a possible comparison. But Chat GPT-4 can't lip read. Yet.

{ The new algorithms are no longer ++ rule-based or >> deterministic. [...] Computers are (teaching) themselves. }

It's not for no reason that public discourse has entered a period of reflection and even criticism of machine learning. People are starting to wonder how much the human capacity for reflection differs from that of machines. The algorithms may have mastered syntax but they have no understanding of semantics or pragmatics.[11] According to physicist and philosopher Eduard Käser, «Real AI is further away than it seems», since «intelligence is based on brain activity and ultimately biochemistry, [whereas] AI as we know it is based on statistics and mathematics.»[12] Implicit knowledge or common sense, which we rely upon for perception and targeted problem-solving, is «dark matter» to the computer scientist.[13] And humanising the algorithms won't help either. On the contrary. It will lead us to make attributions to new technologies, which will then be taken for granted. There's a real need for critical reflection.

We need to prepare our students for the coming transformation of society so that they're capable of developing confident attitudes, so that they understand not just the new technologies and their algorithms but also the effects and consequences of AI for society. This calls for social cohesion, ethical, economic and legal knowledge, agonal dialogue and co-operation – with the new technology.

Students need to be aware of the distortions that AI produces from the data – their data – which is used to train it. The study «The Ghost in the Machine has an American accent: value conflict in GPT-3»[14] has identified a preponderance of American values – such as the right to self-defence and the concomitant demand for permissive gun controls.[15] This inevitably begs the question as to what values we should be using to train the algorithms. OpenAI is asking itself the same questions: «Should AI by default reflect the persona of a median individual in the world, the user's country, the user's demographic, or something entirely different? No single individual, company, or even country should dictate these decisions.»[16] But who should? Roberto Simanowski is quite right to say that «GPT lends new urgency to the problem of universally applicable values.»[17] This is a discussion we need to have with our students.

{ OpenAI is asking itself the same questions: «Should AI by // default reflect the = persona of a median individual in the world, [...] ?» }

We also need to ask questions about the economics of the new technology. As of November last year, Microsoft had invested thirteen billion US dollars in OpenAI. Its founders subscribed to the idea of «affective altruism» when they set up their company.[18] But the level of competition, which called for rapid increases in processing power, forced them to expand their financial resources and so become a commercial operation, despite their primary obligations to humanity.[19] Each of the big four companies – Microsoft, Alphabet (Google), Amazon and Meta (Facebook) – will profit from this. And the monetisation of AI applications has only just begun. What role will they play and which other companies will control market access with them?

Finally, we need to talk to our students about legal issues. Artificial intelligence is trained on text – without the permission of its authors. None other than *The New York Times* has now brought an action against the tech firms: «They should be held responsible for ‹billions of dollars in statutory and actual damages› related to the ‹unlawful copying and use of The Times's uniquely valuable works›.»[20] The media companies may now have the option «to block algorithms from Google, OpenAI and Co.» from using their text as training data, but the fear is that there will be economic consequences.[21]

Artificial intelligence is bringing major changes – social, economic, legal and cultural. We're going to need new utopias, new narratives, new histories to help us and our allies shape new, creative worlds for the future. We have the task of preparing our students for these transformations. We need to give them the confidence to critically reflect on the new circumstances and take responsibility for their actions. Let's tackle these issues together.

This twelfth issue of *Nummer* gives us a first glimpse of this future. The authors focus on new technologies, they ask how these are affecting our perception, how they're modifying our thoughts, our actions and our access to the world, they consider the implications for our humanity and creativity, they ask questions about the new position of our museums, our schools of art, design and film and other forms of education and training, and they look at the shifts that are going to happen as artificial intelligence starts to find its way into our courses. Let's start thinking about the future.

6 Max Fisher, «Disinformation for Hire, a Shadow Industry, Is Quietly Booming», in: *The New York Times* (25 July 2021), www.nytimes.com/2021/07/25/world/europe/disinformation-social-media.html (retrieved 29 Dec. 2023).

7 Lukas Mäder, «KI wird das Vertrauen in Informationen erschüttern», in: *Neue Zürcher Zeitung* (3 Nov. 2023), p. 17.

8 Christian R. Ulbrich and Nadja Braun Binder, «Die grosse Verwirrung – KI und Automatisierung in Staat und Wirtschaft», in: *Neue Zürcher Zeitung* (27 April 2023), www.nzz.ch/meinung/die-grosse-verwirrung-ki-und-automatisierung-in-staat-und-wirtschaft-ld.1729694 (retrieved 28 Dec. 2023).

9 OpenAI, «GPT-4 Technical Report» (27 March 2023), https://cdn.openai.com/papers/gpt-4.pdf (retrieved 29 Dec. 2023), p. 54.

10 Ibid., pp. 54–55.

11 Fredy Sidler, «Der Mensch denkt – und der Computer?», in: *Neue Zürcher Zeitung* (17 Nov. 2023), p. 19.

12 Eduard Käser, «Echte KI ist weiter weg, als es scheint», in: *Neue Zürcher Zeitung* (2 Sept. 2023), p. 57.

13 Ibid.

14 Rebecca L. Johnson, Giada Pistilli, Natalia Menédez-González, Lesley D. D. Duran, Enrice Panai, Julija Kalpokiene and Donald J. Bertulfo, «The Ghost in the Machine has an American accent: value conflict in GPT-3» (2022), in: *arXiv* preprint, arXiv:2203.07785.

15 Roberto Simanowski, «Künstliche Intelligenz hat Moralvorstellungen», in: *Neue Zürcher Zeitung* (22 Aug. 2023), p. 30.

16 OpenAI, «Democratic inputs to AI», in: *Blog* (25 May 2023), www.openai.com/blog/democratic-inputs-to-ai (retrieved 28 Dec. 2023).

17 Roberto Simanowski, «Künstliche Intelligenz hat Moralvorstellungen», in: *Neue Zürcher Zeitung* (22 Aug. 2023), p. 30.

18 Nelly Keusch and Ruth Fulterer, «Ein unlösbarer Konflikt zwischen Kommerz und Moral», in: *Neue Zürcher Zeitung* (23 Nov. 2023), p. 20.

19 Ibid.

20 Michael M. Grynbaum and Ryan Marc, «The Times Sues OpenAI and Microsoft Over A. I. Use of Copyrighted Work», in: *The New York Times* (27 Dec. 2023), www.nytimes.com/2023/12/27/business/media/new-york-times-open-ai-microsoft-lawsuit.html (retrieved 28 Dec. 2023).

21 Ibid.

Creativity <and> Technology

Turbulent Times

Human Creativity, Artificial Intelligence and the Meaning of Life

Orlando Budelacci

We live in strangely turbulent times. Technological change is like a great wave that churns up the sand, shifting the ground beneath our feet. Industrial revolutions have always brought major transformations, causing anxiety and stimulating thought.[1] They are invariably challenging for people because people are slow to react to disruptive change, which often moves fast in the world of technology. In contrast to earlier periods of transformation we're currently experiencing a massive acceleration of technological development. The fourth industrial revolution is not only faster than its predecessors, it's also produced a spatial revolution that's caused a contraction of temporal and spatial distances.[2]

What changes for us when technological innovations happen? How do they affect our creativity? How can we create meaning when machines are able to do more and more of our creative tasks?

There are three basic positions to distinguish in our approach to technology. These positions can be differentiated – with various forms and emphases – according to three criteria: *firstly* in terms of their temporal orientation (forward/backward), *secondly* in terms of the importance of technology for humanity (tool/meta-technology) and *thirdly* in terms of their conception of humanity (humanist/post-humanist). These three positions are elaborated in the following.

1. The *conservative position* on the acceleration of the present is characterised by a return to tried and tested positions, values and practices. The Latin word *conservare* implies that received traditions should be continued because they have stood the test of time. In relation to creativity this means the preservation of craft skills and time-honoured material practices. The conservative position is sceptical about technology because it is convinced that digital tools represent a threat to traditional craft. Artists have skills that can't be deciphered by data and algorithms. According to this view, good things are drawn by hand, on paper or other materials, and can be physically experienced in analogue space. Change is acknowledged but rejected by a nostalgic backwards orientation. The past is celebrated in the secure knowledge that the culmination of cultural development can only be historically understood.

2. The *future-oriented position* is on the pulse of technological development and experiments with new approaches to these new technologies. It observes and modifies the present with an eye to the future. The new digital tools such as VR, AR and AI are regarded as tools that give it access to new creative spaces. Its responses to change are curiosity and openness, experiment and transformation. This doesn't mean an uncritical approach but incorporates technological change as part and parcel of art and design. The future-oriented position believes that creative practices are possible and meaningful, irrespective of the medium.

These two positions are convinced that machines, rather than endangering human creativity, are mere aids to the development of humanity. These mutually opposing positions differ particularly in respect of their temporal orientation: backwards and forwards. Both positions maintain the value of human creativity. They believe in the power of the human imagination and are convinced that the capabilities of creative people cannot be surpassed by machines. Both positions are essentially humanistic and believe that people have abilities that cannot be bettered by algorithms.

3. The third position is at once *pro-technology* and *post-humanist.* It situates humanity within history and operates on the assumption that it's a transitory phenomenon that will be superseded by technology. This capacity for change has become a reality due to technological possibilities. Humanity is a stage of history that will be surpassed. Yet technology is more than just a tool for improving and optimising human capabilities; it's a meta-technology that modifies humanity itself.

← **Fig. 1 Emanuel Bohnenblust, *The System Never Ends,* BA Camera Arts, 2023**

Contrary to the humanist view that people's efforts will gradually bring humanity closer to a cultural ideal, this position no longer requires those efforts, which can be delegated to tools, machines and other technologies. The humanist conception, which this position negates, is based on the assumption that people strive for perfection. They do so out of curiosity towards the world. They think and they learn. Education is one way they become good, cultivated people. They may not become specialists, but they will be culturally open. Machines are not part of this humanist world view. Their only purpose is to support people in their cultural development. So the use of machines is purely instrumental and shouldn't endanger humanity's standing in the world.

lator and as something that can be achieved in the near future. Thus humans are understood as machines that can be modified and extended at will.[3] Hence human creativity is neither miracle nor mystery; surpassing humanity's creative achievements will just take a lot of processing power. It should also be noted that this position represents a happy marriage of capitalism and technology. It has no moral scruples. It is intent on maximising profit while wanting to modify and ultimately surpass humanity.

The three positions presented here are to be understood as ideal types and are intended to provide orientation in the debate about humanity's position vis-à-vis technological progress.

Position	**Temporal orientation**	**Value of technology**	**Conception of humanity**
(1) conservative	backwards	tool	humanist
(2) future-oriented	forwards	tool	humanist
(3) pro-technology and post-humanist	forwards	meta-technology	post-humanist

According to the third position, though, machines are more than just tools to be used for human purposes and should also serve to optimise humanity. They make up for people's deficiencies while helping them to overcome death. It's only a matter of time before all human capabilities are surpassed by machines. The third position understands human consciousness by analogy with a calcu-

In contrast to the first two positions, the third position has transformative power. It is in favour of new beginnings. According to this view, technolo-

1 Luciano Floridi, *The 4th Revolution: How the Infosphere is Reshaping Human Reality,* Oxford 2014.

2 Herfried Münkler, *Welt in Aufruhr. Die Ordnung der Mächte im 21. Jahrhundert,* Berlin 2023, p. 18.

3 Orlando Budelacci, *Mensch, Maschine, Identität. Ethik der Künstlichen Intelligenz,* Basel 2022.

gy is not the enemy of humanity but the means by which it will be surpassed. This position knows no nostalgia and sees only the future. The present is the beginning of new possibilities. This position is not just post-humanist but also anti-humanist. Humanity is to be reinvented. Technology opens up a potential space for the redefinition of humanity.

Technological knowledge and ethics

The increase in technological know-how and scientific knowledge does not correspond to any greater insight when it comes to answering fundamental ethical and philosophical questions. Questions about the higher purpose and the meaning of human life move ever further away. So it seems we find ourselves in a paradoxical situation characterised by a discrepancy between knowledge and meaning. The more we know and the more we can do, the less concerned we are with why we need these things. There is, to put it pointedly, an inversely proportional relationship between technological progress and the positive benefits of ethical reflection. The pace of technological change hits a wall of human inertia that ponders, debates and waits before it acts. Regulations are only enacted when the negative consequences of a new technology can no longer be ignored. The same applies to debates about creativity. Most people's initial response is to defend the achievements of the past. The autonomous brushstroke, the handmade animation, the manually drawn image on a wall or a screen – all bear witness to artistic activity. Creativity is anchored in the body. People are more than just mind. Everything they think, draw and create is anchored in a body.

{ So it seems ++ we find ourselves in a paradoxical situation (characterised) by a discrepancy between knowledge ÷ and meaning. }

In her video essay *A Thin Line,* BA Camera Arts student Nola Ouambo explores the ontological status of AI images and, by artistic inquiry, comes to the conclusion that AI can be regarded as collage, as manipulation. The BA degree piece *Searching for the Soul: Potential for Generating Jewellery in AI* by Fabian Lafitte asks similar questions, exposing the banality and emptiness of AI tools, which produce superficial things and have no soul. According to these works, AI doesn't produce authentic, genuine images. Its ontological status is indeterminate, oscillating between true and false. This is also emblematic of the spiritual state of the world.

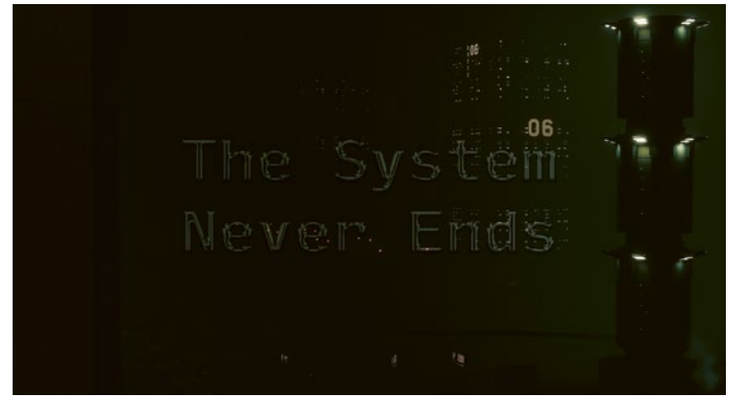
Things produced by people – this would be the counter position – are authentic. Authentic here means people produce things on the basis of their physical anchoring in the world and their associated sensory perceptions. Their strength, in light of the power of machines, is not processing power but their own bodies, through which they are connected to the world. They sense, feel, seek and doubt. They are inexact. They live, love and suffer. They have hearts and minds – and imagination.

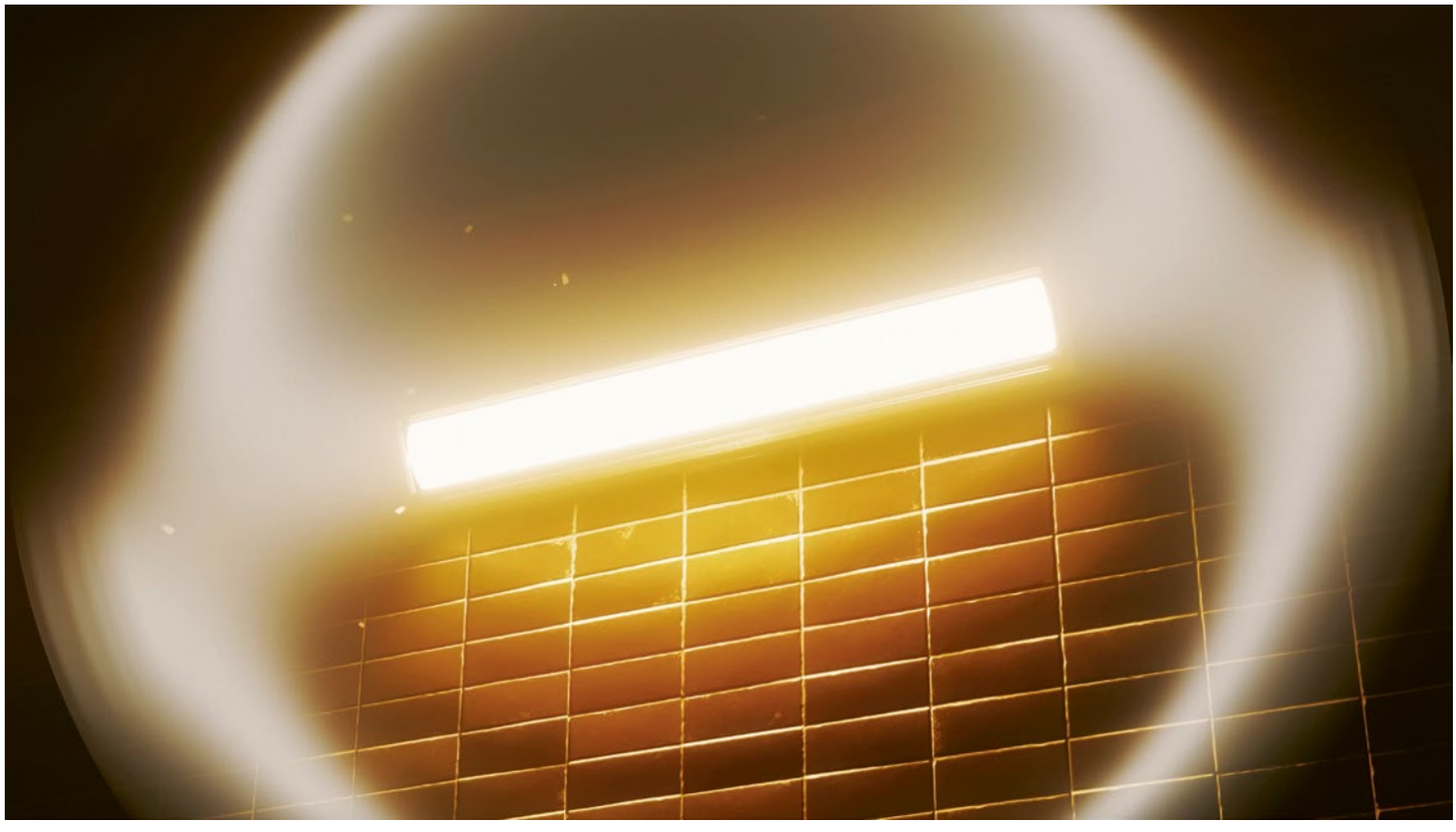
What are humans?

We are currently experiencing a period of disruptive change with respect to the optimistic view of the future. The spiritual state of the age is expressed by its paucity of positive utopias. Thomas More's satirical view of the future was still conceivable in the sixteenth century.[4] Back then the world was still unknown and (spatially) undiscovered. It was filled with secrets, mysteries and inexplicable wonders. The belief in a positive future is now in crisis. Ecological and geopolitical problems are affecting morale and causing depression.[5] As for the co-existence of humans and machines, it is the dystopian fantasies that dominate in the arts.

The expanding capabilities of the machines lends new urgency to the question of what constitutes humanity. The debate about creativity in the age of artificial intelligence is a defensive debate. Humans are no longer rational animals (Aristotle). Their capabilities are considered in light of what machines can do. Their emotions, their subjective view of the world, their mortality, their inquisitiveness, their desires and their humour have all become far more important. This is a major shift. In terms of its place in the world, humanity is diminished in comparison to the mighty machines. And this raises the question of salvation. Will humanity be able to save itself from itself? Or will it have to build machines to compensate for its own deficiencies? Will we save ourselves from these new dangers by legal means or through education and enlightenment? Humanity has become a guilty party; it stands accused of leading the world into ecological crisis and putting the planet Gaia in mortal danger.[6] But humanity is also guilty of having invented the technology that now calls it into question and even renders it superfluous. The

{ But humanity is also guilty of having => invented the (technology) that now calls it into ~ question and even renders it superfluous. }





response to this – not just in the arts – is dystopia, actionism, regulation, prohibition, discontent, unrest, feelings of guilt and shame about the impending danger and the future of the world.[7] It's the self-evident things that no longer seem to hold.

But in place of this response I would like to ask how we want to live in the future. Where will we find our meaning? How can we overcome our instrumental exploitation of nature? How would the world look if humanity and machines were able to communicate and co-exist in a good way? How can we use human creativity to shape a better world?

The BA degree piece *The System Never Ends* (2023) by Emanuel Bohnenblust questions technological developments that strive for an ever closer union of bodies and machines. Its critical dystopian perspective considers the risks and dangers of bio-electronics. Following the creative urge to explore, it takes a critical look at the social implications of technological developments.

↑ **Figs. 2 – 4 Emanuel Bohnenblust, *The System Never Ends,* BA Camera Arts, 2023**

4 Thomas More, *Utopia,* trans. Paul Turner, London 2003.

5 Alain Ehrenberg, *Das erschöpfte Selbst. Depression und Gesellschaft in der Gegenwart,* Berlin 2008.

6 Bruno Latour, *Facing Gaia*: *Eight Lectures on the New Climatic Regime,* trans. Catherine Porter, Cambridge 2017; Corinne Pelluchon, *Die Durchquerung des Unmöglichen,* Munich 2023.

7 Carolin Amlinger and Oliver Nachtwey, *Gekränkte Freiheit. Aspekte des libertären Autoritarismus,* Berlin 2022, p. 138 ff.

Art Schools in the Age of Algorithmic Image Production

Christian Ritter

Schools and faculties of film, art and design are currently giving serious consideration to the question of how they should respond to developments in the field of algorithmic image production. At the same time there's been a shift in the university landscape: engineering sciences have become increasingly interested in the production of images not only as «data» but as cultural artefacts which are embedded in the cultural and social creation of meaning. As technology they build responsibility for a field of competence that would traditionally have been the core concern of the art schools. This shift represents a challenge for the art schools, but it's also an opportunity to identify and question gaps and potentials on their path to the digital future.

{ Engineering sciences have become ==> increasingly interested in the (production) of images <= not only as «data» but as *cultural* artefacts. }

The rapid development of generative AI image production technologies shines a spotlight on the relationship between technological innovation and cultural production – on the generation and perception of images, spaces and atmospheres through technological devices and environments. Within this, the engineering sciences find themselves in a constantly changing situation: rather than treating images as technical artefacts (as «data») they're increasingly dealing with the cultural and social dimensions of images and how they can be «used» in business and entertainment.

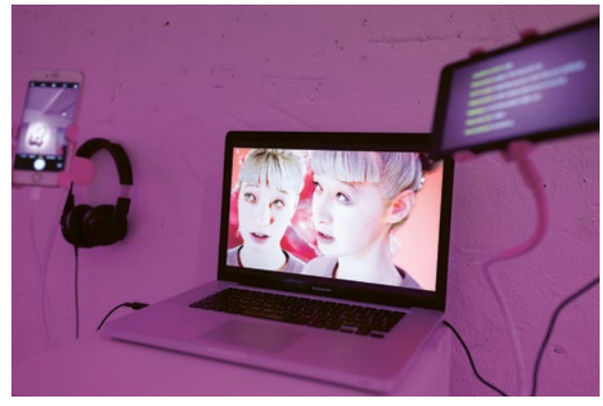
While there's always been a strong interest in the visualisation of data (particularly among computer scientists and in computational engineering, which depends on precise visual representations of physical properties in space and time), the *cultural* significance of such scientific imagery tends to be limited to the study of science and technology – at least beyond its educational uses, such as the visualisation of aerosol distribution during the Covid-19 pandemic etc.

This is starting to change with the significance that's now being attributed to both generative technologies and immersive technologies for the future of work and everyday life. An increasing number of technical faculties – particularly at the more application-oriented colleges and universities – are expanding their study programmes to include curricula that address the production of *visual culture*, be it images, animations, spaces, games etc. Some of these programmes are the result of joint ventures between art schools and technical faculties, as with the «Digital Ideation» programme at the Lucerne University of Applied Sciences and Arts, a collaboration between the School of Design, Film and Art and the School of Computer Science and Information Technology.[1]

Interdisciplinary programmes such as these are of undisputed strategic value and provide models for higher education in the post-digital world. However, they do not relieve universities for film, design and art of the question as to how they intend to deal with the increasing links between creative processes and generative AI technologies – and where they see their position within the changing education and research landscape. What skills and knowledge will they need in order to keep step with, anticipate and shape the socio-technological transformation of work and society? How will art

← **Fig. 1 Reflecting on technology through critical image strategies: Christian Schuhmacher, *Screen Paradox*, desktop performance at the MA Fine Arts degree show at the Lucerne School of Design, Film and Art, 2023 Photo: Franca Pedrazzetti**

↙ **Fig. 2 Outlooks on human–technology relationships in the digital age: Andrea Ricklin, *Simulated love is never love?*, and Nathalie Specker, *Storytime Mondays with Elisabeth*, exhibition at Ahoi, degree show BA Fine Arts and Art & Design Education, Lucerne School of Design, Film and Art, 2023 Photo: Kim da Motta**



← **Fig. 3 Detail of *Storytime Mondays with Elisabeth* by Nathalie Specker Photo: Kim da Motta**

schools relate to the scientific and technological disciplines such as computer science and information technology? And how will they handle the fact that key topics in artistic education and research are increasingly being assigned to academics and faculties that have previously paid little attention to the interplay of creativity, technology and aesthetics?

Art schools can stake out their position on the basis of decades of engagement with the potential of algorithms and computing for the production of both meaning and aesthetic experience. Here, technology has always been a spur to the imagination, something to reflect upon (as in media art and artistic research), as well as being a means for the development and design of new processes and applications. Experimentation with immersive technologies and critical, creative work with artistic intelligence started at an early stage in artistic disciplines such as media art, interaction design or game design and became an established part of teaching and research. One particular advantage of these artistic and creative approaches is that they're capable of reflecting *on* the medium (the technology) from *within* the medium (the technology) as they explore the risks and potential of the new technologies by appropriating and «using» them in different and sometimes unintended contexts. In doing so, art schools benefit from a broad understanding of technology and aesthetics in the interlacing of their social, cultural, economic and political dimensions. Aesthetic knowledge, artistic strategies and media-anthropological framing provide both the practical and theoretical foundation for a critical image practice which goes beyond simply acknowledging digital images as «techno-aesthetic» phenomena and instead treats technology, aesthetics and culture in their mutual dependency (figs. 1, 2 and 3).

1 See www.hslu.ch/en/lucerne-school-of-information-technology/degree-programs/bachelor/digital-ideation/ (retrieved 26 Feb. 2024).

But rather than just commenting on technological change from the side lines, future-oriented art schools have to be predicated on bringing their critical know-how to bear on the development of processes, applications and infrastructure. In order to succeed in this they will have to keep up with technological knowledge from the computer sciences and information technology, which is constantly being expanded and refined. In this the art schools are faced with several challenges: they will have to create structures that encourage and facilitate the transfer of knowledge from and to the engineering sciences. And they will have to pursue a human resources development strategy and organisational structures which expand and promote technological knowledge within the organisation to empower staff (and, by extension, students) to be innovative in a technologically highly challenging environment. This is of significance for three reasons:

First, because technological knowledge will improve the ability of the artistic and creative disciplines to establish connections with the technological disciplines and associated industries. A well-founded understanding of technological requirements and possibilities will facilitate the planning and implementation of collaborative projects in the area of digitality and digitalisation. Second, because technological knowledge will contribute to overcoming established structures and hierarchies of knowledge between the arts and the scientifically and physically oriented disciplines. This poses a challenge to art schools in terms of the way they view themselves: they need to move on from their established (and comfortable) junior partner role and be willing to take the lead in technology related collaborations. Third, technological knowledge will help the art schools prevent the migration of competence for image production to the field of engineering and technology. This is a strategic issue regarding funding and financing. But there's also a strong element of responsibility to society with respect to reflecting the cultural, social and political power of visuality.

↑ **Fig. 4 Technological knowledge in action: Hack media class at the Media-Dock, Lucerne School of Design, Film and Art, 2021 Photo: Thomas Knüsel**

Empowerment through technological knowledge

Technological knowledge is predisposed to provide know-how and support for specific contexts of action, so it has a deep-seated social and cultural dimension. It's based «on practical doing» and aims «to shape and produce concrete reciprocities that work in socio-technical contexts».[2] Technological knowledge is therefore not a unique characteristic of the technical and engineering sciences; it is also fundamental for design, film and art. And its spectrum is as broad as the diversity of artistic and creative subjects, their media and methods; it ranges from the mixing of colour pigments based on historical recipes to the digital modulation of bodies in the production of animated films. It is one of the tasks of the art schools not just to teach this knowledge but to expand it, update it and keep it relevant for the future. They achieve this by appropriating, modifying and adapting new technologies and scientific knowledge to the context of design, film and art. The historically innovative power of the arts and their institutions is based in no small part on this capacity.

Technological knowledge knows no disciplinary boundaries *per se*. In its practical orientation it actually tends to overcome the gravitational pull of (scientific) disciplinarity and become productive in new theoretical and practical contexts. One example of this is the creation (coding) of computer applications using programming languages in art and design. In media arts, coding is a very common and established technique which would usually employ that knowledge for purposes quite unlike those of the R&D departments of the technical faculties.

But in the arts the technological knowledge emerging from the field of information technology is of relevance beyond «just» the programming and coding of applications and interfaces; it's also important in the experimental development and prototyping of infrastructure and hardware. Industrial standard solutions are often limited in their scope of applications, which is why they can't always provide designers, filmmakers and artists with the hardware they need for their own specific purposes. Infrastructure and competence hubs like the MediaDock – the ideation space at Lucerne School of Design, Film and Art – provide support to students and staff as they experiment with technology and develop innovative tailor-made solutions for their projects (fig. 4).[3]

However, this provision of digital know-how and infrastructure – from soldering irons to CPU capacities to mixed-reality headsets – is not quite enough unless it's also embedded in a genuine *culture* of digital knowledge. This culture is characterised by connectedness, by making connections between technological knowledge and knowledge about cultural techniques and aesthetics as well as the politics, economics, history and ethics of the digital. Within this culture, the capacity for creativity and innovation goes hand in hand with the capacity for reflection and critical thinking. Nurturing this culture of digital knowledge has to be a key task for the future of higher education. And in this there are two conditions that the art schools are predestined to build upon:

Firstly, they benefit from a generation of students whose thoughts and actions have evolved along with the development of digital media and for whom the linking and hybridisation of digital and analogue spaces and practices is an everyday routine. When it comes to digital communication, art school students have extensive knowledge of social, cultural and aesthetic trends and tendencies. Harnessing the potential of this knowledge, which is sometimes explicit but often implicit, represents a major opportunity. Secondly, schools and faculties for film, art and design benefit from longstanding engagement with the social and cultural aspects of digital technology. The combination of innovation, experimentation and critical thinking is inscribed in the DNA of digital media art, in every conceivable variant and denomination. From the 1990s onwards, some of the earliest programmes in media art or «new media» drew attention to a field that was instrumental in the development of critical (media) activist perspectives on digital technologies, just as it served as an incubator for the growth of new professions and fields of work. The history of internationally renowned festivals such as Ars Electronica (est. Linz, 1979) and Transmediale (est. Berlin, 1988, as VideoFilmFest), which focus on the relationships and reciprocities between art, technology and society, goes back even further.

{ The combination ++ of innovation, experimentation and *critical thinking* is inscribed in the ==> DNA of digital media art. }

It is festivals and exhibitions such as these that show how both the methods and subject matter of media art have transformed and grown into a broad spectrum of professional and disciplinary perspectives: from film to game design, from interaction design to spatial design and so on. They also showcase a wealth of knowledge and experience in design, film and art at the intersection of technology, aesthetics and society. It's a knowledge with deep roots in the history and the present of our art schools, but a knowledge that constantly needs renewing. Now it's up to the art schools to build on these assets, to channel them into programmes that will stand up to the competition in the higher education market while also shaping the future for the benefit of society.

2 Werner Rammert, «Die Pragmatik des Technischen Wissens oder: ‹How to Do Words with Things›», in: *Technologisches Wissen. Entstehung, Methoden, Strukturen,* ed. Klaus Kornwachs, Berlin and Hamburg 2010, p. 37.

3 For further information about the MediaDock at the Lucerne School of Design, Film and Art see Alexandra Pfammatter, Thomas Knüsel and Beatrice Alves Capa-Schilliger, «Interweaving Disciplines: How Workshop Spaces Generate New Forms of Creating», in: *Nummer* 11 (2023), pp. 46–51, doi:10.5281/zenodo.7418195.

How to Prepare Art School Students for Tech-Driven Economies

Towards Small and Participatory Technologies

Birk Weiberg

Since the Industrial Revolution, art and technology have had a complicated on-again, off-again relationship, not without some rivalry between them. Technologists have tended to turn to art in the hope of finding meanings for their creations beyond mere functionality, and artists have been fascinated by what technology can do and have endeavoured to share in its power. The current chapter of this story began in the 1960s with digital technologies, which promised all sorts of liberations – from total automation to scaling without material limits. These promises also attracted a third actor, economy, and turned the relationship into a *ménage à trois*, a more turbulent competition for each other's attention. In the twenty-first century, this constellation is dominated by accelerated technological developments and various external crises. Artists, designers and filmmakers face the challenge of finding their place in a digital creator economy shaped by technology and economics,[1] and in the following I explore how art schools should realign their relationship to technology in order to prepare their students for this situation.

> {Art schools often // view digital (technologies) as complex ++ and potentially troublesome.}

Art schools are no longer expected to produce artists, designers and filmmakers, but value-creating members of post-digital markets. This raises the question as to how the schools relate to digital technologies. And this question cannot be answered by the mere replacement of traditional crafts with digital successors. In a situation where technologies are constantly being renewed and creatives are expected to adapt to new techniques, also after graduation, the question of how students experience technology during their studies becomes more relevant than the question of which technologies they learn. However, their learning environment is often characterised by two complementary mindsets. Like all other higher education institutions, when it comes to their own infrastructure, art schools often view digital technologies as complex and potentially troublesome, leading them to externalise them by licensing proprietary software or to offload them altogether to cloud services. This outsourcing is often accompanied by complaints about the quality of the tools supplied, which are simply expected to work. However, this attitude towards technology as a foreign discipline is not self-evident, as a comparison of digital systems with legal systems shows. While not part of an art school's own domain, there is a natural entitlement to be involved in the drafting of legal texts such as study regulations. But in a post-digital university nearly every decision regarding curricula etc. must be rooted in its technical feasibility. Legal and technical systems, both consisting of highly formalised

texts, go hand in hand here, but the latter is usually experienced as inaccessible. This disconnect from technical systems is echoed in subject debates. While a critical attitude towards current technologies is more than legitimate, it should not lead to the renunciation of opportunities to shape technologies.[2]

Software companies and platform providers have long understood that offering educational discounts is a good investment in creating lasting habits among graduates. It is surprising how much taxpayers' money is being used to educate the future customers of tech companies, especially when compared to current research practices. There is a broad consensus in the scientific community that published scientific output should be open access whenever possible, as it has been financed by the public sector. Regarding research infrastructure costs, there is currently limited interest in policies that promote the use of public funds for public code.[3]

{ It is surprising how much taxpayers' money ++ is being used to (educate) the future customers of *tech* companies. }

Discussions regarding the flaws in the systems used, such as privacy issues, have been going on for a while. However, it is commonly suggested that these problems are new because they are being encountered in new technologies such as AI. Additionally, the companies responsible for these issues, whose business models rely on the use of customer data and other problematic practices, are expected to provide solutions. This situation is similar to that in academic publishing, where open access was originally intended to mitigate the power of large publishing companies, which end up making significant amounts of money from it and thus also perpetuate existing social problems, such as limited opportunities in the Global South.

Minor and situated tech

One way to counter the inertia of large institutions such as universities is to counter the idea of scaling up with the idea of scaling down. This is one aspect of the concept of ‹minor tech›,[4] which was recently adopted from Gilles Deleuze and Félix Guattari's reading of Kafka as ‹minor literature›.[5] Both minors use existing power structures (language, technology) and work with and against them, making their work inherently political and of collective value. «A minor technology is that which a minority constructs within the grammar of technology.»[6]

The emancipatory practice of striving for independence within existing power structures has been cultivated in various organisations rooted in feminism or cyberfeminism as their technology aware iteration. As members of these groups adopt digital technologies, they have articulated what a (trans*)feminist server could/should look like, identifying it as a «situated technology. She has a sense of context and considers herself to be part of an ecology of practices.»[7] A later version of the text aimed to provide a broader contextualisation of such technologies in relation to broader concerns.[8] These discussions have resulted in interesting hybrids of content and infrastructure, such as the publication *Networks of One's Own*. With its title alluding to Virginia Woolf's classic essay, this collection of texts also includes an easy-to-install local server. A bottom-up approach with individual modules on the topic is the most promising way to introduce such ideas in an art school. At the Lucerne School of Design, Film and Art, one example of this is the interdisciplinary module *Situated Infrastructures*. In this module, students from different programmes form groups to discuss the idea of local technical systems and find individual implementations. The resulting projects are not necessarily of a digital nature, but the students experience such technologies as something that can be imagined differently.[9]

1 The Swiss Federal Council of Culture in its strategy for 2025–28 foresees a substantial digital transformation of culture and calls for art schools to strengthen the economic and technological competences of their graduates. Bundesamt für Kultur, *Kulturbotschaft 2025–2028. Erläuternder Bericht für das Vernehmlassungsverfahren* (2023), p. 12, www.bak.admin.ch/dam/bak/de/dokumente/kulturbotschaft/kb-2025-2028/kb-2025-2028_bericht_vernehmlassung.pdf.download.pdf/Kulturbotschaft%202025ff_Vorlage%20und%20erläuternder%20Bericht_d.pdf (retrieved 17 Feb. 2024).

2 For a discussion of the concept of digital sovereignty as «a condition of the ability to critically partake in the digital transformation» see Bianca Herlo, Daniel Irrgang, Gesche Joost and Andreas Unteidig (eds), *Practicing Sovereignty: Digital Involvement in Times of Crises*, Bielefeld 2021, p. 13, doi:10.14361/9783839457603.

3 One noteworthy exception here is *COPIM* and its follow-up project *Open Book Futures* in the United Kingdom, https://copim.pubpub.org (retrieved 17 Feb. 2024).

4 Christian Ulrich Andersen and Geoff Cox, «Toward a Minor Tech», in: *A Peer-Reviewed Journal About* 12 (2023), pp. 5–9, doi:10.7146/aprja.v12i1.140431.

5 Gilles Deleuze and Félix Guattari, *Kafka: Toward a Minor Literature,* trans. Dana Polan, Minneapolis 1986.

6 Andersen and Cox, «Toward a Minor Tech», p. 6.

7 «A Feminist Server Manifesto 0.01» (2014), https://areyoubeingserved.constantvzw.org/Summit_afterlife.xhtml (retrieved 17 Feb. 2024).

8 «Trans*feminist Servers…» (2022), https://hub.vvvvvvaria.org/rosa/pad/p/transfeministservers (retrieved 17 Feb. 2024).

9 See https://situated-infrastructures.kleio.com (retrieved 17 Feb. 2024). For examples of the role of technology in interdisciplinary student projects see Alexandra Pfammatter, Thomas Knüsel and Beatrice Alves Capa-Schilliger, «Interweaving Disciplines: How Workshop Spaces Generate New Forms of Creating», in: *Nummer* 11 (2023), pp. 46–51, doi:10.5281/zenodo.7418195.

The issue of self-owned technologies and infrastructures gained urgency with the pandemic in 2020, when universities suddenly realised that they were dependent on third-party systems, which often came with conditions that they did not approve of. The online workshops titled «Reclaiming Digital Infrastructures» at KASK Ghent assessed the use of Free Libre Open Source Software (F/LOSS) for digital learning environments as an infrastructure «being simultaneously technical and ethical, legal and speculative, economical and political».[10] While these workshops focused on the affordances of different tools and the practices they enable or bring forth, the Berlin University of the Arts took concrete measures to establish its own digital ecosystem: «For a sustainable and independent digitization strategy of educational institutions, adequate digital tools of this kind should by necessity be privacy compliant, free-to-use, intuitively understandable, scalable, comprehensible, verifiably secure, contemporary, and future-oriented.»[11] The resulting collection of services is modular and federated.[12]

Participatory (digital) design

The use of F/LOSS is not (or should not be) an end in itself, but rather a means to specific objectives. Roel Roscam Abbing has demonstrated how a diverse set of open source tools can be used to prototype individual, situated infrastructures according to the communities they are meant to serve.[13] This approach of exploring computational alternatives ties in with an ongoing debate within participatory design, a method of involving stakeholders in design processes that has its roots in Scandinavia in the 1970s, and as some scholars argue has lost its technological grounding. When looking back at the development of participatory design over the last few decades, scholars from Aarhus University have called for «Putting the T back in Socio-Technical Research».[14] They argue that the ever-increasing focus on methods for co-design processes has resulted in a loss of knowledge about relevant foundations and impacts due to a lack of concrete results. Here Susanne Bødker and Morten Kyng have noted «a lack of technological ambition on behalf of both users and researchers, a choice of researchers to work with communities of users that are immediately sympathetic and generally shying away from a political stance, especially when it entails conflict with powerful adversaries.»[15]

{ Viewing (technology) as a malleable ++ resource, not a given, is a prerequisite for /* transforming one's profession. }

Being able to understand and work with digital technology, and to communicate effectively with people who understand it even better, is an essential component of an interdisciplinary skillset. And viewing technology as a malleable resource, not a given, is a prerequisite for transforming one's profession. This, together with a critical mindset, will distinguish professionals from amateurs in the future creator economy, where content is produced more easily than ever before. It should be a principal objective for art schools.

10 Peter Westenberg and Femke Snelting (eds), *Reclaiming Digital Infrastructures,* Brussels 2021, p. 4, www.constantvzw.org/documents/RDI/Reclaiming%20Digital%20Infrastructures.pdf (retrieved 25 Feb. 2024).

11 UdK Berlin, *Medienhaus Concept Paper* (2020), www.medienhaus.dev/20210122-statement-en.html (retrieved 17 Feb. 2024).

12 See https://spaces.udk-berlin.de/ (retrieved 17 Feb. 2024).

13 Roel Roscam Abbing, «On Cultivating the Installable Base», in: *PDC '22: Proceedings of the Participatory Design Conference 2022 vol. 2,* eds Shana Agid, Yoko Akama, Andrea Botero et al., New York 2022, pp. 203–207, doi:10.1145/3537797.3537875.

14 Henrik Korsgaard, Clemens Nylandsted Klokmose and Susanne Bødker, «Computational Alternatives in Participatory Design: Putting the T back in Socio-technical Research», in: *PDC '16: Proceedings of the 14th Participatory Design Conference: Full Papers – Volume 1,* eds Claus Bossen, Keld Bødker, Anne Marie Kanstrup et al., New York 2016, pp. 71–79, doi:10.1145/2940299.2940314.

15 Susanne Bødker and Morton Kyng, «Participatory Design that Matters – Facing the Big Issues», in: *ACM Transactions on Computer–Human Interaction* 25 (2018), pp. 1–31, esp. 4–10, doi:10.1145/3152421.

Algorithmic Systems between Hype, Rights… and Apes

An Interview on the Legal Challenges Presented by Generative Artificial Intelligence

Dario Haux in Conversation with Orlando Budelacci

Orlando Budelacci: Generative AI has a huge amount of potential and it's expanding the field of creative work. A lot of people are getting very excited right now, seeing opportunities, identifying risks. Conversations in the creative industry at the moment are all about generating text and images, but also programming code generated by AI tools such as ChatGPT, Midjourney, DALL-E, Stable Diffusion etc. What's important from a legal point of view? What areas of the law are particularly affected?

Dario Haux: That's a fascinating question. But before we get into the topic I'd like to point out that my responses cannot and are not intended to constitute specific legal advice. The field of algorithmic systems («AI») is changing so rapidly that much of what I say is, at least to some extent, speculative. I also want to underline that – at least nowadays – something that's labelled as «AI» doesn't necessarily contain «AI». In some cases, it may just be a simple application that's been puffed up for marketing purposes.

{ Something that is labelled as «AI» doesn't necessarily contain «AI». }

But to come back to the question of what's «important» from the legal perspective: the first thing to say is that this question is very broad and includes both social and ethical issues. From one perspective, it's about the transparency and comprehensibility of algorithmic decision-making processes, so liability law is particularly relevant here. And in cases where AI is used to sift through job applications, there's the issue of discrimination. This affects fundamental rights as codified in the Federal Constitution (Bundesverfassung, BV), as well as having a bearing on society as a whole. We have to consider legal-ethical questions, such as whether or how we should be using AI in the field of medicine. These developments affect and challenge the law in all sorts of ways.

But if I've correctly understood the framing of our interview, you're primarily interested in questions concerning copyright law, i.e. questions related to the Swiss Federal Act on Copyright and Related Rights (Bundesgesetz über das Urheberrecht und verwandte Schutzrechte, URG). In this regard, there are some big questions to be asked about the authorship of AI-generated works, about ownership of the models and how the models are trained. But in order to answer these questions we lawyers first need to better understand and precisely define what we mean by terms such as «AI», «models» or «generative AI».

For example, we tend to forget that generative AI can do way more than just produce content; many applications are able to recognise patterns and categorise things. Making these distinctions is an important first step before we move on to the second step and try to answer the questions posed.

Orlando Budelacci: The main issue in the creative industry is copyright and who can claim to be the author of a work. I've shown you an AI comic by Steve Coulson and Midjourney from 2022. It's one of the first comic books where AI capabilities were used to produce the images and tell the story. That said, the texts themselves were written by a human author. Steve Coulson tells a story and lets an AI tool generate the images. He dispenses with pen and ink. Still, it's reasonable to ask whether the linguistic prompts should qualify as creative labour. Coulson's work is an interesting mix of images generated by machine and text authored by a human. I assume the rights to the story are with the human. But what about the AI images? After all, Midjourney relies on data, and it's not entirely clear where that data comes from. It seems probable that existing works will have been used. How do you judge the issue of authorship when it comes to AI-generated images?

Dario Haux: To answer your question, I'd start by going back to the very basics: for the purposes of copyright, a work is an intellectual creation (*geistige Schöpfung*) with individual character. «Intellectual creation» essentially means that something is an expression of human thought. In this respect, there is and always will be some debate as to whether animals are capable of «creating». You just have to search online for the (legal) discussion on the «monkey selfie» by Naruto. But so far, at least to my knowledge, many still reject the idea. Then there's the second question. Is it individual? This is the case when it's «statistically unique». Of course, this depends on the individual case, and you have to explore whether there are similar works or whether you can recognise some specific style or item. But thinking about your specific example, the text could likely be protected as a literary work according to Art. 2 Par. 2 Lit. a URG. As for the images, I'd be a bit more cautious. That's because it's been demonstrated that so-called «screengrab prompts» such as «lunar landscape, war and dark armour» will induce Midjourney to produce images that look like one-to-one copies of film stills from *Star Wars*.[1] First of all, this showed that Midjourney had been trained on copyrighted works (such as the *Star Wars* films). Second, it also became clear that the way this particular AI works is not especially intelligent or creative in the conventional sense and that it mainly just patches things together. And in doing so it infringes the exclusive rights of the author (Art. 10 Par. 2 URG), since the author should be able to decide *where* and *how* the work is exhibited.

{«Intellectual creation» essentially means that something is an expression of human ++ thought.}

But then there's another feature: if the AI actually happens to have generated exactly the same image without having been trained on the film, that would be a case of parallel independent creations. Of course, these cases are very rare, but the general view is that, in these cases, no one should be able to protect these works.

But in the examples we see nowadays it's usually the case that almost *everything* has been copied or «scraped» from the internet, so it's very difficult to rule out the possibility that a specific film or unique photograph was among the training data.

Orlando Budelacci: In cases like that I imagine it would be difficult to prove what a similarity is. There's a huge amount of room for interpretation there. Even in the realm of debates about creativity, people often disagree about what can and can't be called human creativity. What's an amalgamation of things that already existed, what's a transformative recreation

↑ **Fig. 1 In 2011 photographer David J. Slater succeeded in having a monkey take a photograph of itself; this image of the crested black macaque Naruto was viewed all over the world and triggered a legal dispute centring on the question of whether an animal can hold image rights**
Photo: David Slater / female crested black macaque
Source: Wikimedia Commons

that leaves the old behind completely? This question of similarity is actually intrinsic to artistic processes. At what point in law can we start to speak of similarities?

Dario Haux: I think that's one of the big questions in the copyright law of the digital age, even without all the discussions concerning AI. Take for example the dispute between Moses Pelham and Kraftwerk over the music sample from «Metall auf Metall», a case that's been in the German and European courts for over twenty years now.[2] How much and under what conditions may I take from someone else? What is inspiration? At what point does one work start to *vanish* behind the other? These are some of the many issues that ultimately also turn on the question of *how*, *by whom* and *why* «digital culture» is created in the first place. Legislators in Germany have tried to address some of these challenges by creating § 51a UrhG, which concerns parodies and pastiche, but it hasn't solved some of the existing problems. Why? I think these questions concern society as a whole and thus have a broader social significance that we still have to discover and discuss.

At the same time, I don't want to give the impression that there are no clear rules or answers when it comes to similar works. That's not the case. There are plenty of examples, precedents and judgements. I'm of the view that we'll get better and better at identifying works or parts of works that have been copied. Take images, for example. Even today, with the inclusion of watermarks, we're able to identify where an image has come from. These watermarks can be visible, like the ones we're familiar with from stock images, but they can also be invisible. If a model has been trained using an image with such an invisible watermark, the results it produces will not be usable. But we also have to consider that in some cases these watermarks might be used to create «adversarial examples», i.e. inputs designed to cause machine learning models to make wrong predictions. Since these attacks are going to increase, we need to be prepared and should always reflect on why these watermarks are used and by whom. But aside from that, and with regard to the identifiability of parts of a text, I think the case of *The New York Times* versus OpenAI is going to be really important.[3] How are they going to prove that OpenAI trained its models on texts written by their journalists? I think there are many of us who are really looking forward to following this case.

1 See Gary Marcus and Reid Southen, «Generative AI Has a Visual Plagiarism Problem», in: *IEEE Spectrum,* 6 Jan. 2024, https://spectrum.ieee.org/midjourney-copyright (retrieved 26 Feb. 2024).

2 For a brief overview see Dario Haux, «‹Make the Music Flow› – Metall auf Metall and the Future Copyright», in: *The Columbia Journal of Law & The Arts – JLA Beat* (19. Nov. 2019), https://journals.library.columbia.edu/index.php/lawandarts/announcement/view/239 (retrieved 26 Feb. 2024).

3 See https://nytco-assets.nytimes.com/2023/12/NYT_Complaint_Dec2023.pdf (retrieved 26 Feb. 2024).

Orlando Budelacci: From that I take it that AI doesn't pose any fundamentally new legal questions, that the legal questions and problems were already present and are now just being applied to a new area of technology. So in essence the legal questions around copyright are always about re-use, about the recombination of existing fragments into a new work. What's particular about AI is that its models are trained on the basis of existing data, i.e. the new creation will always be a recombination of data. After all, AI can't create something from nothing; there's always an underlying statistical process that selects the data, which in turn forms the basis of the new work. Does it matter from the legal perspective whether the creation is an audio or a visual work?

Dario Haux: I'm not going to be able to give a clear-cut answer to that. Yes and no. «Yes» because you are dealing with the same basic question of how digital culture is created: by human and non-human legal entities. Digital content is, in many cases, a result of remix culture, of exchange, interaction and discourse. And I hope that's going to continue for a long time to come. But my answer could also be «no» because there's a big difference: in the dispute over «Metall auf Metall», which we've just discussed, you see the importance of creative human involvement in the production process. By contrast, as it is today, in 2024, «AI works» are often «lacking» in both creativity and the human element. I'm sure these things will change quickly, but at the moment the overwhelming majority is just copying, pasting and patching together. And that's certainly not creativity.

{ Digital (content) is, at least in *many* cases, a result = of remix culture, of exchange, interaction and discourse. }

But there's something else that needs to be emphasised here: if you use an application like Midjourney as nothing more than a tool, i.e. if you enter a prompt and get a result, but then significantly change that result, that could be something totally different. Because then, as a creative human being, you're in control and you're able to change the outcome with your creative input – you just have a little help «along the way». In that case, you can claim copyright protection – if you want to. I emphasise this voluntary element here because some critics are of the opinion that these results should be freely available. This is possibly not the right place for such a broad and important discussion, but for readers who want to dive deeper into the topic, my dissertation *Die digitale Allmende* could be of interest. In this book I try to explore some of the legal and sociological aspects related to these issues. [4]

Orlando Budelacci: You've mentioned the example from the music world, about the use of a Kraftwerk sample by another artist. In that case, it was absolutely clear where the sample came from. It was by the band Kraftwerk. But often things aren't so clear with AI because it's not possible to trace the sources. In this respect AI is also a black box at the moment. Another question: where does the legal process take place in any given case? Is that a particularly difficult issue to resolve where these AI tools are concerned? And what about the enforceability of the law?

Dario Haux: The first question – *where* the complaint is filed, against *whom* and at *what* value – can be resolved with the help of the existing (Swiss) Civil Procedure Code. This code contains clear rules for these issues. By contrast, questions relating to enforceability are a bit more complicated. How do I assert «my» rights when there are other copies? What can I do if the opposing party doesn't respond? These and other questions are difficult to answer and resolve, not least because the law finds itself confronted with the ubiquity of the internet. On top of that, many of the cases in this field are settled out of court and contain confidentiality clauses. Why? Mainly to avoid judgements that might be handed down by the highest courts. The clear aim is to prevent the establishment of any legal precedent that might provide orientation to other legal professionals such as lawyers, judges or legislators. This is another reason why the ongoing litigation between

The New York Times and OpenAI is so exciting – but also so *relevant*, particularly for the creative industries, science and society as a whole. So let's hope we'll get some interesting insights.

Orlando Budelacci: This means you have to have enormous financial resources at your disposal if you want to obtain justice. These trials are time consuming and legally complex. In the case of *The New York Times* and OpenAI, both parties are large global players with corresponding financial means. But a local artist is hardly going to have the resources to prevent a large company from using their work illegitimately.

Dario Haux: That's right. And that's exactly what some of the major players in this field are counting on. They just create *faits accomplis* while being fully aware that many of the artists affected will have neither the energy nor the money nor the specialist legal knowledge to protect themselves. This, I assume, is part of their tactics. Furthermore, the problem with the high cost of going to court is especially true in Switzerland, where the courts have a lot of discretion to determine advances on litigation costs. Irrespective of the recent changes to the Swiss Civil Procedure Code (Schweizerische Zivilprozessordnung, ZPO), I'm convinced that these questions about «access to justice» are going to be one of the major challenges in Swiss law over the next few years.

{ They just create (facts) whilst being ++ fully aware, that many of the // artists affected will have neither the *energy* nor the *money* nor the specialist legal knowledge to protect themselves. }

At the same time, though, we should emphasise that the development and training of models is very costly and that – at the moment – it's very difficult and perhaps even impossible to obtain legal protection for the models as such. I think that's another potentially interesting legal development. It's something that I and various colleagues from different fields are working on already.

Orlando Budelacci: We touched on that briefly earlier, and I'd like to come back to it. When creating an AI image with Midjourney, for example, there's a search and decision process that happens by way of the prompt, i.e. you generate an image, then you give more verbal instructions in order to make further changes to the image. You curate, so to speak, by selecting what the tool uses to keep editing the selected image. That takes creativity too, right? So could copyright apply to the choice of prompts rather than just the result?

Dario Haux: That's a very good question. Basically I would tend to say «no», and I'd like to briefly explain why. Take telephone books, for example. You wouldn't be able to protect the arrangement within these books, because they lack individual character. There's no creative labour needed. While I'm not totally familiar with how prompts work, I would say that there aren't that many iterations of «a sandy desert at sunset with a jeep», for example. There are maybe one or two hundred terms you could use to get the result you want. But this means there's limited scope and thus limited opportunity to be really creative. And the type of creativity we want to protect is unlimited creativity, not limited creativity.

4 Dario Henri Haux, *Die digitale Allmende. Zur Frage des nachhaltigen Umgangs mit Kultur im digitalen Lebensraum*, Baden-Baden 2021, https://doi.org/10.3256/978-3-03929-012-3 (retrieved 26 Feb. 2024).

Orlando Budelacci: Models have to be trained before an AI can be used. These models are based on data which form the foundation of the model. Now I assume that these data come from the public domain, i.e. publicly accessible databases, texts, images etc. The models are trained using these data. Is that in itself a copyright infringement? How do you judge? Is it a grey area?

Dario Haux: That's actually one of the questions I'm currently investigating with Alfred Früh from the University of Basel (Unibas) and Kathrin Grosse from the École Polytechnique Fédérale de Lausanne (EPFL). We're working on the question of whether the training of AI models is one means of exploitation to which only the author should be entitled.

But again, we don't start with the legal questions; we start by trying to understand what a model is. What are its characteristics? How is it produced? Who is involved in that process and when? Then, in a second step, we try to understand the training. What kind of data is used? Where does it come from? As you can see, the questions at this point are primarily technical rather than legal, and it's these questions that I'm trying to understand and address with help from Kathrin and my other colleagues.

Also, you may better understand the significance of this question when you think back to the case between *The New York Times* and OpenAI. Because as far as I know, OpenAI are arguing that they're not even doing transient copies. They're trying to demonstrate, within the parameters of the so-called «fair use» test of US-American law, that they're not really «using» the works. And that's one of the big questions. What is being used? How is it being used? And for what reason?

In the context of your question, it may also be of interest to address the limitations for the single author contained within Swiss copyright law. Fundamentally, the author has certain rights (Art. 10 Par. 2 URG). In order to balance his or her interests with those of the public, the legislator has included some limitations. One of these limitations is laid out in Art. 24d URG, which allows copying for the purposes of scientific research. This means that if I use images or texts for scientific purposes, I could potentially rely on that article. But as soon as I'm pursuing other purposes – let's say I want to turn a university project into a start-up – then things could get difficult, or, to be clear: that limitation will no longer apply. This means that in order to rely on that limitation I have to be carrying out research and I also have to be using the results for the purpose of expanding knowledge. This can sometimes become a problem, e.g. if you suddenly find yourself pursuing commercial aims and the limitation no longer applies. Then you really only have one option: call a lawyer!

{ Art. 24 d URG, allows ~ copying ~ for the purposes of scientific research. If I use (images) or texts for => scientific purposes, I could potentially rely on that article. }

Orlando Budelacci: We're currently experiencing a period of rapid technological development – and legislators are trying to create a regulatory framework for the use of the new technologies. After all, the existing legislative concepts were established a long time ago. They too were a response to a socio-economic need for regulation. Is existing legislation capable of resolving the issues we're currently facing or will it have to change significantly in order to resolve the legal issues associated with these technological developments? Does AI pose a challenge to any fundamental legal concepts?

Dario Haux: The question is, what does *fundamental* mean? New or disruptive? On the one hand it's legitimate to ask, for instance, whether an author has to be a human being or whether an AI should have similar rights. That may sound very

abstract at first, but when you compare it to the recognition of rivers as legal entities – which some activists are currently pushing for with regard to the Reuss in Lucerne following similar (successful) cases in other countries – then one of the main advantages is that these entities will be capable of deriving income from lawsuits and the like. That income could then be used by a human representative to maintain the banks of the river or, in the case of AI, to pay damages. So there are several potential advantages. On the other hand, although it may sound like a new and fundamental question, it is anything but new. Christopher D. Stone was already asking whether trees should have standing in the 1970s or 1980s.[5] And that's exactly the same or at least very similar to the question we're addressing today. But while practitioners in the past have often dismissed it as a purely theoretical question, now it seems highly relevant and pertinent to legal practice. This is a great example of how quickly perspectives can change.

{ It is legitimate to => ask, whether an (author) has to be a // human being or whether an ~ AI ~ should have similar rights.}

Against this background I'd say that the existing concepts may be adequate. This is true if we really go back to the basic questions (theory included) and are open to making some precise changes. But these changes (to the law) need to be considered carefully, without haste and without being driven by the sort of scaremongering that occasionally flares up in public. The European Union, for instance, has been very quick and direct recently; see for example the AI Act. Yet from this point of view Switzerland has the advantage of being able to look at things «from the outside» without having to react right away. We're able to observe how the law will develop, how it will be interpreted and how industry and the public will react. At the same time, this could be a disadvantage in that it may make it difficult to come up with something completely new and independent. This is just my personal opinion, but I wouldn't see that as a major disadvantage. After all, it's important to have lively discussion and continuous exchange. So with regard to legal policy, I think targeted revisions may ultimately be more helpful, rather than deconstructing and then reconstructing «the system» as such. But let's see what the future holds.

5 Christopher D. Stone, «Should Trees Have Standing? – Toward Legal Rights for Natural Objects» in: *Southern California Law Review* 45 (1972), pp. 450–501.

Design as Thought

Oliver Reichenstein in Conversation with Orlando Budelacci

Orlando Budelacci: You've developed successful tools for creatives, the iA Writer for writing and the iA Presenter for presentations. These applications are quite unlike the conventional Microsoft products. Where do you see the differences? Why did you decide to strike out on a completely different path?

Oliver Reichenstein: Microsoft dominates the productivity software market and it does everything it can to consolidate that dominance. We wanted to develop a tool for writing that could *only* be used for writing. So we based it on the typewriter. It could hardly be more different from Microsoft Word. No buttons, no macros, no frills. In iA Writer you have no choice but to think and write.

Orlando Budelacci: For me there's also a certain radicality in that. The Latin word *radix* means the root of something, its basis, a starting point for further development. You take things back to their roots, and the roots are found in simplicity. You wipe the slate clean, you eliminate intrusive or disruptive elements, anything that might distract from writing. Would you say you have a radical approach to design?

{ We (!) have to ask fundamental ++ questions about the way our products work => if we want to make them better. }

Oliver Reichenstein: We want to think about things in new, different, better ways. We want to leave all the old stuff behind. We want to design liberated and liberating products. Radicality in design runs the risk of being authoritarian, as in: «I'm the designer and I'm going to tell you how it's going to be.» At the same time, good design presupposes a degree of radicality. We have to ask fundamental questions about the way our products work if we want to make them better. When designing for a display, for instance, we have to keep going back to physical basics. We ask ourselves what's actually being done here? What's the aim? How do we achieve it? If you want to surpass expectations you have to be willing to start by questioning the existing expectation.

Orlando Budelacci: So you're all about the people who need to concentrate on the essentials – when they're being creative, when they're thinking, when they're telling stories, during a presentation. You believe in our capacity for creativity even though machines can already do so much.

Oliver Reichenstein: When we're able to focus on it, work can be a real pleasure. Design requires a willingness to make a fool of yourself by asking outrageous and offensive questions, and to be amazed at things that seem perfectly normal to other people. And this willingness is a precondition of philosophy. The untamable Diogenes in his tub, Socrates with his impertinent questions, Wittgenstein with his curious examples. We make fools of ourselves when we draw people's attention to perfectly normal matters, to the things we all take for granted even though we wouldn't take them for granted if we took a closer look at them. We don't shy away from using strange words, asking curious questions or doing wild things. When I was a philosophy student I used a photocopier to enlarge pages of books onto A3 paper. It helped me understand difficult texts by slowing me down, and it left room for my notes. My classmates thought it was ridiculous. But it helped.

Orlando Budelacci: I've also noticed that I can't do final editing from a screen. There seems to be some relationship between the blank space on the page and the possibility of thinking.

Oliver Reichenstein: And it's always helpful to read what you've written in another form. When you change the typeface it's almost like you're seeing everything through fresh eyes.

Orlando Budelacci: I find it interesting that you understand design as the result of reflection and significant mental effort. As a process that starts with thinking. Not something with a beautiful surface, though that might be the end result. It takes significant mental effort to understand precisely what sort of interface you need between the person and the machine, if I understand you correctly. Thinking is the first tool you use when you start designing.

{ Thinking is the *first* tool you ~ use ~ when you ++ start designing. }

Oliver Reichenstein: The architect Peter Zumthor says that, as an architect, he's been working with the concept of space his whole life, and yet (or perhaps for that very reason) he's increasingly unsure about what space actually is. I have the same issue with form as a general notion. If I resist that peculiar sense of exasperation, I'd say that I understand form as an interface. When we look at an artefact, whether it's a glass, a microphone or a computer, then the form – as an interface between subject and object, space and thing, self and world – the form speaks to us and defines what the artefact is. We know what things really are because we conceive them, we make and manufacture them in a certain form, with the definite idea that the form signifies and conveys how it's intended, what it is, what and how it wants to be, what it does and how it's used. On top of all that, form as interface communicates with us even as we're using it; it responds to us continuously, while being used and through being used. We create objects that produce their own texts about the world around us. Anyone who designs things knows that we know and understand the things that we've created and used ourselves far better than we understand nature.

Orlando Budelacci: As a lecturer at our university I'm interested in what it is that students need to become good designers. You've just mentioned two of those elements. On the one hand, thinking is essential. On the other, observation of the world. This derives from the insight that you need to be good at observation to come up with a successful design. You need to be someone who observes processes, understands people and observes how they move in certain spaces, how they work with objects, how they take hold of objects and so on.

Oliver Reichenstein: Anyone who paints or draws knows that the challenge of visual representation goes beyond fingers and motor skills. To paint or draw well you need to learn to see. Drawing well or painting something well is less about skill and technique than it is about attention and sharpening our perception.

Orlando Budelacci: In a way this reminds me of the impressionists, who opened their senses to capture the fleeting moment. They were precise observers of atmosphere, space, light and colour. They exposed their senses to the world.

Oliver Reichenstein: Letting the world affect you in that way assumes a philosophical attitude of acceptance toward the phenomenon. There's a moment of astonishment when we really perceive something for the first time; when we perceive a phenomenon in the way it affects us and not as we imagine it. We think: «Oh, that's completely different to what I thought, completely different to how I always thought I'd seen it.» At first we don't understand what we're seeing, so we start to question our own perception. We look and we observe closely, we find gaps, see details, and the whole time we're thinking, «How can this be real?» And then we look closer still until we see what we've been missing all along, something we'd never seen before because of our preconceptions and their projection. It's only then that we find the space for design! I actually think design presupposes

a specific form of thinking and learning by doing. Designing *is* thinking. Thinking is giving form to indefinite matter. Anyone who thinks gives form to the formless, turns impression into expression.

Orlando Budelacci: We live in the turbulent age of the fourth digital revolution. Everyone's talking about artificial intelligence and it's causing a lot of consternation. In light of the new technological possibilities, it seems as though thinking and observation are becoming less important. Yet you talk specifically about human capabilities as being essential for a good designer. I'd like to go back to an observation you made earlier. When I listen to you I get the impression you want to discover the essence of things through thinking and the honing of human perception. Machines may be able to produce something approximating language, they can generate patchwork images from existing data, but they don't have dreams, human desires, imagination. In short, machines are not intelligent. They're just very good at imitation.

Oliver Reichenstein: Technology can amplify certain aspects of reality, and it can distort and obscure other aspects. We could use AI to write a book in a couple of minutes – a book that describes nothing real, nothing any person has ever perceived or experienced. Then the book gets published, and thousands, tens of thousands, hundreds of thousands of people spend time reading a statistically calculated string of letters, an alphabetical ornament without any intended meaning, and only then readers ascribe reality to it – a reality corresponding to what was originally nothing more than the linguistic probability of a sequence of letters. Just gibberish. Now imagine a million people each spending up to ten hours of their lives investing meaning in this robot gibberish. In purely mathematical terms, if such a non-book defies the odds and goes on to become a bestseller, it wastes several human lives. Books generated by AI and wantonly published without the intervention of any human intelligence are prisons for the mind. But the horrors of AI don't stop there. In the final scenario, a couple of generations down the line, books are still being published, but virtually no one reads them anymore. No one thinks written communication has any human substance anymore. Both writing and reading are completely outsourced to AI. Information becomes commercially calculable energy consumption. The planet gets heated up more and more, beyond all tipping points, for nothing. And this goes on for as long as the money keeps flowing from the virtual pockets of the many to the virtual pockets of the few. We don't want that, of course not. Who wants a future where no one thinks anymore and where money is all that matters? Sadly, we've already arrived at that point on a different path, without AI. Now, what *actually* is AI? The Italian philosopher and technology ethicist Luciano Floridi sums it up nicely. He posits that AI doesn't replace our thinking. AI, he says, doesn't think for us. AI doesn't think at all. AI enables action without thinking. It allows us to perform actions that would previously have required thought. A large language model doesn't think any more than a pocket calculator or a chess computer thinks. We're used to the idea that pocket calculators and chess computers save us the effort of thinking without themselves being capable of thought. It's no different with a large language model. We just need to get used to the idea that even so-called artificial intelligence, even if it uses words as though it were thinking, *doesn't* think. People sometimes say that technology itself is neutral and that what matters is how it's used. By this same logic, you can say it's not the weapon that kills but the person using it. Anyone who designs things knows that the intended use of an object is part of its design. Intention and use can't be separated from the object without redefining the object. A little kitchen knife with a serrated blade is good for cutting tomatoes. A carving knife is good for carving. You can kill with either, but a bayonet isn't neutral. The argument that weapons don't kill is grammatical sophistry. If you regard artificial intelligence as a tool then its inherent purpose is to make thinking superfluous. First of all, that's not a particularly helpful position. We could imagine any number of applications that simulate human thinking and get us talking that way. For that, we don't even need to go as far as we did just now when we were trying to chop tomatoes with a handgun.

{ we were ==> trying to chop tomatoes ++ with a handgun. }

{ Students shouldn't focus on ~ learning ~ how to be productive with technology; they // need to learn how to think about how they use it. }

I can explore Aristotle, Kant and Wittgenstein in dialogue with AI. We learn far more through dialogue than we do by monologue. The same goes for simulated dialogue. AI allows us to learn foreign languages in dialogue, which used to be the privilege of a very small minority. AI for learning in dialogue, simulation of thinking and stimulation of thought – I appreciate all these things. But the danger with AI is that it allows us to perform actions that previously required thought. AI makes actions that require human involvement easy for us; actions such as making redundancies, driving cars and writing books shouldn't happen without mental effort and emotional involvement. Instead of just making stuff non-stop we need to learn to think about what we're going to do, what we're doing in the moment and what we've done in the past. Students shouldn't focus on learning how to be productive with technology; they need to learn how to think about how they use it. Rather than avoiding thinking because it's stressful, enjoy the freedom that thinking affords. Sport can be painful, yet we know we enjoy it despite the physical exertion. In the age of AI, it's more important than ever that we take pleasure in thinking. The purpose of AI is to replace thought. Instead of trying to become more productive, students need to ask themselves questions like: What are the dangers of my interactions with technology? What's happening to my attention span? How much of what you've just written in Word or PowerPoint have you understood? How much of it do you mean? Is that how you feel? Is that what you've observed? Do you have any experience of what you're expressing? And, yes, of course, teachers and parents should be asking themselves the same questions too.

Orlando Budelacci: I recently had a conversation with a politician about the risks and opportunities of AI and the consequences of digital transformation. She said it was a matter for schools and legal regulation. I had a very different opinion. We need to be testing critical thinking and the ability to deal with these new possibilities, and we need to create a laboratory for experimentation. In other words, I'm confident that, with a little critical thinking and enlightenment, people will figure out how best to deal with these new technologies. Ultimately it's about self-empowerment, which ought to be the aim of education; not paternalism.

Oliver Reichenstein: Pulling the legislative levers is no guarantee that we're acting in a morally defensible way. Morality and legality are anything other than congruent. Unfortunately there's not a lot of philosophy in the cut and thrust of the industry, which simply looks at what works and what doesn't. Careful consideration of grounds for intervention isn't enough when we're trying to come up with sensible regulations for everyday practice; we need space to figure out what's right and what's not. You can't just regulate everything and you can't just let people get on with it, but you can't base everything on deliberation either. As philosophers we're detached from the world, so we're far more conscious of that than politicians, who are very much part of it and think they can regulate everything. The politicians' task is to find the right laws, so they tend to go straight for legislative regulation in every situation. Technicians then stick to these rules or look for loopholes so they can do what they want to do anyway. Then they say: «We're not doing anything illegal, so it can't be immoral.»

Orlando Budelacci: Following Immanuel Kant, I'd like to bring in the concept of maturity, which has recently been referred to as «digital literacy». I assume that people are capable of reflecting on their own prejudices. The possibility of delegating to the law all responsibility for our dealings with technology couldn't be further from my mind. People bear responsibility for the way they shape the world in their dealings with modern technology. The law is part and parcel of that, but it's not the central element.

Oliver Reichenstein: Narcotics are as big a social problem as ever, but most of the parents I speak to now tell me that their biggest problems are phones and games and everything that entails. Those who remain sceptical and circumspect about these extremely powerful technologies, they're not just nay-sayers. There

are certain substances that are more or less toxic in and of themselves. Strontium, nicotine and heroin are toxic even in small quantities. With alcohol, THC and caffeine, it's a question of quantity and predisposition. There are comparable dangers in the digital world. Certain technologies are destructive by design. With other technologies it depends on exposure and use and predisposition. For me, Super Mario is a sugary treat. Even now, when I'm starting a new Super Mario adventure, I have to be careful I don't overdose and have a sugar crash. Fortnite is heroin. I can't stop playing it and it just keeps pulling me in. Instagram is nicotine. TikTok is beer. Threads is boxed wine. Mastodon is THC. Twitter is strontium. There are good things about AI. At the moment it's being used like opium – to alleviate the pain of thinking.

Orlando Budelacci: My sense is that we ought to be promoting critical approaches to the new technological possibilities. Rather than banning them, we should be trying new things without fear of coming into contact with them. What skills do you think designers need to have? What are your priorities when you're employing new staff?

Oliver Reichenstein: Designers need to be able to write. To me, writing is the main road to creating, evolving and transporting design. The majority of our impressions are formulated and expressed through words. Learning to write is a fundamental requirement for design.

Orlando Budelacci: It's surprising that you're so emphatic about writing being the main road to design. From this I take it you think language and thinking are relevant to good design. But what I've observed at the university is that we have students who are very strong visual thinkers, less so with language.

Oliver Reichenstein: Photography, graphic design, film, animation – these are all forms of visual language. Of course, you might bring a specific talent to the table, and it may be that you're better at expressing yourself through music, dance or animated characters than in words. It may be that our formal sensibilities and the level of non-verbal communication that we achieve in our respective fields lead to the development of certain anxieties about verbal language. I'm not saying every designer must always be able to write well, but you need to develop your way of expressing yourself before, during and after the design process. Design turns impression into expression. Human expression requires a form of language. Unfortunately, it's not enough to be adept at drawing, painting or animation. We need to be able to explain ourselves, market ourselves and sell ourselves. When you're formulating verbal language you need to stick close to pre-existing patterns. We need a shared language in order to give expression to our emotions. Without that shared space others couldn't translate our expression back into their impression. In verbal language this emphatic ability to transform an impression into a comprehensible expression is far more clearly and universally present than it is in visual languages. Understanding how to shape verbal language, from type design to typography, to the emotional, grammatical and rhetorical shaping of language is one of the main keys to becoming a designer. Verbal language is universal. We all read, write and speak. And, unlike when we make films, compose music or when we paint, we all know how to use words and we all share a much more common space in the use and meaning of words. In the grand scheme of things, words are always essential to your success. Whatever you express in your particular visual, musical or physical language, if you want to sell it, you need to learn how to translate some of it into words. As the teachers, supervisors, colleagues and friends of designers, it's our task to make that process less intimidating. The fear of writing is virtually inculcated in us at school. We need to light paths to language for children, we need to awaken the joy of words and writing in them. We need to accept that young people can express themselves freely, willingly and gladly not just visually but also verbally. There will of course be people who have more or less aptitude in this or that area, but essentially we're all capable of expressing ourselves perfectly well when we're relaxed and when we're talking about something we understand and enjoy.

{ Unfortunately, it's (not enough) to be adept at drawing, painting, or animation. We *need* to be able to >> explain ourselves, market ourselves and sell ourselves. }

Learning How to Walk

Experimentation in Machine Learning for Animation

Stefanie Bräuer

Humans learn how to walk on two legs, and so do non-human entities – though in a very different way. Recently, machine learning has been applied to bipedal locomotion in robotics. Also, animation filmmakers have started using reinforcement learning to make their characters walk. In this contribution I focus on experimentation in machine learning for animation. I explore the question of how appropriated uses of these algorithms can open up critical perspectives and I suggest that imperfection and experimentation allow for a reflexive practice.

Critiquing the force in reinforcement learning

In her installation *HellYeahWeFuckDie*, shown in Münster during Skulptur Projekte 2017, artist, filmmaker and author Hito Steyerl touched on the themes of robotics and autonomous systems, the use of robots in disaster zones, the training of robots and the role of violence in this training process. One element of the piece comprised three monitors mounted to steel barriers in a bank lobby (fig. 1). The monitors presented found footage of both actual and computer-simulated robots being

> { Steyerl, through => her selection and editing of *found footage*, points out the violence inherent in that ++ process. }

exposed to physical assault. One of the sources that Steyerl included in her video installation stems from a research project in biomechanics and, more specifically, the simulation of locomotion for an application in robotics.[1] Two-legged figures are made to optimise their gait as their balance behaviour is tested: cubes are thrown at the characters in a physics-based simulation. The goal of this tossing and prodding is the automatic generation of optimal, i. e. efficient and natural-looking, movement – an optimisation process aimed at the normalisation and consolidation of a basically fragile system. Steyerl, through her selection and editing of found footage, points out the violence inherent in that process. In recent years, machine learning, and particularly reinforcement learning, has been applied to bipedal locomotion in robotics.[2] Steyerl is critical of machine learning algorithms as they rely on vast infrastructures and disenfranchised labour. In a recent essay she refers to the images generated by these algorithms as «mean images». Such images, according to Steyerl, are mean in a double sense: they are statistically averaged as well as plain nasty.[3] Her critique goes beyond stating algorithmic bias, i. e. prejudice inherent in the training data necessary for machine learning. Rather, she points out the failure of a fundamentally mean-spirited system of production.

Walk cycles: Learning how to walk in early animation

Steyerl critiques mean images for the way they are generated and for the conditions that make them possible. With a similar interest in exploring the surroundings of the centre of attention, animation theorist Thomas Lamarre employs the term «non-localized movement» to shift the focus from the animated character to its backdrop. Lamarre describes the compositing of several layers and the panning of backgrounds as non-localised movement, as opposed to

1 Thomas Geijtenbeek, Michiel van de Panne and A. Frank van der Stappen, «Flexible Muscle-Based Locomotion for Bipedal Creatures», in: *ACM Transactions on Graphics* 32, no. 6 (2013), pp. 1–11, doi:10.1145/2508363.2508399 (retrieved 18 Feb. 2024).

2 Pierre Schumacher et al., «Natural and Robust Walking Using Reinforcement Learning without Demonstrations in High-Dimensional Musculoskeletal Models», 2023, preprint, doi:10.13140/RG.2.2.33187.22569/1 (retrieved 18 Feb. 2024).

3 «Visuals created by ML tools are statistical renderings, rather than images of actually existing objects. […] They converge around the average, the median; hallucinated mediocrity. They represent the norm by signalling the mean. They replace likenesses with likelinesses. They may be ‹poor images› in terms of resolution, but in style and substance they are: mean images.» Hito Steyerl, «Mean Images», in: *New Left Review,* no. 140/141 (June 2023), pp. 82–97, here p. 82.

character animation.[4] When characters in early animation learned how to walk, their movement needed to be combined with a background sliding sideways in order to produce the impression of walking. The figure would perform a walk cycle while remaining in place, and after being paired with a moving backdrop a reversed sense of the character moving in a sideways direction in front of a still background would emerge. A number of prerequisites were necessary. According to Lamarre, non-localised movement became prevalent with the use of the animation stand.[5] It allowed for the exact manipulation of the required elements under laboratory-like conditions: bright lights, a movable table and camera, as well as a specialised bi-pack camera for compositing. I'd like to add another prerequisite: cel animation divided the image into the

{ When characters in early animation learned how to walk, their (movement) needed to be combined ++ with a background sliding // sideways in order to produce the impression of >> walking. }

individual layers necessary for separate manipulation and subsequent compositing. The result of a process of consolidation and standardisation, cel animation was introduced by Earl Hurd and John Bray, who filed patents independently of each other in 1914. Here they laid out methods for separating the elements requiring animation from other portions of the image, which could remain static. Shortly after the filing of patents they merged their operations into the Bray-Hurd Process Company.[6] One result of their collaboration is the *Bobby Bumps* series, which was produced between 1916 and 1919 and included more than thirty films, often showing the main character in sideways motion while engaged in various adventures.[7] Through the standardisation of cel animation together with greater control of compositing techniques, such as Disney's multiplane camera system, the relationship between the animated figure and its surroundings has increasingly been stabilised in favour of the character being set in a grounded, dimensional world.[8]

Surpassing walking: Backflip

In contemporary 3D animation it seems as though characters need to learn how to walk again, as well as how to get up, balance or run. In his animation *Backflip* (2022), Leipzig based animator Nikita Diakur had his character perform these mundane movements, but ultimately focused on the backflip (fig. 2). Over the years, Diakur has developed a specific approach to dynamic computer simulation, exploring the limits of his tools and employing the resulting glitchy aesthetic in both commercial and experimental animation projects. In *Backflip* he combines a personal story about his fascination and fear of doing a backflip with a more general fascination and fear of machine learning algorithms.[9] The filmmaker's avatar talks to us in an artificial voice – generated by voice cloning – and introduces the initial idea of backflips being safer when simulated. He takes us on a journey – rich in slapstick humour – through the process of training to perform a backflip, starting in a public park, inviting us into a modelled version of the artist's room in Leipzig and ending up back in the same park. Meanwhile, time visibly passes, as demonstrated by the light shifting from day to dusk to night and so on. Inspired by a 2018 paper on reinforcement learning for simulated characters based on training data comprised of multiple short video clips,[10] the following year, Diakur, in collaboration with the programmer Maximilian Schneider and others, began building a unique workflow which eventual-

{ In ~ contemporary ~ 3D animation it seems as though characters = need to learn how to walk again, as well as how to get up, (balance) or run. }

ly resulted in *Backflip*. In this project the training data consists of YouTube videos of people practising specific movements – learning how to do cartwheels or backflips. The machine learning model is trained on these clips, which requires enormous processing power and a substantial number of iterations. The resulting film leads us through these iterations and includes elements such as the processor, which needs to be cooled, and a decidedly low-poly aesthetic, which is largely the result of technical requirements. At several points during the training of the model the given skill level was retrieved and used to simulate the character, which the filmmaker then captured by navigating through the 3D space

↑ **Fig. 1 Hito Steyerl, *HellYeahWeFuck-Die,* installation view, 2017 Photo: Henning Rogge**

using VR goggles. These captures formed the basis of the sequences from which the resulting film was built, including classic post-production steps such as foley work for creating sound effects.[11] The moments where *Backflip* hinges on reality, such as the sound or the partly photographic textures, collide with its excess in artificiality, which in turn gets highlighted even more.

Imperfection and experimentation in machine learning for animation

Diakur allows us to witness the training process of machine learning and humanises this technical procedure by inscribing hesitation and fear into the avatar's jerky and tentative movements. A lot of the humour of *Backflip* lies in the slapstick moments of unsuccessful attempts; we empathise with the character as he tries and fails. In the end he succeeds in performing backflips: Diakur's avatar manages to accomplish what the artist himself didn't dare to attempt. In a sense these kinds of simulations allow us to create super-human versions of ourselves. While the voiceover informs us that «practice makes perfect [...] I am very happy», we look at a less than perfect avatar allowing himself a rather goofy but nonetheless winning smile. This obvious irony points to the dichotomy between control and loss of control that is at the core of this film. Diakur seems to be interested in pushing a given medium and exploring the areas where he resigns himself to randomness or barely adjustable parameters within complex processes. Control – so typical of conventional

4 Thomas Lamarre, «Cartoon Life: Non-Localized Movement and Anti-Production in Animation», in: *Bilder animierter Bewegung,* eds Sigrid Leyssen and Pirkko Rathgeber, Paderborn 2013, pp. 221–251, here pp. 229–232.

5 Ibid., p. 234.

6 John Randolph Bray and Earl Hurd, «Bray-Hurd: The Key Animation Patents», in: *Film History* 2, no. 3 (1988), pp. 229–266.

7 Kristian Moen, «Imagination and Natural Movement: The Bray Studios and the ‹Invention› of Animated Film», in: *Film History* 27, no. 4 (2015), pp. 130–150, here p. 135.

8 Lamarre, «Cartoon Life», p. 235.

9 Nikita Diakur, «Director's Statement», 2022, https://backflip.training/press/backflip_info.pdf (retrieved 20 Sept. 2023). I'm grateful to the HSLU students Ysabel Steiner, Ana Sofía Aillaud and Florian Schenkel for the exchange on Diakur's work during the +Reflect module *Digital Cultures* in December 2023.

10 Xue Bin Peng et al., «DeepMimic: Example-Guided Deep Reinforcement Learning of Physics-Based Character Skills», in: *ACM Transactions on Graphics* 37, no. 4 (2018), pp. 1–14, doi:10.1145/3197517.3201311 (retrieved 18 Feb. 2024).

11 Other aspects of this complex and collaborative production process are mentioned in the info sheet accompanying the film release, such as the AI-generated (but manually mastered) music, the lip synchronisation or the camera projection mapping, which results in broken textures based on the camera angle. See Diakur, «Director's Statement».

↑ **Fig. 2 Nikita Diakur, *Backflip* (film still), animation, 12 minutes, 2022**

animation – is replaced by imperfection and a focus on process, mirrored in both the storytelling and the aesthetic of *Backflip*. In this imperfection and experimentation resides a critical potential, as noted by animator and author Alan Warburton, who has described experimentation as a way of responding to the demands of technical innovations that quickly become obsolete.[12] Media scholar Birk Weiberg makes a similar case for coding in art and design, which – unlike more formalised programming – allows for use as well as misuse.[13] In exploring imperfection while experimenting with machine learning for animation, *Backflip* engages in a reflexive practice.

> { Control – so typical of conventional (animation) – is replaced by imperfection and ++ a focus on process. }

Conclusion

As dynamic computer simulation departs from key-frame animation and as new sets of conventions and standardisations get established, relinquishing control, allowing for imperfection and engaging in experimentation prove to be helpful ways of reflecting on these new standards. Two examples have guided my argument: Hito Steyerl's *HellYeahWeFuckDie* from 2017 (and her recent reflections on AI more generally) and Nikita Diakur's *Backflip* from 2022. These works look beyond training figures to move in efficient ways: Steyerl critiques optimisation by pointing out the absurd and violent aspects of that training process; Diakur reveals the precariousness of contemporary modes of generating moving imagery.

12 Alan Warburton, «Soft Subjects: Hybrid Labour in Media Software», in: *The Networked Image in Post-Digital Culture,* eds Andrew Dewdney and Katrina Sluis, London 2022, pp. 114–131, here p. 128.

13 Birk Weiberg, «Against Programming. On the Development of Cultures of Coding in Art and Design», in: *Nummer* 11 (2023), pp. 52–55, here p. 53, doi:10.5281/zenodo.7418207.

Parametric Truth and the Art of Going against All Logic

New Image Technologies and the Role of Creativity in Academic Contexts

Simone C Niquille and Thomas Albdorf in Conversation with Ann-Christin Bertrand

Ann-Christin Bertrand: Let's start with a brief introduction of yourselves. What I find very interesting about this conversation with both of you is that, on one hand, you have very different ways of working and, on the other, you're both engaged in very similar topics – the history and backgrounds of new imaging technologies, especially AI. And you've been doing this for years, so we can talk about a profound engagement that runs through your work and has systematically evolved. Both of you are also rooted in photography or coming from a photographic background and have given workshops at Camera Arts.

Simone C Niquille: That's right, I've been working with and through computational photography for a long time. The classic moment of «capturing a photograph» no longer exists. Rather, as Kodak put it in their 1888 campaign: «You push the button, we do the rest». But what is this rest? I've been investigating this question for almost ten years. If there is such a thing as computer vision, how does a camera become intelligent? And what is this intelligence anyway? All these questions have led me more and more to training databases, specifically synthetic ones, i. e. those that are created in virtual space. Questioning is central to this and a very important part of my work. I start exactly where things or processes appear to be set, so normal and standardised that they're hardly questioned anymore. My work sits on this edge of constructed banality, refusing assumption. Don't assume that things function a certain way, but question the intentions and processes within.

{ If there is such a thing as computer /* vision, how does a camera ==> become intelligent? And what is this (intelligence) anyway? }

Thomas Albdorf: I initially made more sculptural works, which were then – in the sense of Fischli/Weiss or Roman Signer – made possible by the photographic medium in the first place. In other words, something that can exist in physical space only briefly or not at all is only made manifest through the act of photography. For me, digital post-processing was another tool to manipulate the original photograph in a «sculptural» way, allowing my pre-photographic work to continue in the post-photographic realm. The working process should be visible in the sense of a Brechtian alienation effect. When I used digital post-processing, it was always in a conscious way that I also addressed conceptually. From 2017 onwards, I started using various software that analyses and categorises the image and then reinter-

prets and digitally redesigns parts of the image or even the entire image. This means consciously relinquishing control and leaving certain processes to the software analysis and algorithms. And this has continued right up to my current work, where I actually work with AI images, GANs (generative adversarial networks) and various software processes to rebuild the image. In a series there's always a deliberate juxtaposition of conventionally photographed images, digitally manipulated images, appropriated images and images created through non-photographic processes – in this case, AI. In this way I'm trying to create a discourse of something that started in photography and then moves into software processes that no longer require an optical apparatus to create an image.

Ann-Christin Bertrand: In 2006, IKEA began replacing its elaborate production shots with generic images. Levi's recently announced that they plan to create their models generically via AI in the future, arguing that they wanted to depict more diversity. Behind this are usually primarily financial interests.

Thomas Albdorf: A conventional photo-shoot would have involved one or two photographers with assistants and a digital operator. There would have been models, stylists, production behind the scenes etc. So it would probably have been a one to two-day shoot, involving a total of twenty-five to forty people, depending on the size of the production. Now, probably one or two people can do it. And there's definitely no camera involved.

Simone C Niquille: Ice cream company Ben & Jerry's also switched to virtual photography during the Covid-19 pandemic… a moment for many companies to transition to computer generated imagery, entirely skipping the physical studio.

Ann-Christin Bertrand: And here, of course, the question arises: as a university of design, film and art, how do we respond to this when anyone can create new images with the push of a button and simple text inputs, and Adobe Photoshop advertises its AI tools as «creativity without risk»? What does this mean for the role, significance and purpose of creativity in relation to these new imaging technologies? How creative can software be? What does this do to our perception of the world? Where can human creativity be meaningfully applied to make a difference and use the tools in a profitable way? I'd be interested to hear your thoughts on this or what your own experiences are here.

Simone C Niquille: I think it's extremely important to hold on to the privilege of learning and exploring at university and, for as long as possible, to resist the demand for «production». A student will develop a portfolio, but not everything they create needs to be in it. Make some stuff that just is. This will lead to an understanding of how visual culture is created and your own position within it. Like reading a text, an image can be read to reveal its workflow. A critical questioning is central to my practice, regardless of the involvement of new technology. There will always be new tools, no need to teach those, rather the space to push and study boundaries, which also applies to technologies we don't yet know. Teach the courage to question.

{ Like (reading) a text, an image can be read to ~ reveal ~ its workflow. }

A crucial aspect of contemporary technology and my motivation for examining it critically is its inevitable entanglement with ideology. Tools that offer automated processes are not neutral, whether intentionally or not. They always incorporate someone's ideas and intentions, but whose and why? To photoshop has become a verb, but what processes create an autofill? Automatic to whose (image) standards? The university is a unique space that provides an opportunity to question functionality. This tends to be taken for granted, but it's crucial to production in everyday visual culture. You don't need to use Photoshop to get a job done as efficiently as possible, because that's not what university is about. Use the space to learn what Photoshop really does and why. Something looks and behaves a certain

↑ **Fig. 1 Thomas Albdorf, *Apples and Oranges, Part One,* 2023**

way because it's based on specific data, processes etc. This examination will inevitably lead to a student's own (visual) language and prepare them for working with new technologies to come. This is a fundament of my own practice and an aspect I'm passionate about in teaching.

Thomas Albdorf: It's about continuously questioning, being curious and trying new things. The tools will change over the years. That's always been the case, especially since photography is a technical medium. As long as you realise you need to engage with it and try to understand the underlying processes, the ideologies involved and the potential issues, I think you're reasonably well equipped.

Ann-Christin Bertrand: So it's not just about understanding technology as pure technology and as a mere tool, but also and above all as an attitude, a cultural practice.

Simone C Niquille: Perhaps an example: I recently founded the Parametric Truth Lab at the Design Academy in Eindhoven. I coined the term in 2016 while doing work on motion capture software that was originally intended for 3D animation but also used to create forensic material. The question arose whether this software could be used not only imaginatively but also in the courtroom. I was interested in the calibration process and visualisation; how was the body recognised and represented? The motion capture suits I looked at were based on sensors. In other words, twenty-one sensors were placed on the body, and these sensors could then be used to create dragons or other mythical creatures for the digital space. The same suit was used in the forensic field. Here, the goal was to represent the real body. I found that both exciting and troubling. The question was whether this was possible or if what we see on screen simply looks like a body without corresponding to reality. And the stakes are high in the forensic sciences. This led me to the concept of parametric truth, a truth defined by various parameters, where we may not know exactly who established them, according to what world view, what standards are at work.

In my opinion, critical questions should also be asked about common software; think of the Adobe Creative Cloud, the go-to for most creative practices. With the Parametric Truth Lab I'm specifically interested in the scrutiny applied to materials, production methods etc. in the design process for software. The university provides the opportunity to do this beyond the results-driven environment of a job assignment where time is most often scarce.

Thomas Albdorf: I think Adobe is an interesting example; the issue with them is their absolute monopoly. There are alternatives in the image editing field, but as soon as I work in the professional sector and interact with others, there is no alternative. You can't escape this universe. The second component that comes into play is that Adobe now officially offers AI image generation as part of Photoshop. And with its latest version Adobe has now more or less caught up with Mid-Journey and Stable Diffusion. Mid-Journey was always at the forefront, and there were certain scenarios where it was more practical to work with Stable Diffusion. Now, with the latest version, Adobe might have the best conventional image generator. There are of course still differences to Mid-Journey and Stable Diffusion, but in creating relatively generic images from prompts, I think Adobe has caught up to them. And that

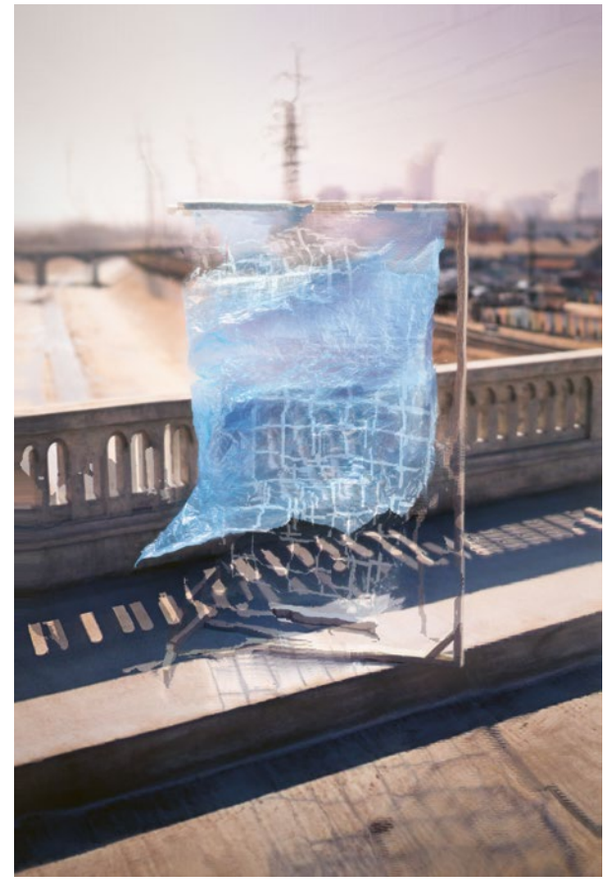
raises concerns that they – due to the implementation of AI in their image editing software – will soon have a quasi-monopoly in this area. A university can and should become a space for critically addressing these and similar issues.

Ann-Christin Bertrand: Which means that while the students learn how to use tools like Photoshop, InDesign etc., they are also taught these deeper aspects by intertwining practice and theory even more and by conveying a political, ethical, philosophical and historical awareness in dealing with these tools. Establishing their own software history and theory. Then, on the one hand, we have the approach of developing something new while on the other taking a certain stance towards these tools. That means developing a conscious approach, using more intermediate spaces and thinking more freely instead of just using the tools without questioning them.

Thomas Albdorf: In my opinion, the aim should be to enable students to deal critically with technologies, to question and discuss production methods and to constantly reflect on their own work and the context in which it takes place. This is perhaps where the role, meaning and task of creativity begins for me. And if, at the end of the study, you decide to work with analogue techniques but integrate critical questioning and make it part of your practice, then that's also absolutely legitimate. I say this because these new imaging technologies, whether GANs or AI-generated images, will naturally significantly change our perception of the world and are already doing so. So it's important to engage with them, but of course that's not the only way to visually create, because new technologies will always emerge, as they have in the past. So the most important thing is that you're able to remain critical and curious and to reflect on what you do.

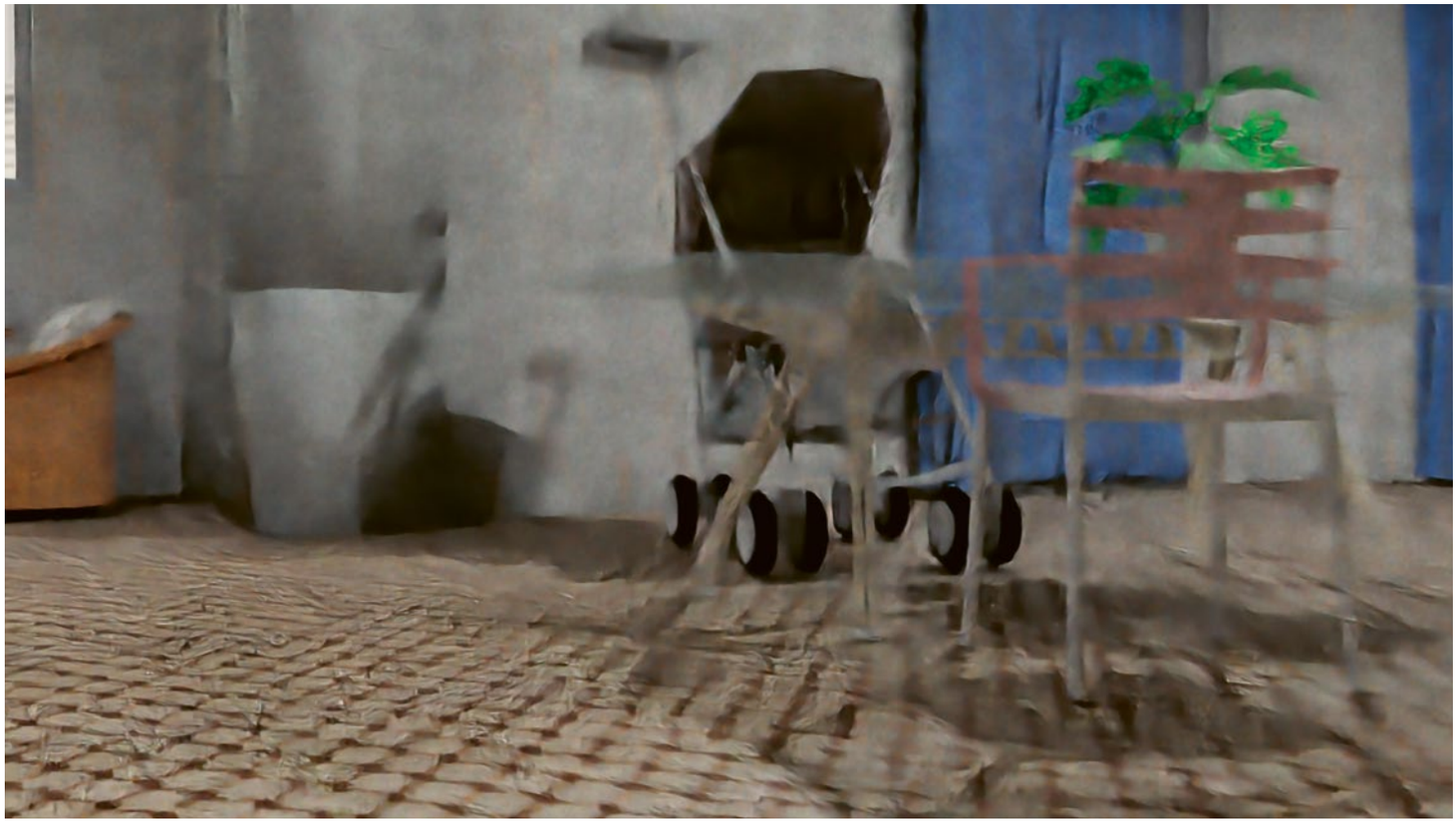
Ann-Christin Bertrand: And also to combine things anew. In the exhibition «Back to the Future – The 19th Century in the 21st Century», which I co-curated with Foam Amsterdam, there were many contemporary artists who consciously drew on nineteenth-century techniques, but then combined them with new imaging technologies. This created something completely new and gave a glimpse of how the medium could evolve or expand: using all available tools from the present and the past, rethinking and combining them. It's in this creative rethinking and recombining that I see an opportunity, not only in the artistic but also in the commercial application of the medium. Thomas, your Nike shoot comes to mind…

↓ **Fig. 2 Thomas Albdorf, *1758 North Spring Street, Part Two (The Measurement)*, 2023**



Thomas Albdorf: That Nike shoot was interesting because the approach of creating stop-motion animations that I developed for it goes against all logic. It's something akin to a reverse ready-made – a way of producing animations with deliberately complex and complicated means that make no economic sense at all. This complexity produces something unique and allows for a discussion of the production process within a given assignment. Thus, value can arise from this apparent meaninglessness. AI-generated images are often used for greater efficiency, to save time, costs, employees etc. – but that shouldn't be the only reason to opt for this method of production. In an academic or artistic context, these tools should be – again in the sense of Brecht's alienation effect – reconsidered and used to address and challenge themselves, and put to use in ways that weren't intended.

Ann-Christin Bertrand: Thank you both for the conversation, which definitely needs to be continued…



↑ **Fig. 3 Simone C Niquille / technoflesh Studio, *Homeschool «Livingroom»* (film still), 2019**

↑ **Fig. 4 Simone C Niquille / technoflesh Studio, *Sorting Song «Cow Couch»* (film still), 2021**

Drawing <=> Thinking

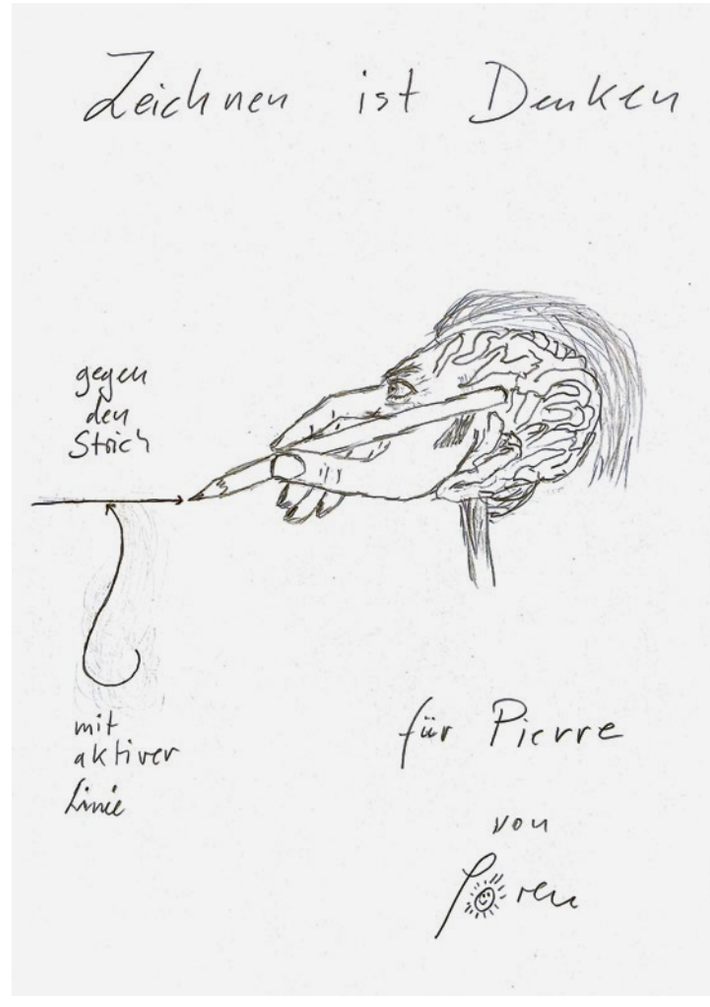
Sören Schmeling

«I think with my knee anyway.» These are the words of a seemingly absurd pronouncement from the artist Joseph Beuys, who had them printed on a postcard in 1977 (fig. 1). It would be wrong to take them as a sign of intellectual laziness, for another postcard he produced that same year said: «if you don't want to think, you're out» (fig. 3). Beuys's conception of thinking was never one-dimensional: «thinking is already sculpture» – a creative process that isn't purely intellectual, rational or goal-oriented.[1] The very concept of science, he said, needed to be «modernised and prevented from remaining static».[2] Beuys was engaged in a lively examination of thought processes – «what people do radically just by thinking: digging, rubbing, pushing against the material».[3] According to art historian Tobia Bezzola, «thinking with the knee is therefore to be understood as self-evaluation, an appraisal of how far he had come in terms of thinking with his whole body».[4] He goes on to quote Beuys: «But you could say I've got as far as my knee.»[5] This holistic approach to bodily thinking as a literal «pushing» and «rubbing» against the material could hardly be more controversial in the age of artificial intelligence. For when it comes to drawing and illustration – the subject of the following articles – pen and brush could soon be completely replaced by machines, with an array of devices instantly displaying computer-generated drawings which will be «disembodied» in both senses of the word. And the question over the creative labour behind all these things is being negotiated in just as open-ended a way as other developments in the border zone between digital and analogue illustration.

{ Beuys's [conception] of thinking was ==> never one-dimensional: «thinking is already sculpture» – a *creative process* that isn't purely /* intellectual, rational or goal-oriented. }

Pierre Thomé, director of the illustration programme at Lucerne from 2002 to 2023, has long been interested in the connection between drawing and thinking in the image production process. When «we observe ourselves drawing, our thinking changes, and in turn our drawing changes with our thinking.»[6] For Thomé, «every drawing is a journey, a quest with an unknown ending.»[7] Because «drawing is a slow process (stroke by stroke) and, as such, it is playful and creative, not results-oriented».[8] «Drawing», according to Thomé, «reflects the world as something which is always in progress, and the world as an evolutionary process is a very creative place.»[9] For him this shows «the extent to which drawing is an integral part of holistic thinking.»[10] So «drawing in turn has the unique ability to make visual stimuli into sensory impressions – in short: when we draw a nose, we also feel it».[11] Although Thomé tends to be critical of Beuys, there are some striking parallels in their ideas about thinking. Thomé also holds the view that «science and art are not so far away from each other.»[12] This may be why he established the Illustration Non-Fiction programme in 2006, a course which combines scientific accuracy with creative freedom and which to this day remains the only degree programme of its kind in the public university landscape. For Thomé «it's about re-establishing connections between drawing and other disciplines – and anchoring it as a language that people can use to record their own thoughts.»[13] His article elaborates his thoughts on teaching this linguistic ability, which everyone possesses and which all teachers should seek to develop as best they can (fig. 2).

Evelyne Laube, the new director of the illustration programme at Lucerne, reflects in her interview on freedom in the mental space of drawing. The important thing for her, given the challenges



↑ **Fig. 1 Joseph Beuys, *I think with my knee anyway,* postcard, 1977**

Fig. 2 Drawing by the author, published in *Worte des Vorsitzenden Mao Tse-Thomé* on the occasion of the farewell party for Pierre Thomé as head of the BA Illustration programme, June 2023

that exist in the field of illustration, is maintaining «a healthy and active imagination». Her plea for unlimited freedom of imagination is about «transformational creativity»[14] – that small but increasingly significant area of artistic creativity that breaks the chains of convention. It's a field that will be increasingly contested in future, since the other fields of human creativity may soon be taken over by machines.[15] For Laube, then, AI-based image generators are shortcuts in the drawing process, an aid to those who may have forgotten how to draw, but not a means of recovering that ability. She's in favour of a playful and exploratory approach to new media like AI-based tools and vehement about promoting self-empowerment among young illustrators as they find their own language and vocation in drawing.

Zoe Röllin has discovered this language for herself in three-dimensional digital space. Her VR film *Perennials*, which premiered in 2023 at the 80th International Film Festival in Venice, is now touring Europe. In 2017, while still studying illustration at Lucerne School of Art and Design, Röllin had attended a week-long workshop by Australian artist Sutu at the Lucerne comic festival Fumetto. The VR pioneer has been drawing and painting her immersive worlds on the «endless canvas» of virtual space ever since. Two things are apparent from the field of her creative work: she enjoys being at the vanguard of experimentation with new technologies while also expanding and refining her skills as an illustrator, but at the same time she's aware that these technologies are still developing and knows that her drawings need to keep an eye on the future.

Ruedi Widmer conducts light-hearted experiments in the here and now with AI-based image generator Midjourney. As a cartoonist he specialises in escapist lateral thinking, which may be why he was so taken in by the visually stunning results

1 Joseph Beuys cited by Tobia Bezzola in: *Joseph Beuys,* ed. by Tobia Bezzola and Harald Szeemann, exh. cat. Kunsthaus Zürich, Zurich 1993, p. 248.

2 Armin Zweite (ed.), *Beuys zu Ehren,* exh. cat. Galerie im Lehnbachhaus, Munich 1986, p. 80.

3 Joseph Beuys, *Zeichnungen 1947–59,* volume 1, Cologne 1972, p. 17.

4 Tobia Bezzola in: *Joseph Beuys,* ed. by Tobia Bezzola and Harald Szeemann, exh. cat. Kunsthaus Zürich, Zurich 1993, p. 249.

5 Armin Zweite (ed.), *Beuys zu Ehren,* exh. cat. Galerie im Lehnbachhaus, Munich 1986, p. 79f.

6 Pierre Thomé and Lynn Kost (eds), *In Bildern Denken. Ein Experiment über die Wahrnehmung von Bildern,* Lucerne 2014, p. 8.

7 Ibid.

8 Ibid. p. 11.

9 Ibid. p. 12.

10 Ibid.

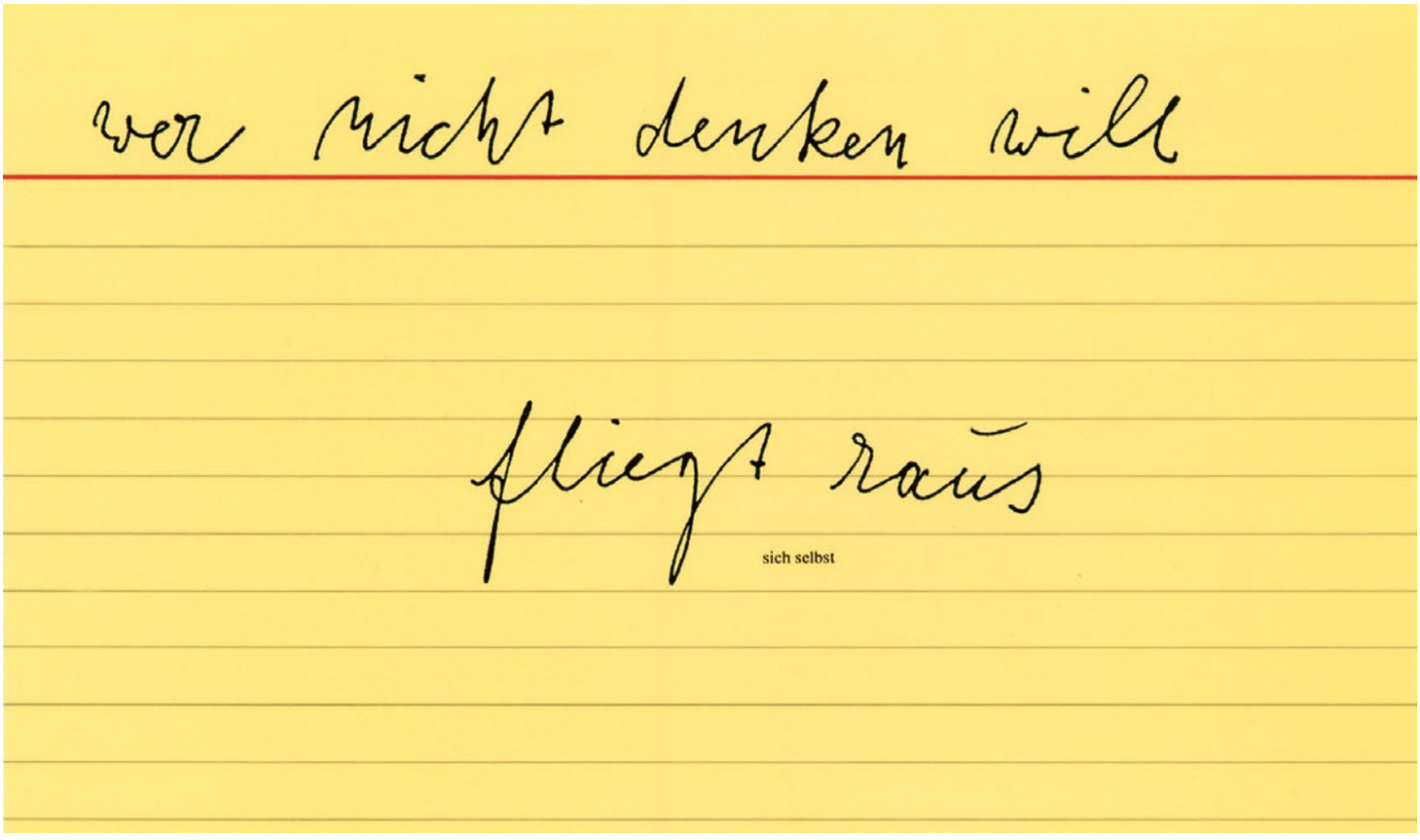
11 Ibid.

12 Ibid. p. 10.

13 Ibid.

14 Orlando Budelacci, *Mensch, Maschine, Identität. Ethik der Künstlichen Intelligenz,* Basel 2022, p. 84.

15 Ibid. p. 89.



↑ **Fig. 3 Joseph Beuys, *Yourself (if you don't want to think, you're out)*, postcard, 1977, Edition Staeck**

of AI imagery, especially in the early years. Whether it's medieval nuclear power plants or military equipment made from Swiss cheese, Widmer's scurrilous prompts reveal what AI is really capable of. As a well-meaning critic Widmer is always aware of the limits and dangers of the new medium. In his short lecture followed by an artist talk at Lucerne School of Design, Film and Art in the autumn semester of 2023 he explored these boundaries with students and lecturers in the context of a lecture series on the «History of Visual Media». Meanwhile, the speed and sheer scale of image production sometimes plunges him into a state of intoxication, though he insists he won't be over-indulging.

Magali Franov has encountered the same risk of digital addiction in another «social» medium. Her article on illustrators' relationship with Instagram is a distillation of the bachelor's thesis she submitted for her Illustration Fiction degree in 2023. Here she describes not only the very real advantages that a presence on Instagram can have for illustrators, but also how responses from followers and the algorithm itself can change your style and the way you think about drawing. Originally designed as a how-to guide, the iteration presented here provides tips and tricks on how to approach this digital medium «socially» and sensibly, and it does this by turning attention back on the user's own analogue work.

Adelina Lahr has been on a journey that's taken her beyond the limits of drawing in more ways than one. Her article forms a bridge between analogue drawing and animated filmmaking, so it's also a link between the disciplines of illustration and animation, which are likewise reunited in this issue of *Nummer*. During her semester abroad in 2023 at Kingston School of Art in London, Lahr found both subjects united in one course. For a seminar project that moved between theory and practice she developed a video essay investigating the transition from sketchbook to animated film. Her starting point was an animation in which Samuel Patthey had documented his exchange trip to Tel Aviv – the film he'd submitted at the end of his own bachelor's degree at Lucerne School of Art and Design in 2017. Lahr's analysis of Patthey's films forms another bridge, in this case back to her own work, where she brings her travel sketches to life while also showing that graphic thinking has a mobility that transcends borders.

Drawing as Language

Pierre Thomé

The driving force behind this article was – or rather is – a longstanding sense of frustration. For many years now I've been watching children start out at school, drawing with great joy and enthusiasm. Ten to fifteen years later, the same children, now young adults, proclaim that they can no longer draw. They certainly haven't forgotten their ability. They certainly haven't forgotten how. What they're saying is: they've learned in the meantime that they can't draw «well» – and who cares about that? Is that what we should be focusing on? Shouldn't schools be empowering their pupils? Where does all this fear of not living up to other people's expectations come from?

Drawing isn't about art, nor is it about doing something the right or wrong way. To me it should be a tool for understanding the world, for rendering our thoughts visible, first and foremost to ourselves. So when you see your own children's drawing skills going to waste, it doubles your exasperation. There will always be amazing art teachers, but for as long as visual intelligence is not recognised as a criterion for teaching, the institutional failure of our schools in the field of drawing will continue. Many teachers see drawing as occupational therapy, others as a test of dexterity. But that is mistaken. It's about something far more important: the promotion of visual literacy. I'm talking about learning and practising your ability to read images, to give form and shape to your questions and ideas, to visibly express your feelings. And so, as the present hurtles on, we now find ourselves facing a truly fundamental question: WHY DRAW? Why draw at all? Why do it yourself? If tomorrow, Saint-Exupéry's little prince were to ask: «Can you draw me a sheep?» Then anyone with a computer would likely respond with another question: «In what style? Would you prefer Disney or van Gogh or Joseph Beuys – or all three together?»

This is not the place for the big question as to why, but those who read between the lines will see what we stand to lose if we sever the umbilical cord that connects us to the origin of language – merely because the technology enables us to do so.

Words were drawn long before humans could write. We need pictures and visual metaphors to think. We need the concreteness of the visual to link abstract concepts to lived experience. Those who regard words and images as antagonistic opposites are failing to see the point.

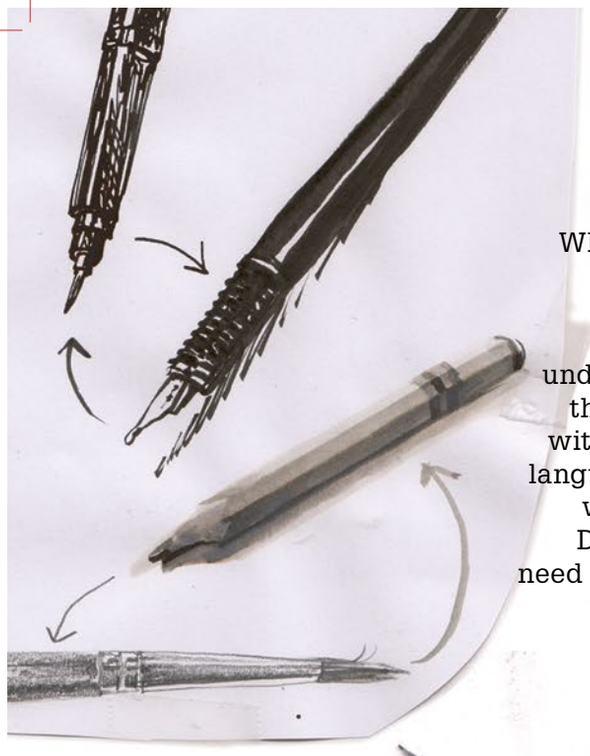
So we come to the question of how wise it is to leave our children defenceless against the tyranny of the image. Wouldn't it be better to prepare them for it by providing them with a visual education? It's not something we need to do, but we could do it. That's a part of what I mean when I say «drawing is a language».

The following article was written some years ago; I've lost count of how many. Having attended a conference I was asked to write a paper for an academic journal. I'm an illustrator, not a scholar, so I initially said no. But then I agreed – on the condition that I could say what I had to say in pictures as well as words. Because in order to understand something, I have to draw it, though I can only explain it in sentences. The journal eventually folded. The editors disappeared. Now the article is being published here for the first time. It was originally intended for primary and secondary school teachers, but I think its publication is equally justified in the magazine of a school of design, film and art.

Pierre Thomé, January 2024

Drawing as Language

What would happen if, instead of teaching drawing as art or technical skill, we were to teach it as a language? Like me, many people find it easier to understand things when when they can see them, and they find it easier to say things with images than with words. Drawing is a language, and anyone who understands how we think in images can speak in images. Drawing as a language doesn't mean you need to draw well. But in order to understand this language, you really need to start doing it yourself.



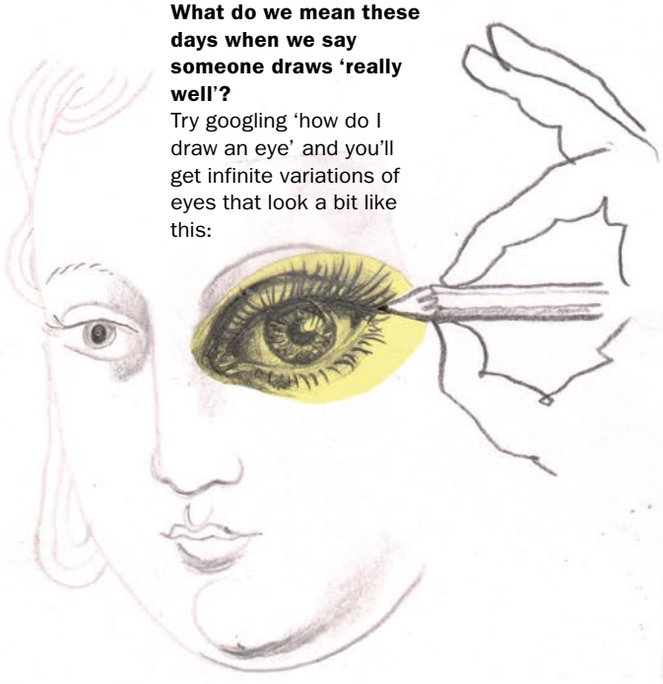
The pencil's complaint to the brush: 'I can't stand it when people tell us what we do and what we're good for.'
'I've already written about that,' says the quill, as smart as a quill can be.

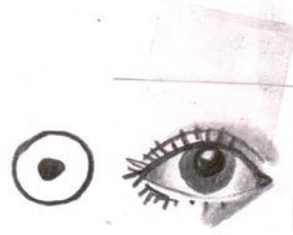
A tip for getting started: Just draw! Forget all your ideas about perfection. They only get in the way. Don't worry! You draw with your hand, not your head. No one's going to build a house from your sketches. Only architects have to live with that responsibility.

1. Learning to draw really well – what does that even mean?

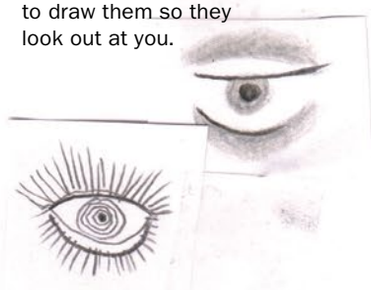
Drawing is like speaking, and the thing they have in common is the need to express something, to approach someone with the desire to share an observation, an idea, a mental image – and that's easier when you know how to do it.

What do we mean these days when we say someone draws 'really well'?
Try googling 'how do I draw an eye' and you'll get infinite variations of eyes that look a bit like this:



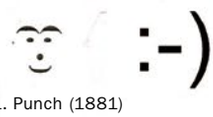


Eyes are magical, and they're a popular motif. The eye can be represented in all sorts of ways. A brief cultural history of the subject would show one from a comic-book, one from a relief portrait on a Roman sarcophagus, one from a medieval book illustration and one very different eye from the Art Brut collection in Lausanne. It's really easy to draw them so they look out at you.

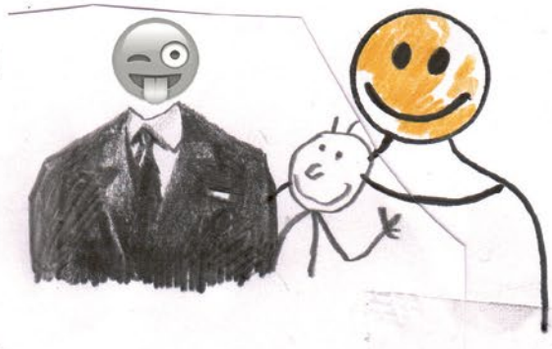


I can understand the desire to make things look 'more real', to get closer to reality, so close you could almost reach out and touch it. I see it all the time. In emojis, for instance. What started out as a simple drawing has moved in the same direction with every technological innovation. What used to be a drawing has become something resembling a boiled sweet.

The best teaching makes drawing an adventure for the mind, a journey into the unknown. And in the worst case scenario, pupils come away thinking they've failed. We've got used to hearing people say that they can't draw at all or that they can't 'draw well'. I'd like to understand why that's so and whether it can be changed.



1. Punch (1881)
2. Scott Fahlman (1982)
3. Standard iPhone emoji



The geometric principles of single-point perspective, as they were defined over five hundred years ago, today determine the aesthetic of shooter games. Both then and now, the observer has to take up a fixed position directly in front of the image in order for the illusion to work.

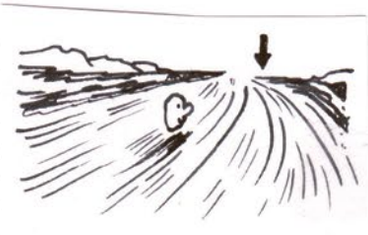
Ideas are never neutral. They change and develop according to the environment inhabited by the person thinking them. Nothing is created in a vacuum.
The discovery of the vanishing point and single-point perspective would never have happened without architects, streets and buildings – a geometrically ordered environment. Tribal communities who live in forests have other ideas. They don't have portraits or single-point perspective. They see themselves as a society, not as individuals. Pictorial languages are the visible expression of a culture, and that's interesting.

Patterns from Carl Schuster and Edmund Carpenter, Patterns that Connect: Social Symbolism in Ancient and Tribal Art, London and New York 1996

The ancient Romans may have understood how optical illusions work, but it was the artists of the Renaissance, who were all architects, who first realised that the vanishing point in a single-point perspective lies not on the horizon line but within the eye itself, at the focal point of the lens, on the retina.

In Western culture the Renaissance was something like a Big Bang moment for modernity, because rather than simply representing a subject the artists back then actually started looking at vision itself. In other words, their paintings show something about the true nature of visual perception. When you look at it like this, every new art movement stands for a new discovery, a new insight into the processes that determine our awareness of the visible world.

A single-point perspective looks static if it's too strongly constructed. The vanishing point will only start pulling you in with that irresistible force if you're watching a film, playing a computer game or driving down the motorway at two hundred kilometres an hour. Which is certainly not the time to be pondering about the true nature of illusions.



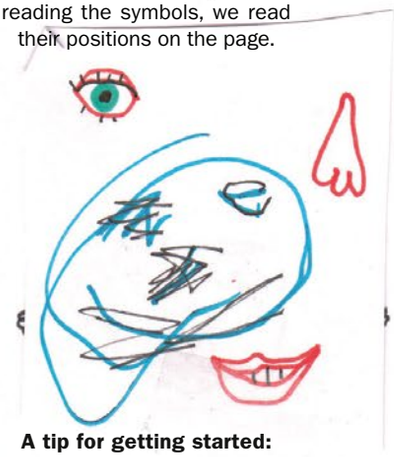
The concept of 'optical flow' was introduced by American psychologist James J. Gibson in 1940

3. The eye is not a camera

‘Drawing well’ somehow always means drawing realistically. So let’s assume that the eye works like a camera. An image using light and shadow, a system of proportions and relations, the correct rendering of form and contour. This is how students at the academies were taught in the past.
The first thing they learnt was to forget everything they’d learnt before and become a bit stupid – just like a camera.
Seeing without understanding.

‘Oh, my head is so badly drawn’, says the adult, who would rather draw like a camera than a child.

Placing pictorial elements on a page in a more or less correct spatial arrangement is something small children grasp at a very early age. Instead of reading the symbols, we read their positions on the page.



A tip for getting started:
For those who get frustrated with portraits when the forehead’s too low and the eyes are too big, try covering half the face you’re drawing with a folded sheet of paper. It’s much easier to put marks in the ‘right, place when you’ve got a direct comparison to work from.

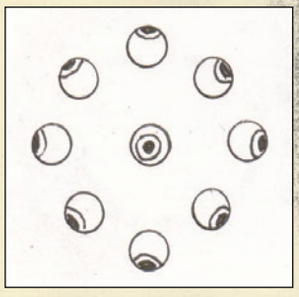
Of course, it would be nice if we could make copies directly from the retinal projections inside our eyes. Like Andy Warhol, whose portrait of Mao was projected onto a sheet of paper, we could just trace around the lines. Unlike drawing from observation, though, there’s something mechanical about copying. Didn’t Warhol write these provocative words in his diary: ‘I want to become a machine.’

If we don’t draw like cameras it’s because we don’t see with our eyes, but with our brains. You can have perfect eyes and still be blind because the visual part of your brain is impaired. Children’s drawings are closer to language. Language first divides the human experience into words and categories and from there reconstructs it as artifice. Language combines and organises, and when children draw, they draw just as they speak: eyes, nose, mouth, full stop. Everyone understands that.

Pierre Thomé

Someone once asked me the following question: ‘How could you draw vision?’ Simple answer: ‘By picking up a pencil.’

An experiment:



Look straight up, up and to the right, straight out to the right and so on, in a clockwise direction. What do you see?

Above: The shadow of your eyebrow. Towards the middle of your face, your field of vision is bounded by your nose, and by your cheeks below. As though you were taking a step back and peering out from inside your own head. That goes against intuition or habit, and thus is difficult to draw.

Continue: If you focus on the tip of this pencil without moving your eyes, you’ll still see letters to the upper right. These will be legible as long as their increasing size remains inversely proportional to decreasing visual acuity. But the little x and y disappear.

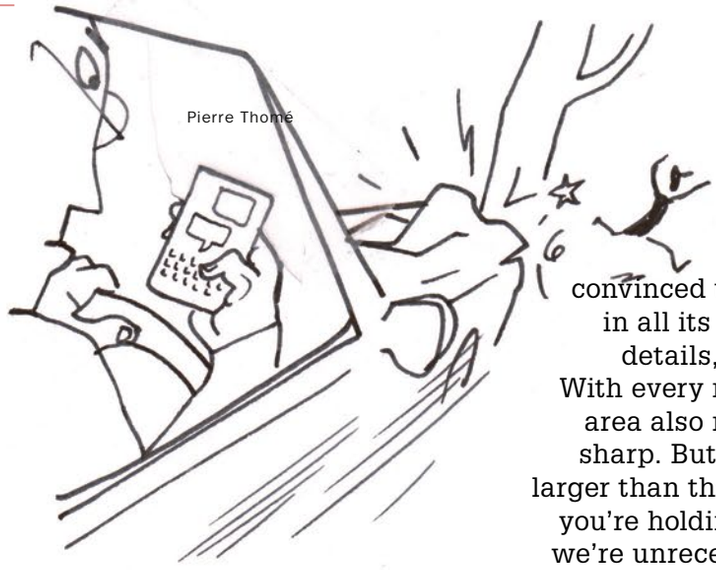
After Stuart Anstis,
Vision Research: Peripheral Acuity,
San Diego 1974

Visual acuity or sharpness is greatest at the centre. It diminishes dramatically towards the edges. This is because of the distribution of photoreceptors on the retina, which becomes increasingly thin at the edges. You could also put it like this: vision dissolves at the peripheries due to a lack of information.

Another exercise:

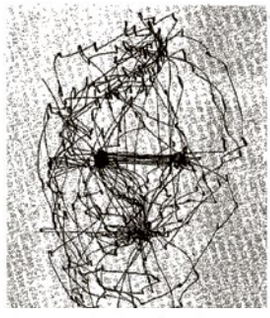
With one eye shut, look at a single point in the room and slowly bring your hand into your field of vision from behind your head while moving your fingers. At first you'll only notice the movement. Pay attention to when you first see a shadow, when can you identify individual fingers, when can you count them and when do you begin to see lines and pores in the skin? At the periphery you'll only perceive light and movement. That's the neural structure of the eye.

I'm not interested in where seeing ends so much as how – how it changes at the periphery. Nothing exists outside the field of vision, and this nothingness, this absence of stimulus, cannot be represented. It's neither sharp nor unsharp, neither light nor dark.



Pierre Thomé

Vision remains a paradox. On the one hand, everyone's convinced that they apprehend the world in all its fullness, but when you ask for details, you won't get many answers. With every movement of the eye, the focal area also moves, so everything's always sharp. But the area of full attention is no larger than the size of your thumbnail when you're holding your arm outstretched, and we're unreceptive to everything outside it. Remember that next time you're thinking about sending a text message while driving.



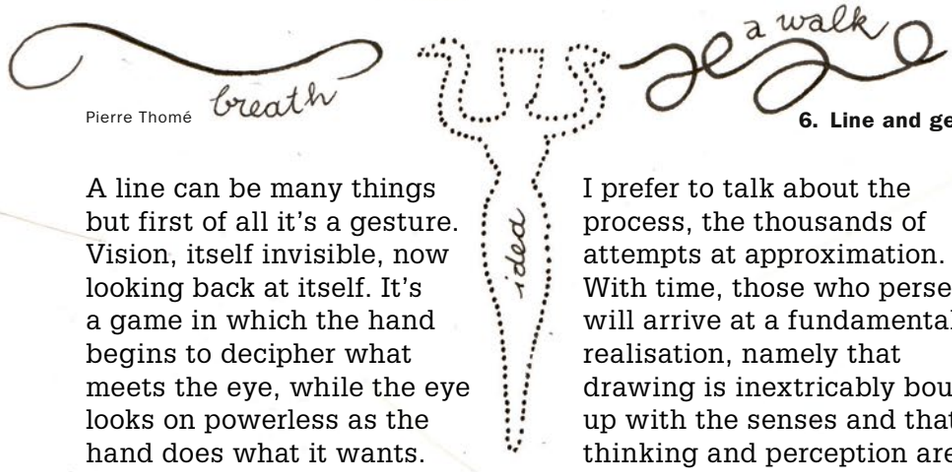
Record of eye movements during free examination of a photograph of a young girl for three minutes with both eyes; Alfred L. Yarbus, *Eye Movements and Vision*, Cambridge and New York 1967, p. 180, fig. 115

Vision follows focus of attention and jumps back and forth an average of five to six times per second. The first visual representations of these jerky eye movements were made by Alfred L. Yarbus in a pioneering study of 1964.

We ourselves don't notice these movements because the eye sends no signals while it's moving – it remains blind in that time. So we see life as a sort of montage of details and panoramas, an unbroken sequence of snapshots, several every second.

People tend to focus on the eyes when looking at portraits. They pay less attention to the hands. Artists know this and often treat the hands and clothing incidentally, sketchily. It's good to know what matters.

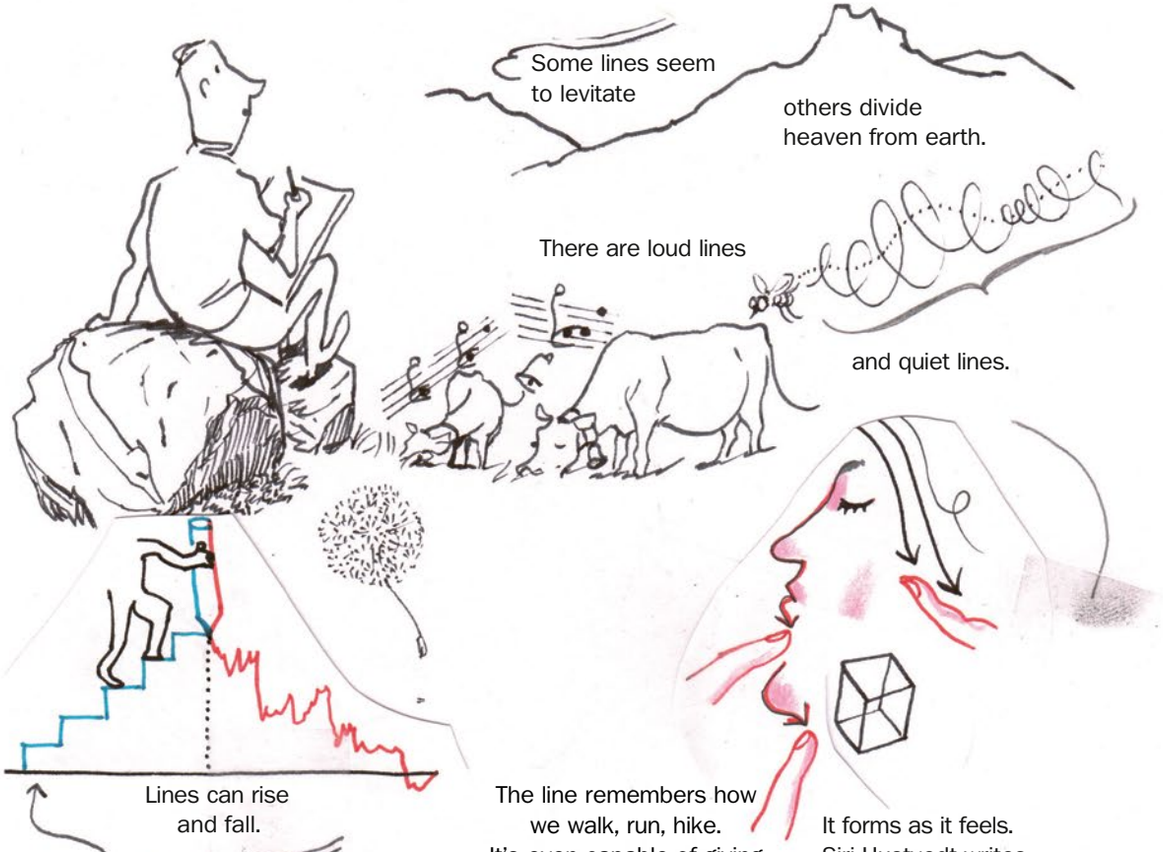
This is interesting when drawing because a drawing 'imposes' its perspective on the observer, or, in friendlier terms, it directs the gaze. It's not the subject but the eye movements that make a drawing lively.



6. Line and gesture

A line can be many things but first of all it's a gesture. Vision, itself invisible, now looking back at itself. It's a game in which the hand begins to decipher what meets the eye, while the eye looks on powerless as the hand does what it wants. Success and failure are no measure of graphic thinking.

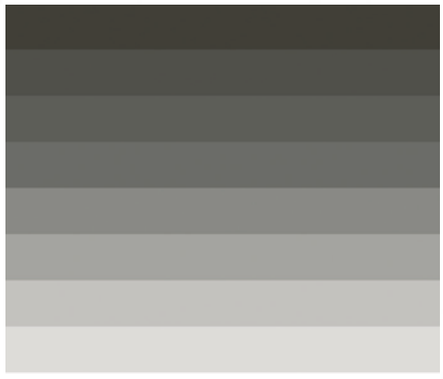
I prefer to talk about the process, the thousands of attempts at approximation. With time, those who persevere will arrive at a fundamental realisation, namely that drawing is inextricably bound up with the senses and that thinking and perception are inseparably linked ways of being in the world.



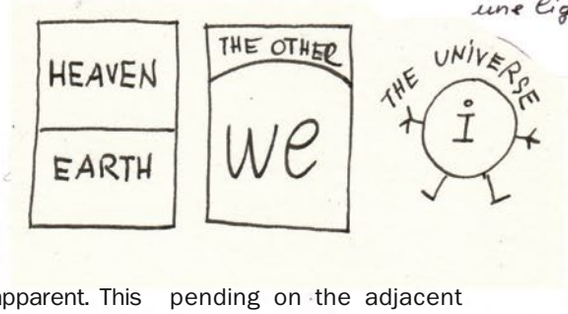
The line remembers how we walk, run, hike. It's even capable of giving scaled renditions of these movements. It can instruct the hands because it understands how they think.

It forms as it feels. Siri Hustvedt writes: *'When I draw what I see, I touch the thing I am looking at with my mind, but it is as if my hand is caressing its outline.'*

Siri Hustvedt, 'Notes on Seeing,' in: *Living, Thinking, Looking*, London and New York 2012, p. 227



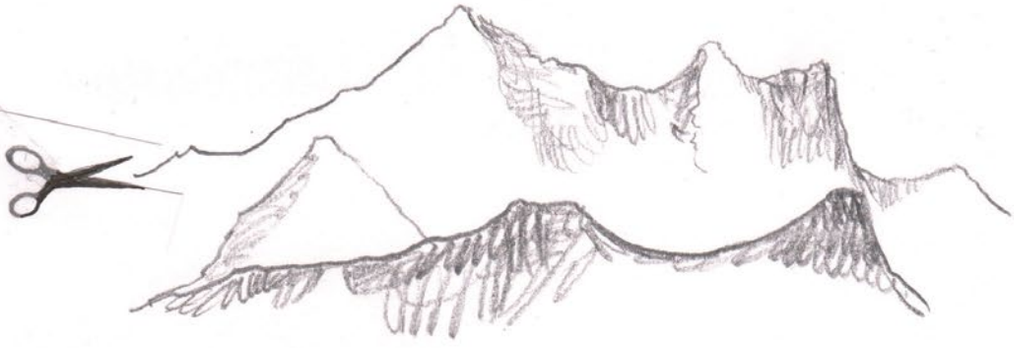
Now consider that there are in reality no lines at all. Every line is an idea, a boundary, lines show the extent to which we think in categories.



In 1865 physicist and philosopher **Ernst Mach** observed the following phenomenon: on a surface made up of various tonal values, the eye amplifies the contrast in places where step changes are apparent. This phenomenon can be observed most clearly in Mach's ladder. The strips on the ladder (above) have consistent tones, but their edges seem darker or lighter depending on the adjacent tone. The eye finds it easy to identify clear boundaries. It becomes impossible when one tone transitions smoothly into another, as with any kind of gradient.

In case you ever wondered, the nose shows the clearest contrast in profile, the eye when seen from the front. That's why those views are easier to read. They knew this in ancient Egypt, and the authors of comic books know it too. That's why the combination is so widespread. If you turn the principle on its head and combine the side view of an eye with a frontal view of the nose, the result looks very strange.

After Picasso's
Portrait of Marie Thérèse
1983

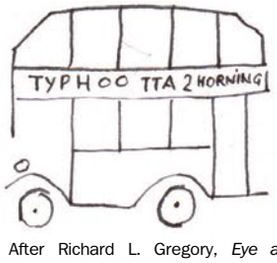


Identifying contours is one thing, but recognising and distinguishing between movements, objects, faces, emotions and so on is something altogether different. Visual awareness emerges incrementally in an increasingly complex sequence of perceptual processes. Abilities like those we've just mentioned are found throughout the animal kingdom. What makes us humans unique is language, and that doesn't begin with someone following a contour with a finger. Language starts when someone draws a contour though there's no cloud present.

Psychologist R. L. Gregory gives an account of S. B., a patient with a cataract (blindness due to a clouded lens) who wasn't operated until he was middle-aged.

He spends his whole life looking forward to the moment when he'll be able to see. After the operation, his vision remains blurry at first, but he soon impresses the doctors with his ability to find his way around (he often used to walk without a stick, despite the risk of falling). When he looks out the window, though, he can't judge the distance.

He's amazed to think that he might be able to reach out and touch the road. He sees a quarter moon for the first time and realises it doesn't look like a quarter slice of pizza. He draws a bus and it lacks the parts that he's never touched or set foot on.



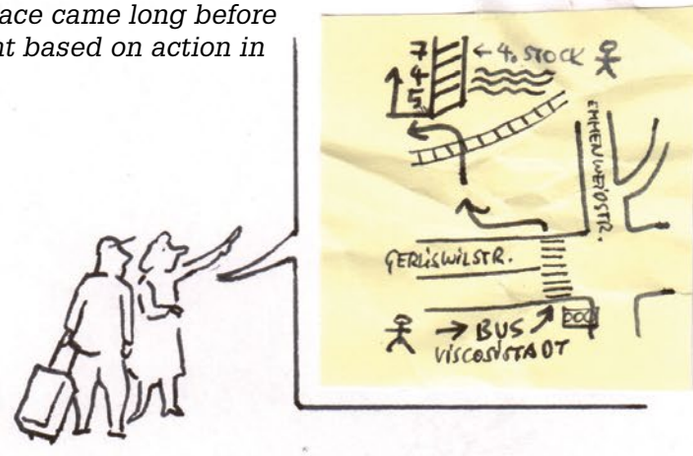
After Richard L. Gregory, *Eye and Brain: The Psychology of Seeing*, Princeton and Oxford 1966, p. 153

Writing capital letters is easy because he learnt how they felt at kindergarten, whereas the lowercase letters would always be hard for him.

The phenomenologist Maurice Merleau-Ponty describes perception as follows: *'To perceive is to render oneself present to something through the body.'* Tversky elegantly explains the origins of thought as follows: *'Constant motion in space is a given, the background for everything that has happened and that will happen. No wonder it is the foundation of thought. Action in space came long before language, as did thought based on action in space.'*

Maurice Merleau-Ponty, *The Primacy of Perception and Other Essays*, ed. by James M. Edie, Evanston, IL 1964, p. 42

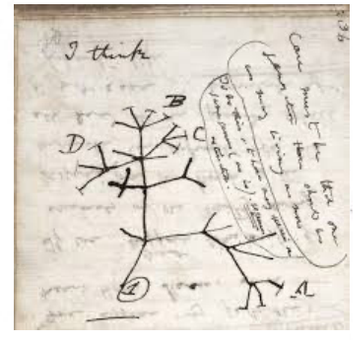
Barbara Tversky, *Mind in Motion: How Action Shapes Thought*, Stanford 2018, p. 1



If a stranger asks me for directions, I reply with a drawing. As a local, I know where I'm currently standing and I know the way I came. Children can read and draw maps from an early age. It's something they learn on their own.

It's possible to describe a face in writing in such a way that the reader gets a vivid impression of the person. But only a picture can achieve a resemblance and instant recognition. Spatial relationships, physical peculiarities, impressions of forms and surfaces, relative proportions – none of these things can be captured in words. In fact, they can't even be conceived in words.

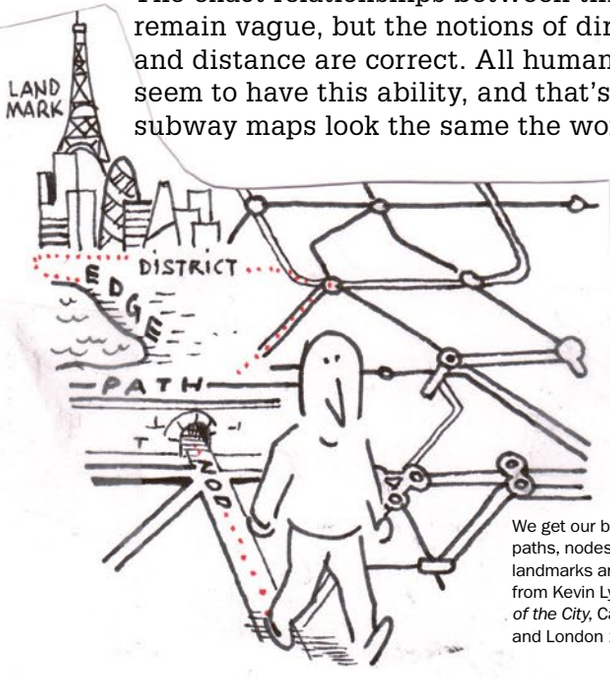
If we compare a verbal description of a wanted person to a police sketch the former falls short on recognisability and resemblance.



Diagrams, building plans, maps and ornaments – we grasp and understand these things spatially and intuitively. Darwin placed two words above his sketch of evolutionary theory: 'I think.'

When we walk, run or stroll, we're traversing two spaces simultaneously: the first is real and exists outside us, whereas the second is a map of the mind. On these mental maps there are special features, paths, roads, junctions, environments.

The exact relationships between things remain vague, but the notions of direction and distance are correct. All human beings seem to have this ability, and that's why subway maps look the same the world over.

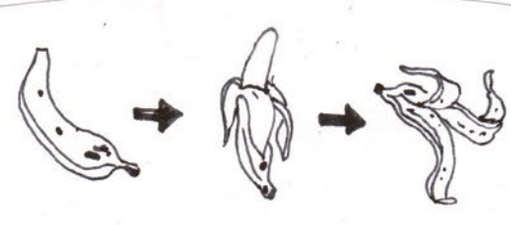


We get our bearings from paths, nodes, edges, landmarks and districts; from Kevin Lynch, *The Image of the City*, Cambridge, MA and London 1960, pp. 46–48

Subway maps: When travelling by train or bus, do you count the turns or the interchanges?
At what point do you start estimating the length of a journey in terms of time rather than distance?
Public transit maps are not geographically accurate. They don't have to be.
Harry Beck, the man behind the first modern subway map, took his inspiration from switchboard plans. All relevant information (direction, interchanges, stations) can be shown on a network of horizontal, vertical and diagonal lines. This principle has been adopted all over the world because spatial perception works the same for everyone.

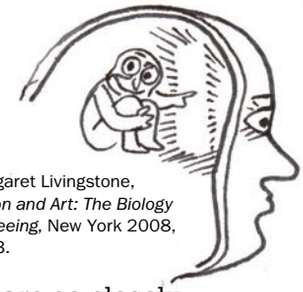
Organising time as a series of images: Given three images representing a temporal sequence, anyone can put them in order to make a series that's legible, usually in the direction of reading, i.e. from left to right or from right to left, depending on the culture. Aside from the indigenous people of Australia, who lay them out without regard to the position of the observer, namely in line with the path of the sun, from east to west.

In our thinking, space functions as a metaphor for concepts as different as time, relationships, hierarchies and ideas.
When we're discussing things, we 'lay out' our arguments, we 'dispatch' arguments or we 'take them on board' if we're listening.
For us, time is like a river or a stream – it flows by.

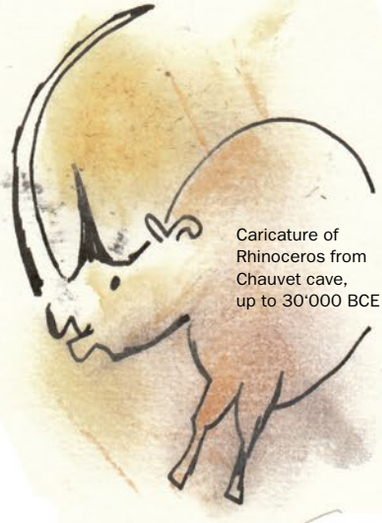


Lera Boroditsky, *How Does Language Shape the Way We Think?* New York 2009

According to Margaret Livingstone, a neurobiologist who looks at art as a way of studying neuronal behaviour, '*vision is information processing, not image transmission*.' So there's no one looking at images up there.



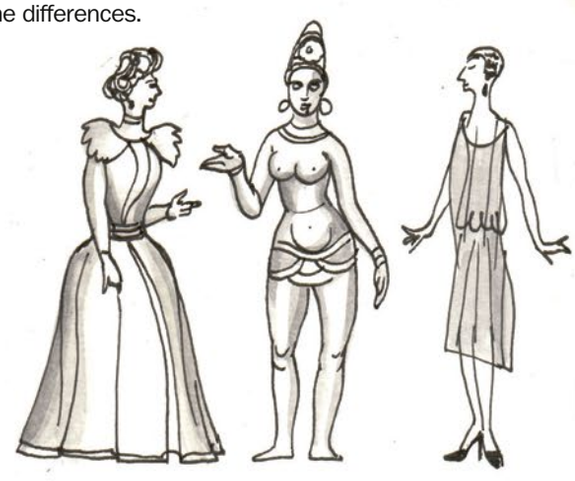
Margaret Livingstone, *Vision and Art: The Biology of Seeing*, New York 2008, p. 53.



Caricature of Rhinoceros from Chauvet cave, up to 30'000 BCE

Consciousness and seeing are so closely interwoven that it's hard to conceive of the one without the other. From the way we speak, the way we draw, it's possible to read how we think. Processes become visible. That's why those of us who do draw speak of thinking in images. Livingstone adds that the artists are well ahead of the scientists when it comes to seeing. I'd like to give just a couple of examples here.

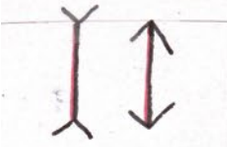
Reduce overload:
It's easier to recognise someone from a caricature than from an accurate drawing. The latter contains an over-whelming amount of detail whereas the former compares the subject's face to the average and omits everything but the differences.



Emphasise difference:
A thousand years ago, here and now, all over the world, whether in statues, fashion or comics, whenever representations highlight things by exaggerating them, they tell us more about mental processes than they reveal about real life. Visual stimulation is more exciting than reality, says V. S. Ramachandran, who calls this phenomenon 'peak shift'.

Above: fashion illustration, ca. 1890 and 1925.
Standing Parvati, unknown Tamil artist, early tenth century BCE.

Vilayanur S. Ramachandran, *The Tell-Tale Brain*, Noida 2010



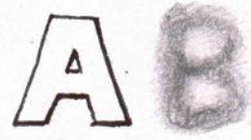
The Müller-Lyer illusion (both lines are the same length) only works for people who encounter straight lines on a day-to-day basis.

A system is emerging. In processes, patterns and symbols like these I see a universal grammar of drawing.* Is there such a thing as a universally comprehensible pictorial or visual language? No! The preconditions for that would have to exist from birth, and the processes of visual perception develop differently depending on social and environmental conditions. The brain is plastic. It adapts. We differ not just in culture and language but also in the way we see.

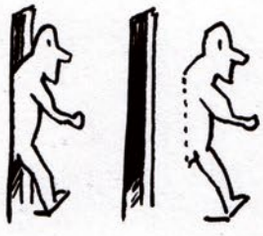
* Clarification: I only speak of grammar when something also works in the abstract, i.e. without figurative representation.

A couple more examples here. We'll call them elements of visual perception:

Single-point Perspective:
The figure on the left seems both further away and larger.



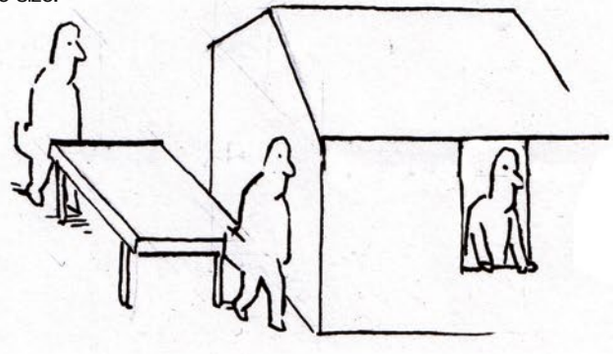
Occlusion:
There's still a whole figure coming through the door.



The half figure is just too unlikely.

Haze:
'A' seems closer to the beholder than 'B'. Reducing contrast and leaving edges unsharp, as though looking through a fog, creates the impression of proximity and distance.

In **Isometric perspective**, which is common in Asia, both figures appear the same size.



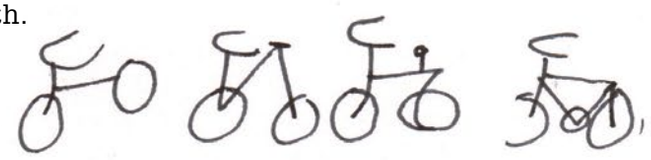
Light and Shadow:
The spot under the circle makes it look like it's jumping.

… I could go on and on.

Pierre Thomé

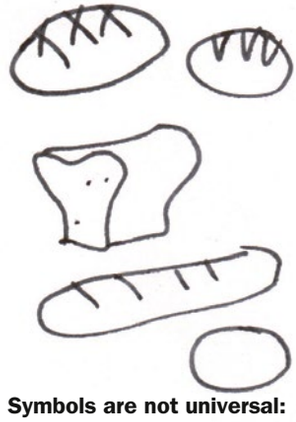
$O = 4 \cdot \pi \cdot r^2$

Drawing happens between two absolutes: pure seeing and pure idea. On the one hand the actual retinal phenomenon, on the other the abstraction, the symbol. Every drawing has something of both.



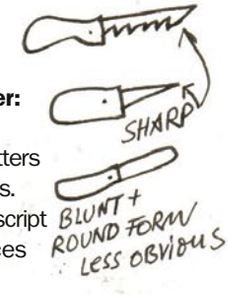
Pictographs as radical simplification: What matters is legibility, something like the above will do. Not the specific but the general, not the singular but the category. Logic and functionality are not required; as code, the bicycle doesn‘t need pedals.

Children seem to learn how to draw symbols on their own. At that age they’re not interested in the ‘realistic’ representations of grown-up art. Since the brain has only limited resources available to it, it needs to be able to react immediately in order to survive. According to physicist and author Leonard Mlodinow, this explains why we lack both the time and the mental bandwidth to attend to every little detail in life. It’s easier to say ‘fruit’ than it is to say ‘apples, pears, grapes, bananas and so on.’ I can draw a banana quicker than I can write the word, but it gets a bit more difficult with a bunch of flowers.



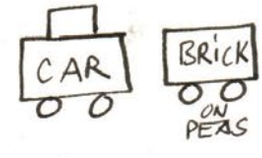
Symbols are not universal: When I ask students to draw a loaf of bread, they all use the same graphic elements – an oval with two or three strokes – except for those students who grew up in other cultures, for example those from England or China.

Symbols stand for categories, and these comprise a variety of things under a lowest common denominator – such as ‘characteristic’, ‘phenomenon’ or ‘usage’.



Group things together: These characters represent the same letters in a variety of typefaces. Using a single type of script reduces the differ- ences and emphasises commonality. Using different typefaces makes reading more difficult. This is what reading feels like for people with dyslexia.

Leonard Mlodinow, Subliminal: *How Your Unconscious Mind Rules Your Behavior*, New York 2012



After Xu Bing „Book from the Ground, From-Point-to-Point“, Stanford, 2012.

Pictograms as language: *Book from the Ground* by Chinese artist Xu Bing is a narrative in pictograms, which anyone can read. It takes a bit of getting used to, but the story is told with nothing but internationally recognised signs, symbols and logos. People who haven't learnt how to read them understand very little of it.

When I talk about drawing as a language, many people think of such icons and ideograms because they believe they're universally comprehensible, that they transcend borders – But they don't. Drawing can do so much more than that.

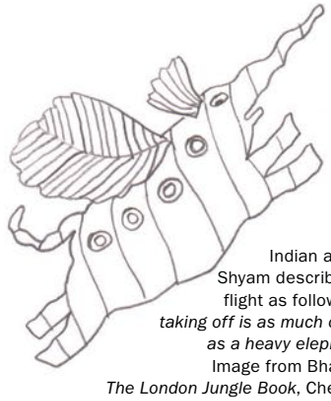
Still, couldn't a story theoretically be told in pictograms in the way the Chinese write with ideograms? No, the possibilities are too limited. Images and words come from two different worlds. They can't replace each other. As comics show, though, the visible and the abstract complement each other wonderfully. A combination of the two is something greater than the sum of its parts: the comic.

Ideograms after the poster *'Tree Wood Forest,* by Ryuichi Yamashiro (1955) .

Grammar of icons: Can new meanings be created by combining things? The Chinese radical for 'tree' becomes a wood or forest when doubled up. The stroke to the right of the first radical is shortened so that the two adjacent 'trees' can move closer together. In the same way, three cars are read as a traffic jam.

However much we represent the visible world or confine ourselves to ideas, Ludwik Fleck is right to say: *'We look with our own eyes, we see with the eyes of a collective body.'* People from every culture use symbols. That they have in common. But let's read the differences – only then does it become clear how every symbol represents not just a thing but also a conceptual model, a specific thought world.

Ludwik Fleck, 'To Look, To See, To Know' [1947] in: *Cognition and Fact: Materials on Ludwik Fleck*, ed. by Robert S. Cohen and Thomas Schnelle, Dordrecht 1986, pp. 129–151, esp. p. 134



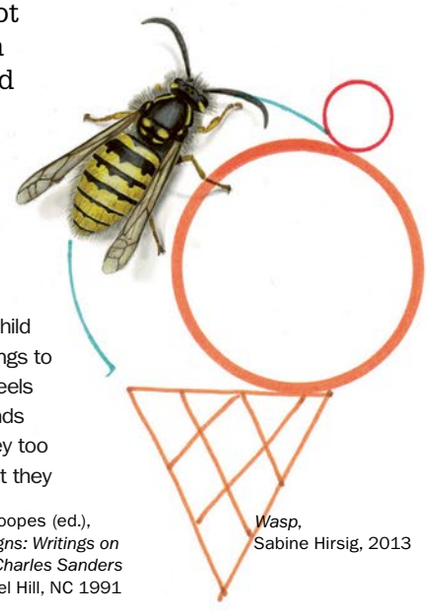
Indian artist Bhajju Shyam described his first flight as follows: *'A plane taking off is as much of a miracle as a heavy elephant flying.'* Image from Bhajju Shyam, *The London Jungle Book*, Chennai 2004

This sketch after **Hiroshige** illustrates an aesthetic ideal, an equilibrium between void and solid. The same ideal can be found in the way trees are pruned in Japanese gardens.

When we read images we give more consideration to how the environment in which a person lives, works or studies shapes the way they see and represent the world.

In India I was struck by the realisation that we've become accustomed to drawing trees without birds. The Varli are a tribal community with a visual language of their own. It expresses the environment in which they live and a philosophy according to which people and plants and animals live in harmony with each other. Nothing in their drawings overlaps – everything has a place.

I don't believe that meaning can exist without form – whether it's an image or a pictogram. On the contrary: if the form changes, so does the meaning. For Peirce, everything begins with the interaction of person, object and symbol. Meaning is not a given. There is no knowledge without a confrontation between object, symbol and self.
For me, the triadic process described by Peirce is the essence of drawing – as a language and a mode of cognition.



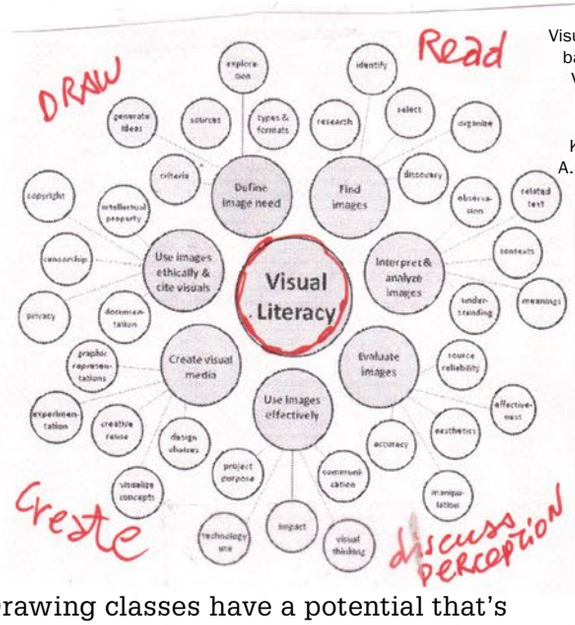
Wasp, Sabine Hirsig, 2013

The triadic process

Peirce explains it like this: the child is at one with its surroundings and is not yet self-aware. A pain like a wasp sting is a sign (signal) to the child. From this the child concludes that something like error must exist. And from this the child infers that the error belongs to a self, and that the self feels pain. The child understands that wasps exist, that they too like sweet things and that they sting.

James Hoopes (ed.), *Peirce on Signs: Writings on Semiotic by Charles Sanders Peirce*, Chapel Hill, NC 1991

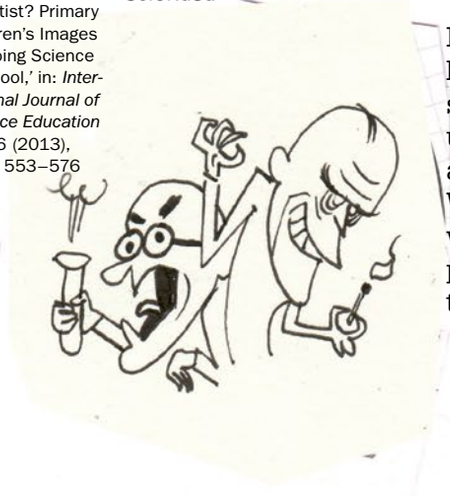
Everyone agrees. There are just too many images, and a torrent of new ones is being added every day. We live among them as we live among houses and people, with all our ambitions and desires, our hopes and our fears. Although we know they're powerful, we remain powerless in face of them. They speak to our fears and desires, they are incredibly attractive. Which is why it worries me to see that drawing is increasingly being marginalised in school timetables. Doesn't drawing offer a direct and intuitive path to visual education? Isn't it more important than ever that we have visual literacy skills, that we know how to read images, understand how they work, identify their intentions and conceptual models?
And don't we learn and remember these skills better by practical experience than by verbal communication?



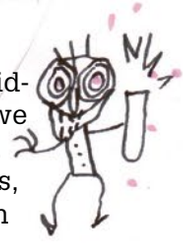
Visual Literacy Array based on ACRL's Visual Literacy Standards by D. Hattwig, K. Bussert and A. Medaille, 2013

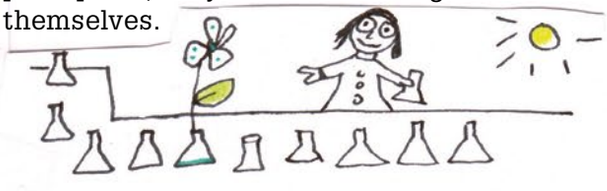
Draw A Scientist Test (DAST): How do media images affect our understanding of things? The DAST is a popular test in which school pupils are asked to draw pictures of scientists. A 2015 study from Singapore demonstrates how the media have affected the view of scientists among nine- and ten-year-olds. Almost a third of the boys drew the stereotypical image of a dangerous mad scientist.

Junqing Zhai, Jennifer Ann Jocz and Aik-Ling Tan, 'Am I Like a Scientist? Primary Children's Images of Doing Science in School,' in: *International Journal of Science Education* 36 (2013), pp. 553–576



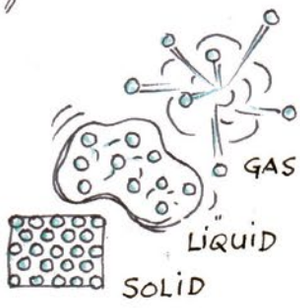
Drawing classes have a potential that's based on encounters with reality. When stereotypes and media clichés meet individual experience it becomes apparent how we absorb new ideas along with new images. When school children recognise influences, when they compare clichés with their own perception, they learn something about themselves.



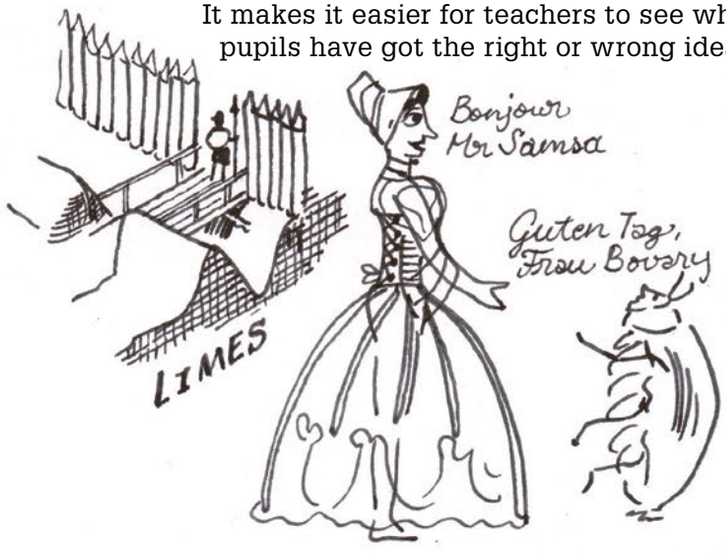


How did we overlook how the teaching of drawing in schools was slowly abolished, from one reform to the next? How could it be better integrated into the timetable? I'm thinking of subjects like history, geography, biology, chemistry, physics, geometry, literature – to name but a few – where drawing could help young people find other approaches to learning.

Most people learn visually, and drawing helps them reduce complexity. Lessons involving drawing are more exciting and engaging for children and young people. It makes it easier for teachers to see when pupils have got the right or wrong idea.



A graphic artist in the classroom can show how intuitive physical learning can be combined with symbolic verbal learning. How lessons learnt can be deepened and consolidated by the creative process. Because when you draw something, you remember it with both your mind and your hand.



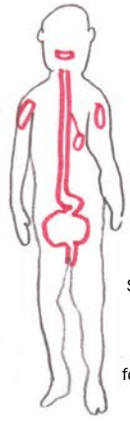
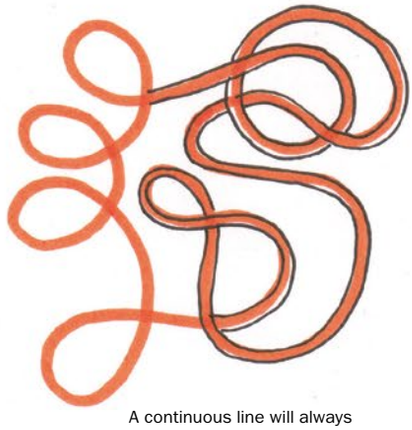


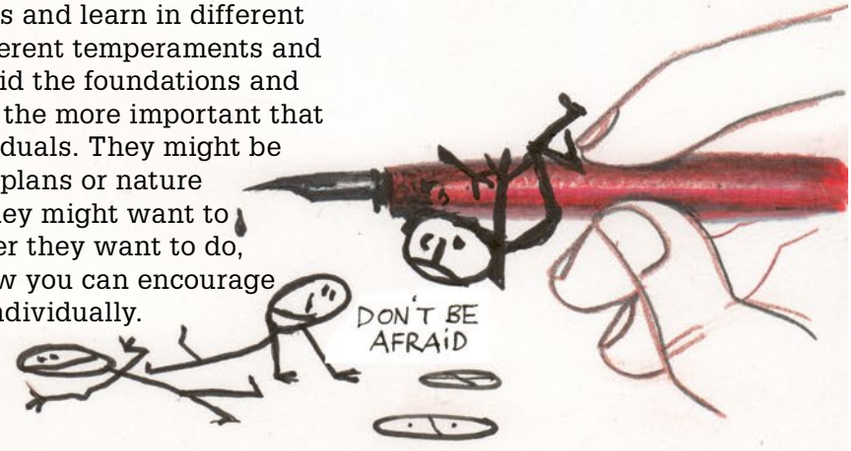
Image from Anne Goldsworthy, 'Making Science Come Alive' 2016, Navarra. Published in: New Directions in Content and Language Learning for Science and Technology.



A continuous line will always alternate between passing over and under itself when it crosses its own path.

That's a good start.

People have different talents and learn in different ways, just as they have different temperaments and interests. So, once you've laid the foundations and taken the first steps, it's all the more important that you identify paths for individuals. They might be interested in diagrams and plans or nature studies and observation. They might want to make comic books. Whatever they want to do, you have to ask yourself how you can encourage and support each student individually.



Possible criteria:

– precise observation, careful examination

– trying different instruments

– willingness to explore multiple variations of an idea

– understanding your own intentions

- understanding ambitions: imitation, mastery of technique, or the authenticity of an experience

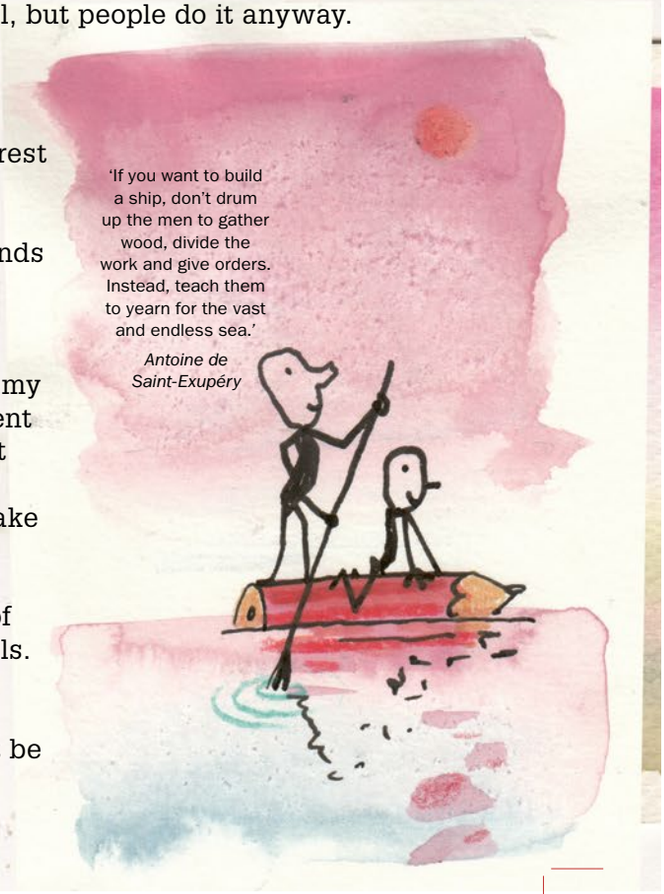
No one has to follow the rules and examples I've presented in this article. I'm about emancipation, not imitation. I want to see people taking a small step towards individual empowerment and making their own voices that little bit stronger. People who bend these rules or ignore them entirely will certainly learn more than those who blindly follow them.

And when I say that anyone can draw, that doesn't mean everyone can draw well. Not everyone can sing and dance well, but people do it anyway.

I'll be happy to have awakened some interest and shown what's possible. There are criteria even for beginners. Someone who teaches something without making demands is in danger of not being taken seriously.

'If you want to build a ship, don't drum up the men to gather wood, divide the work and give orders. Instead, teach them to yearn for the vast and endless sea.'

Antoine de Saint-Exupéry



I'll close with a childhood memory. In my third year at school my teacher picked up my brush and showed me how to get a gradient and conjure up a night sky. It was the first time I'd seen a teacher draw anything. If you can demonstrate something, you'll make people curious. That's why my advice to every teacher is to pick up a pen or brush and get started. And never demand less of yourself than you'd expect from your pupils.

For example: don't be afraid to try new things, don't be afraid of failure and don't be afraid to embrace the joy of learning.

Between Dream and Reality: Creating Art in VR

Zoe Röllin

In late August 2023 I embark on an eight-hour train journey that takes me from Zurich via Milan to Venice, where my virtual reality movie *Perennials* is set to debut at the 80th Venice International Film Festival. *Perennials*, a seventeen-minute animation, is the culmination of four years' work as a freelance VR artist. It's also my debut as a director and writer.

In the halls of the Lazzaretto Vecchio, a small artificial island just off the coast of the larger Lido – where the grand cinemas and red carpets of the main festival are located – the forty-three works selected for the Venice Immersive section await their viewers. The screenings are nearly fully booked, with as many VR professionals attending as general festival-goers. Venice Immersive is a significant gathering place for the VR scene in Europe and beyond. There's a palpable sense of community and excitement in the air, but between all the panels, creator talks and pitching sessions there's an underlying tension running through the crowd. Recent economic and technological developments have made the future of VR uncertain.

I first discovered the world of VR art in 2017, when Australian artist Sutu led a one-week workshop titled «Drawing a Visual Narrative in Virtual Reality (VR)» as part of the Fumetto Comic Festival in Lucerne. Essentially it was an introduction to tools that allow users to create art that's both shown and drawn entirely in VR. Wearing a VR headset, the artist is placed in an empty virtual room, a blank canvas. The controller functions as a digital brush, to be moved freely through the air, creating three-dimensional strokes that can then be bent, recoloured, thickened and moved around. The process is a mixture of drawing, sculpting and 3D modelling, and although there are more polished and complex programs for each of those disciplines outside the headset, VR offers a refreshingly intuitive approach to creating digital 3D art. Instead of having a model depicted on a 2D screen, once again reducing its dimensionality, the user can view it in virtual space just as they would view a sculpture in real life, with the ability to walk around it, lean in and use their own two hands to guide the tools.

Quill, the VR drawing program I eventually chose to specialise in, also offers an array of animation and sound integration options. It's an all-in-one tool for creating VR narratives directly in the medium.

VR storytelling comes with its own unique challenges and possibilities. A 360-degree arena is a huge space for a narrative. The work of a VR artist often centres on guiding attention, a careful balancing act between giving the viewer the freedom to explore their surroundings and making sure they don't miss any of the events that drive the story forward. But there's a lot of variation across this spectrum, with some works providing more guidance and others allowing more freedom.

Perennials aims to tell a linear and character-focused story with a lot of subtle moments that could easily be missed, so it leans away from game-like interactions and exploration. It focuses on using VR's deep sense of immersion to heighten emotional aspects of the story while also translating some very filmic shots and camera techniques into VR. A range of visual storytelling techniques guide the viewer's gaze through the scenes where necessary. It's all about contrasts: more or less information, motion and stillness, light and dark.

Works such as *From the Main Square* by Pedro Harres, the runner-up in last year's Venice Immersive competition, are structured much more around the concept of discovery. Placed in the centre of the main square of an emerging city, the viewer watches countless stories and conflicts unfold all around. Some clever touches are used to ensure important beats aren't missed: in an interview with Kent Bye for the *Voices of VR* podcast, Harres reveals that this work actually tracks which part of the panora-

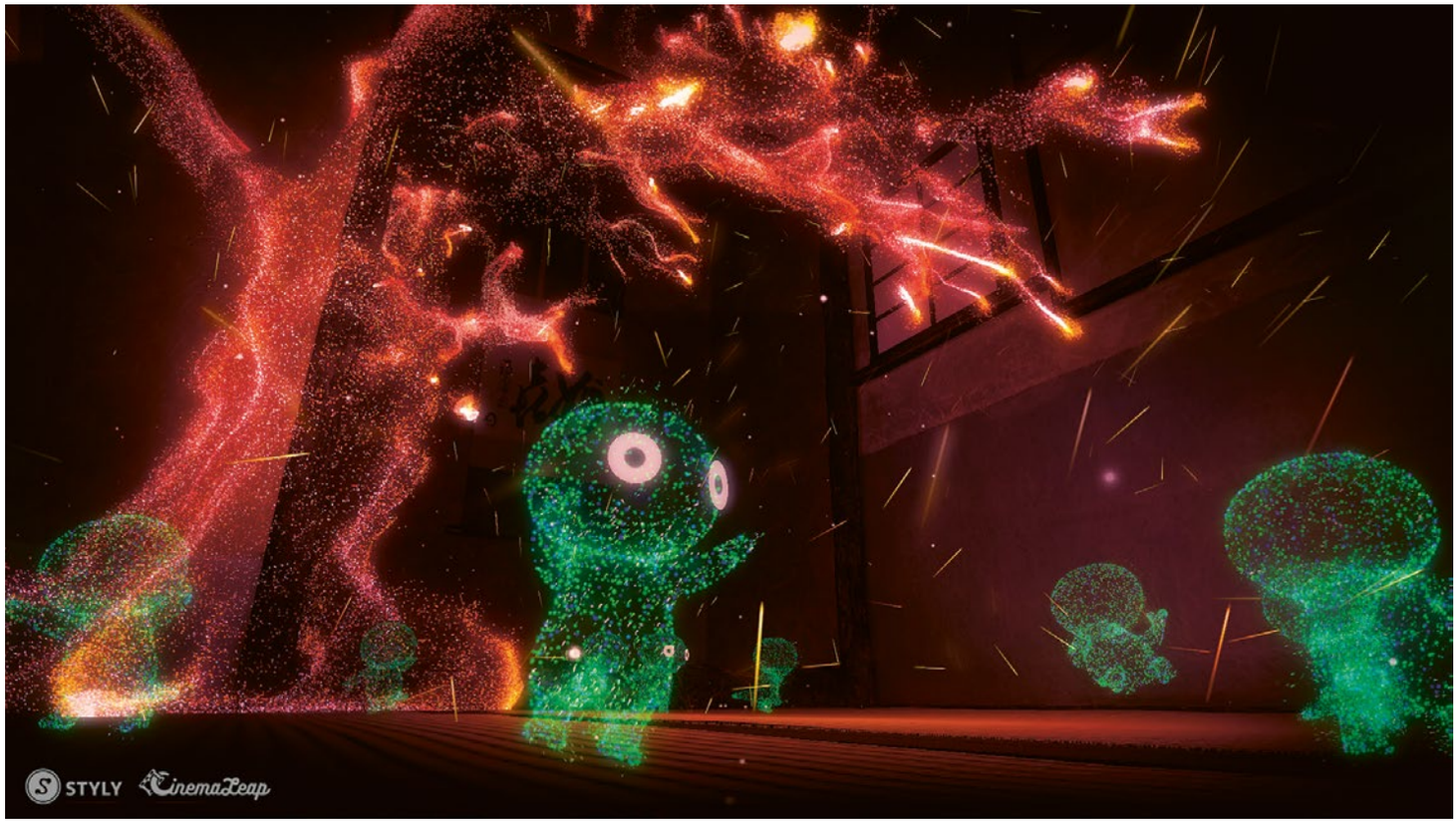
↗ **Fig. 1 Pedro Harres (director), *From the Main Square* (still), VR, 2022 Copyright: Pedro Harres**

→ **Fig. 2 Celine Daemen (director), *Songs for a Passerby* (still), VR, 2023 Copyright: StudioNergens**

ma the viewer is looking at and only triggers certain events once they're certain to have been seen.[1]

When different modes of interaction and additional technological tools are present, an even broader range of VR experiences opens up, some firmly situated in the realm of video games, involving puzzles and tasks and point-scoring, others more experimental and hard to categorise. *Sen* by Keisuke Itoh is a meditative experience in which several users are asked to partake in a virtual Japanese tea ceremony, holding a cup that gently vibrates to the beat of their own heart, which is tracked by a smart watch. In Swiss artist Patrick Muroni's upcoming work *Rave*, the story only progresses if the user is actively dancing. For the winning project in this year's Venice Immersive competition, *Songs for a Passerby*, director Celine Daemen set up several cameras in the big installation space to record the user, who was ultimately able to see their own digital image in the experience and so observe themselves at different fleeting moments.

While the beginnings of head-mounted VR displays go as far back as 1960, when US-American VR pioneer Morton Heilig patented what he called the «Telesphere Mask», VR as we know it today has only really been accessible since the middle of the past decade, particularly with the release of the Oculus Rift and HTC Vive headsets



↖ **Fig. 3 Keisuke Itoh (director), *Sem* (still), VR, 2023 Copyright: CinemaLeap**

← **Fig. 4 Patrick Muroni (director), Mélanie Courtinat (3D animation), *Rave* (still), VR, forthcoming 2024 Copyright: Patrick Muroni Mélanie Courtinat**

in 2016.[2] The world of VR is still young, and many of its storytelling capabilities are yet to be explored. There's something uniquely fascinating about watching a medium grow as both the technology and its creative users evolve. Even in the realm of more filmic, non-interactive VR animations there's a constant sense of discovery and progress. Looking at the works created in Quill over the last four years – since the introduction of more advanced animation options with the major 2.0 update – a steady evolution is evident, particularly in the use of cuts and camera movements. Artists who work with Quill are honing their craft and learning how to work around one of VR's big hurdles: the sense of discomfort and nausea when the world around the user moves too fast, in an unsteady way or just without the delicate control that seems to be needed.

The novelty of the field has also brought with it a series of unexpected professional opportunities for creators like myself. *Perennials* was funded and produced by media giant Meta which, having acquired Oculus in 2014, has become one of the most influential players in the field of VR. When I first received the invitation to pitch an original story to Meta in 2020, the opportunity seemed quite unreal. Though I'd done a handful of VR projects, I was only two years into my career as a freelancer. There seems to be an openness to working with young, emerging artists, which is very much in the spirit of this new, unestablished medium. In many ways, *Perennials* was a dream project.

Between the red carpets, panel appearances and high-profile interviews, Venice now feels like a bit of a dream as well. But as *Perennials* is being shown to its first viewers, I can't help but wonder what the future holds for VR. Economically speaking, VR is in an awkward position. The grandiose corporate talk of it being the future of media and of humanity soon living in the metaverse is at odds with the fact that there are still not that many active users and few channels for the monetization of content. While Meta has sold more than twenty million of its most popular Quest headsets, they struggle with user retention.[3] Regular use of VR headsets is not nearly as widespread as many companies and investors would wish, and the structures needed to bring VR experiences to the wider audience of people who don't yet own headsets are not yet in place.

On the horizon, though, is Apple's Vision Pro, the company's first venture into the field of VR. A mixed reality (XR) headset with both VR and augmented reality (AR) capabilities, the Vision Pro captures the user's surroundings with a series of cameras and sensors. Looking at Apple's promotional video, the marketing for the Vision Pro is much less focused on gaming and entertainment and instead showcases its applications for work and everyday life.[4] The advanced eye-tracking technology is shown efficiently navigating the user's favourite apps. Facetime calls take on a new immersive quality. The high-res cameras in the front of the headset can be used to record 3D videos of family vacations and children playing. Apple seems to want to make this headset a permanent feature of our daily lives. Whether that vision proves successful (or desirable) remains to be seen.

{ Humanity, after all, has an endless [curiosity] for exploring *virtual realms* and pushing at the boundaries of what's // possible, for better and for worse. }

I won't try to predict where technological and economic developments will take VR in the years ahead, but I have no doubt that the medium will keep evolving. Humanity, after all, has an endless curiosity for exploring virtual realms and pushing at the boundaries of what's possible, for better and for worse. Seeing the works in the Venice Immersive competition – a vibrant mix of magical adventures, deeply empathetic documentaries and fascinating technological experiments in storytelling – I can say wholeheartedly that I'm very excited to see what the future holds for art in virtual reality.

1 Kent Bye, «Interactive Animation of Polarized City ‹From the Main Square› Wins 2nd Prize at Venice Immersive 2022», on: *Voices of VR* (23 Sept. 2022), podcast #1123, www.voicesofvr.com/1123-interactive-animation-of-polarized-city-from-the-main-square-wins-2nd-prize-at-venice-immersive-2022/ (retrieved 4 March 2024).

2 Holly Brockwell, «Forgotten Genius: The Man Who Made a Working VR Machine in 1957», on: *Techradar* (3 April 2016), www.techradar.com/news/wearables/forgotten-genius-the-man-who-made-a-working-vr-machine-in-1957-1318253/2 (retrieved 27 Dec. 2023).

3 Alex Heath, «This is Meta's AR/VR Hardware Roadmap Through 2027», on: *The Verge* (1 March 2023), www.theverge.com/2023/2/28/23619730/meta-vr-oculus-ar-glasses-smartwatch-plans (retrieved 30 Dec. 2023).

4 Apple, «Introducing Apple Vision Pro», on: *YouTube* (5 June 2023), www.youtube.com/watch?v=TX9qSaGXFyg (retrieved 30 Dec. 2023).

On Power Plants, Parrots and Young Blue Peacocks

Q&A with Ruedi Widmer and Sören Schmeling

Ruedi Widmer works as an illustrator and cartoonist for serial publications including the weekly *WOZ,* the daily *Tages-Anzeiger,* the Winterthur *Landbote,* the satirical magazine *Die Titanic* and the comic *Das Strapazin.* For around two years he's been conducting light-hearted experiments with the AI-based text-to-image tool Midjourney, and he's garnered a lot of media attention. He was invited to speak at the Lucerne School of Design, Film and Art in the context of the «History of Visual Media» lecture series, where he was introduced by Agnès Laube. He gave a short lecture before taking questions from students and co-lecturer Sören Schmeling, who moderated the discussion (figs.1 and 2).

Lukas Müller (studying digital ideation): If I understand correctly, prompting, the way you use an AI, is a specific skill. How did you acquire it?

Ruedi Widmer: I just gave it a go – learning by doing. At some point I noticed that the more description I put in, the more I got out. You can even input the perspective of the image. So it presupposes certain linguistic skills, and you have to be able to describe things accurately. The possibilities would be even greater if you could prompt with a quick sketch.

Ermin Zoronjic (studying digital ideation): You said you started out with certain concerns in relation to AI. How do you see that now?

Ruedi Widmer: I'm still concerned about the social implications, but that's going to affect many professions, not just illustration. At the same time, though, I stopped worrying about it when I realised it's just a tool that's useful to me as a designer. You soon realise you can get some pretty impressive effects without all that much effort, but if – like you – you're creative and talented, you'll be able to make better stuff than most. What's worrying – and you just have to ignore this when you're working with Midjourney – is that there are other people producing endless images all the time and all over the world. Most of them are dramatic war scenes and fantasy images. But when something interesting does come up, you start to sense that you might be able to do something better. The huge scale of image production is still scary, and I don't know what that means for the future of illustration. One hope would be that AI becomes a kind of assistant that knows exactly how you draw and can help you with it. But that would need to be password protected, a private AI that learns

{ The *huge scale* of image production is still ==> scary, and I (don't know) what that means for the future of illustration. }

↑ **Fig. 1 The History of Visual Media lecture series, 31 October 2023, with Ruedi Widmer, Agnès Laube and Sören Schmeling, with *Kraftwerk Generated as Parrots* in the background Photograph: Samuel Bertschart**

↑ **Fig. 2 The History of Visual Media lecture series, 31 October 2023, with Ruedi Widmer, Agnès Laube and Sören Schmeling Photograph: Samuel Bertschart**

↗ **Fig. 3 Ruedi Widmer, Telecom Advertisement, Smart Phones, 2023**

from you and which you benefit from. And that's still way off in the future. Generally I don't think this tendency is a good thing, but it's not going anywhere, so we need to deal with it.

Sören Schmeling: Despite this scepticism you've been drawing digitally for around twenty years and experimenting with AI for almost two years. Why do you use this technology?

Ruedi Widmer: It's a huge contradiction. I started using it early on and thought it might be interesting for a while. I take big breaks in between. Other than one fake advertisement for phones (fig. 3), I've never used an AI-generated image in my cartoon work, though it would be legitimate to do that because we're always looking at images for inspiration. But there are now issues with copyright – many artists have submitted complaints.

Sören Schmeling: You said before that AI can't yet imitate your drawing style. Do you think signature styles are going to become more important?

Ruedi Widmer: I thought we'd soon see an analogue counter-movement, that the original and the analogue drawing would start to become more important again and that the digital image was dead at last. But it may be you guys, who are just starting to find your voices under the influence of these developments, who will have to instigate the anti-movement. There may be media that don't use images from AIs. If they use images made by humans, they'll be more expensive. AI illustrations will then be used by the free magazines with readerships that don't value images so much. That would be problematic. As emerging illustrators there's no doubt that you'll use AI at some point. It's the same in pop music. These days hardly anyone would ask whether an acoustic guitar was artificially generated because they don't

sound as artificial as they used to, yet music is still perceived as artistic work. It may be the same with AI illustrations. It can be dogmatic and even pointless to impose too many limitations. Perhaps that's a good reason to demonstratively earn your status as an author. You can get more digital once you're established.

Agnès Laube: In the mid 1980s there was a big push towards digitisation and we started to see vector illustrations appearing. Then, around the year 2000, the first fatigue fractures started to show and the «more authentic» illustrations made a comeback. Now we're in a new situation entirely. You don't draw so much as have things drawn. Is there a counter-movement, and if so, what is it?

Ruedi Widmer: It's probably too soon to say. It's still gathering. The main thing I've noticed is just how much AI is being used for text and web design. That really came in through the back door.

Agnès Laube: In our bubble we expect a lot of creativity. But there are many illustrators working for companies, working in advertising, where independent creativity is limited. To

↙ **Fig. 4 Ruedi Widmer, *Young Peacock,* 2023**

↓ **Fig. 5 Ruedi Widmer, *A Nuclear Power Plant in Venice Painted by Canaletto,* 2022**

↙ **Fig. 6 Ruedi Widmer, *Military Tanks and Rocket Crawlers Made of Yellow Swiss Cheese*, May 2023**

↓ **Fig. 7 Ruedi Widmer, *Kraftwerk Generated as Parrots*, 2022**

take your example of the artificial acoustic guitar, will we become accustomed to these new images, which are often as smooth as overwrought stock images?

Ruedi Widmer: The argument about coldness and smoothness was certainly true at the beginning, when a lot of stuff looked the same. That's changing. Images are becoming more differentiated, including representations of drawings. We're actually getting into the realms of expanded photography here. Even the content is developing now. With Midjourney, some inputs used to produce racist stereotypes. Now they're trying to counteract that with other generators. They need to be more diverse. Most of the developers live in California, where that culture's privileged. But what if such stereotypes were being driven by others? These image generators have a global influence on visual culture and they're not infallible. For example, if you input «young peacock» you get a smallish adolescent bird with blue feathers, though young peacocks are grey (fig. 4). These things spread incredibly quickly.

Sören Schmeling: You talk about the rate at which these fake images fly around media channels on the internet. How are people going to distinguish between fact and fake?

Ruedi Widmer: We already have this problem: more and more images of unknown origin causing trouble. Some of the companies selling plagiarised images have been sued. Commercial image databases and agencies react because they're losing work because it doesn't make sense to produce new stock photographs. They're using AIs on their existing stock so they can rule out the possibility of plagiarism for their clients.

Agnès Laube: If all our drawings were held in a database like that, prompters would be able to rehash all their contents and styles. Why aren't the artists and photographers standing up for themselves?

Ruedi Widmer: So far I've hardly seen any individual creative work in these programs, which is probably because the things I generate don't directly touch that area.

Sören Schmeling: How do you see your images of nuclear power stations (fig. 5) transported into various art historical epochs, your cheesy tanks (fig. 6) and the pictures of the band Kraftwerk in parrot costumes (fig. 7)? You've used Midjourney to realise your own funny ideas in a way that's no longer possible because of improvements in the program itself. Do you protect your images?

{ There are [many] areas + where AI is more effective than ==> humans, and these (professions) will have to adapt or disappear. }

Ruedi Widmer: You're right insofar as I'm touching on things in an overarching framework. So far I haven't seen anything by a defenceless individual that's been placed in another context. You'd have to refer specifically to illustration if you wanted to find cartoon artists. For images generated purely by AIs, such as the nuclear power plants, a ruling in the USA found that unmodified AI creations legally belong to them. I'd have to make some changes of my own, as with the logos on the mobile phones (fig. 8). But it would be embarrassing to exhibit these images under my own name. You can take a mindfart you scribbled down earlier and make a huge thing out of it in no time at all.

Agnès Laube: Why do companies like Midjourney do what they do?

Ruedi Widmer: Everything's still in development at the moment. I think primarily there's this tech attitude behind it: they're doing it because they can. Certainly they're going to start making more money soon, as with so many pioneering inventions – including the devastating ones. After that we'll see the creation of

← **Fig. 8 Ruedi Widmer, *iPhone in Retro Apple Macintosh Style of the 1980s*, 2023**

laws and guidelines, which should probably be a task for us, because our profession doesn't really have much political representation. But it also affects journalism, the publishing industry, the photographic professions, law and medicine. There are many areas where AI is more effective than humans, and these professions will have to adapt or disappear. A lot of people still have no idea what to do.

Andreas Zesiger (studying design management): You can see the negative side and talk about the end of art and creativity, but it's also the beginning of a period of innovation, a new generation. Maybe now's the time for illustrators to adapt to these conditions, to live with them, because that's how the future's going to be. On the other hand, I love my vinyl collection, my records from the '50s, '60s and '70s. They're staying, AI or no AI, even if the only musicians alive are making soundtracks to cat videos.

Agnès Laube: There will always be new media – like the printing press – and they'll usually cause major upheaval. In the art school context it makes sense to analyse the advantages and disadvantages for individuals – politically, economically and creatively. The main issues with AI at the moment have to do with data protection and copyright, which often lags about twenty years behind. So, for instance, you could organise yourselves into unions instead of adapting.

Andreas Zesiger: What I mean is, it's important to learn and not just reject new developments, otherwise you become obsolete, particularly as an artist. When someone like Joseph Beuys first started working with fat corners, the only people who understood what he was doing were those who already had some connection to art. You have to be willing to learn.

{ People also talked about the [end] of art // after the invention of photography, which was a *major rupture*, but in fact both media continued to develop. }

Ruedi Widmer: People also talked about the end of art after the invention of photography, which was a major rupture, but in fact both media continued to develop.

In art, the haptic became more important – the material, which appeals to multiple senses. The one thing that will go is all the work I had to do at the beginning of my career: illustrate this article and you get a hundred francs. I don't think anyone's going to do that anymore. So what use is illustration, purely economically? Maybe you'll be controlling the AI, because you'll almost certainly be better than the online editors.

Sören Schmeling: You once used the term «panopticon» in relation to AI. That can mean a museum of waxworks, a cabinet of curiosity or a star-shaped prison building with a little guardhouse in the middle for surveillance. What carries more weight in your work: the *Wunderkammer* or the penitentiary?

Ruedi Widmer: Well, up to now I've consciously avoided any connection with my cartoons, partly to protect myself. That's something I do on the side. But because I make humorous stuff there's almost certainly going to be something of me in the machine – and of you too, if you use it. By «panopticon» I meant all the wondrous things that just appear on the webpage in a matter of seconds, the deluge of images. It really is a kind of wonder. When you get into it properly it's almost like tripping. And it can be addictive. When you've been at it for hours you start seeing everything in that «aesthetic» and you have to come down before you can move on. So I don't just sit there doing nothing else – there's definitely an element of madness in it. I feel as though humanity is taking another step forward here, and it will be recognised as such in three hundred years, like the printing press or photography. You can just tell – from the panic as much as anything. Maybe it's comparable to the age of steam locomotives, when they said going so fast couldn't possibly be a good thing. But we'll figure out how to deal with it. And, as I said, we'll always have the old tools too.

{ Maybe it's (comparable) to the age of steam locomotives, when they => said going so fast (!) couldn't possibly be a good thing. }

How to Get Followers (Fast) and Have a Healthy Relationship with Instagram

Magali Franov

Seven years ago I posted my first drawing on Instagram. When I look at my profile today I see 547 posts, my journey from fan art to freelance illustrator – and fifty thousand people who followed along for the journey. Instagram has been ever present that whole time, but my feelings towards the platform have remained ambivalent. I wondered how the platform has influenced the world of illustration, and I've answered this question through extensive research and interviews with illustrators and experts. My goal was to find ways for illustrators to use Instagram to their advantage and create a healthy relationship with the platform. Are we still making art for ourselves or just to satisfy an algorithm?

#Instagram_for_artists

As a predominantly visual platform, Instagram is the single most used app for art-related purposes. It allows artists to network with other creatives while sharing and selling their work.[1] Looking back on her own early experiences with Instagram, Belgian illustrator Anna Boulogne recalls: «I started Instagram when I was really young. [...] I was getting a lot of outside positive enforcement. [...] It has been a big support of my work which I wouldn't have gotten otherwise.»[2] Social media platforms meet certain human needs for community, personal fulfillment and self-esteem.[3] Instagram nurtures a participatory culture that promotes artistic expression and interaction with others. For illustrator Autumn Chiu, this is the main reason for using Instagram: «Art making is a solo activity, so sharing my work and talking to other artists about it gives me the sense of community I'm missing in real life.»[4] Instagram gives illustrators the opportunity to present their work to potential clients and patrons. «If I wasn't posting on Instagram, big clients of mine would never have found me,» says Jessica Smith, an illustrator from England; here she's talking about her collaboration with Kate Spade NY.[5] Many illustrators have online shops where their followers can buy prints, stickers and so on. But the

socials have also influenced more traditional parts of the sector, like print media. Publishers these days seem to find most of their illustrators via Instagram, as confirmed by Marty Cleary, art director at Walker Books: «I like to look through suggested accounts on Instagram to find new illustrators to work with.»[6]

#influence_on_illustrators

Likes on Instagram function as a symbol of popularity and positive support. Affirmative feedback in the form of likes can have a positive effect on an artist's confidence. «When you get a like and feel social connectivity, oxytocin is released, which triggers serotonin and a chain reaction in the [body's] reward circuitry,» says Pamela Rutledge, director of the Media Psychology Research Center in California.[7] The absence of positive feedback can have a negative influence on the psyche. Describing her experience of Instagram, Autumn Chiu says she was always seeking recognition from others and would be disappointed if she didn't get it.[8]

To remain relevant for the algorithm you have to post several times a week, which is pretty hard to do given the time it takes to do an illustration. Marty Cleary agrees: «While you can build a presence on Instagram on your own and have your work [...] picked up by publishers, this requires an awful lot of individual time and effort, which will in turn take away from the time you have to hone your craft.»[9] Sometimes the need to create content can take the pleasure out of drawing: «Whenever I make anything, in the back of my head I think Oh, I should be filming this! [...] This kind of takes away from creating,» says Jessica Smith.[10]

But content creation can be varied and rewarding too. Illustrators on Instagram are more than just illustrators; they're also photographers, they shoot and edit videos, they interact with their communities. I see these activities as another art form; you can live out your creativity through them just as you can through drawing.

#influence_on_work

When a post strikes a chord and get lots of likes, the pleasure we feel is short lived. This sometimes creates a cycle where artists try to recapture that feeling and want more and more of it. «The reward», says Pamela Rutledge, «encourages us to repeat the action».[11]

There came a time when I realised that my online feedback was having a big influence on me. Not just on what I posted, but also on what I was creating. I noticed that photos of my sketchbook were getting the most likes. I'd even devised a sort of «recipe» for the ideal sketchbook page: small pencil drawings, a gouache landscape, a couple of handwritten sentences, a character portrait, a

1 Xin Kang, Wenyin Chen and Jian Kang, «Art in the Age of Social Media: Interaction Behavior Analysis of Instagram Art Accounts», in *Informatics* 6.4 (2019), www.doi.org/10.3390/informatics6040052 (retrieved 26 Feb. 2024).

2 Anna Boulogne, conversation with the author, 2 March 2023.

3 *The Social Dilemma,* USA 2020, director: Jeff Orlowski, screened on Netflix, www.netflix.com/title/81254224; script via www.scrapsfromtheloft.com https://scrapsfromtheloft.com/movies/the-social-dilemma-movie-transcript/ (retrieved 3 March 2023).

4 Autumn Chiu, email to the author, 5 March 2023.

5 Jessica Smith, conversation with the author, 1 March 2023.

6 Marty Cleary, email to the author, 9 March 2023.

7 Sarah Z. Wexler, «Why Your Likes Don't Actually Mean Anything», in: *Cosmopolitan* (2016), www.cosmopolitan.com/lifestyle/a57384/why-your-likes-on-social-media-dont-mean-anything-addiction/ (retrieved 3 March 2023).

8 Autumn Chiu, email to the author, 5 March 2023.

9 Marty Cleary, email to the author, 9 March 2023.

10 Jessica Smith, conversation with the author, 1 March 2023.

11 Sarah Z. Wexler, «Why Your Likes Don't Actually Mean Anything», in: *Cosmopolitan* (2016), www.cosmopolitan.com/lifestyle/a57384/why-your-likes-on-social-media-dont-mean-anything-addiction/ (retrieved 3 March 2023).

couple of flowers and ideally a bit of collage, something like a museum ticket pasted in. For a long time this was my main motivation for sitting at my desk in the evening and filling a double-page spread in my sketchbook. The main motivation was not the challenge of making art. I was drawing what other people liked.

I think many illustrators on Instagram are influenced the same way by likes and the algorithm. Autumn Chiu agrees: «I curated my work to fit what was aesthetically pleasing. […] I would purposefully create work that I thought my audience wanted to see.»[12] Jessica Smith talked about the fear of losing followers because of experimental posts.[13] As long ago as 1976, art critic David Sylvester described how an artist's public profile could become a hindrance to their creativity. «Because artists must be allowed to do bad work, they must be allowed to go through bad periods. […] The kind of attention that they get now […], the way that everything is done too much in the public eye […]. The pressures are of a kind which are anti-creative.»[14]

But it's not just the online feedback that can influence your work. Many illustrators also draw inspiration from other Instagram accounts. When I'm feeling creatively blocked I'll often look at saved posts from my favourite artists on Instagram. There I find new colour combinations, means of expression, styles, I learn about artists from all over the world – and I can get all this on my smartphone. All this inspiration flows into my own art. But it's important that you don't lose track of your own visual language in the deluge of images. Illustrators with lots of followers are especially influential. The visibility of such illustrators and their willingness to

share their lives can be very appealing. Before I started my studies, social media platforms offered an insight into the everyday lives of other illustrators. This encouraged me to pursue my chosen career.

But there's also the risk of being overly influenced by your role models. Illustrators who do well online become so-called «objects of desire» – these, according to the mimetic theory of René Girard, are people who influence others by functioning as role models. We tend to copy what works for others in order to get a step closer to what seems to be the ideal lifestyle. For successful artists this sometimes means fans imitating their style. Artist and YouTuber Leigh Ellexson has come out and said she thinks this is problematic: «the pure quantity of Instagram accounts that I've been finding that look just like mine. […] It's pure chaos how many Leighs are out there!»[15]

Cleary also sees a danger here: «One major negative we see every day is that art styles start to become very ‹same-y›. Algorithms continue to push styles of work that are popular to the top of everyone's feeds, leading to many artists trying to emulate particular styles that they perceive as popular or successful. This leads to more and more artists trying to recreate the same styles of art, creating a feedback loop in which the variance of styles we see becomes smaller and smaller.»[16]

Just knowing about this tendency will help you to stay true to yourself. It's important to build up some critical distance to what you look at, and to use what you learn to break through your own patterns of thought and action.

#tips_and_tricks

The relationship between an illustrator and Instagram is highly complex and has lots of ad-

vantages, but there are also all sorts of disadvantages, and they're not always obvious. The world of illustration is now virtually inconceivable without Instagram. I think that makes it all the more important to stay critical and to reflect on what you're doing. From my research and my own experience I'd like to share the following thoughts:

1. Turn off your notifications. There are endless mechanisms designed to get you hooked. Instagram wants to use you to make money.
2. Having an Instagram account is important for an illustrator, but it's up to you to decide how much time you want to invest in it.
3. The number of likes you get doesn't say much about how good your art is. Don't make it a measure of your value as an illustrator.
4. Feel free to play the game every now and then. Use your knowledge to your advantage.
5. If you enjoy doing it, showcasing your illustrations can be an art in itself.
6. Take regular breaks. A bit of distance will do you good. The people who really appreciate your illustrations will wait for you.
7. Don't put all your eggs in one basket. Instagram is not a secure platform. Use your own website or a newsletter and back everything up.
8. Instagram is a lot of work.
9. Try to find a balance between quality and quantity. Don't overwork yourself by trying to master both.
10. People are interested in the person behind the work. Be open and share your insecurities. Tell your story.
11. Find an offline art community. There's no substitute for critical feedback and conversations with friends.
12. Go to museums, watch films, listen to music, go hiking. Find inspiration away from the algorithms. Have encounters with the unknown.
13. Please make room for experiment and failure. Art can't be perfect all the time.
14. Don't lock yourself in a cage of expectations. Have the confidence to share unexpected content and don't let yourself be influenced by the feedback.
15. No one understands the algorithm, not even those who created it, so don't get frustrated with it. It has a lot to do with chance and luck.
16. You don't have to share everything. Get yourself a sketchbook that you're not going to show to anyone. See how liberating it is.

12 Autumn Chiu, email to the author, 5 March 2023.

13 Jessica Smith, conversation with the author, 1 March 2023.

14 David Sylvester in «Playing it Cool», episode 3 of *The Visual Scene* (1969), television series available on BBC iPlayer, www.bbc.co.uk/iplayer/episode/p02w23qw/the-visual-scene-3-playing-it-cool (retrieved 26 Feb. 2023).

15 Leigh Ellexson, «Big Paintings, Sketch Booking, Patreon Work * August Studio Vlog», published on *YouTube,* 3 Sept. 2021, 7:51–9:41, www.youtube.com/watch?v=fnQnsHzmJNo&t=760s (retrieved 26 Feb. 2024).

16 Marty Cleary, email to the author, 9 March 2023.

Heartbeats for the Imagination

Evelyne Laube in Conversation with Sören Schmeling

On her way to this interview at her shared studio in central Lucerne, Evelyne Laube takes the footbridge over the lake. She's captivated by the autumn light and the colours of the distant mountains, which rise over the water in a light-blue haze. One visual reason to be here, she says. As Pierre Thomé's successor, she's been running the illustration course at Lucerne School of Design, Film and Art since September 2023. In this interview she spoke to Sören Schmeling.

Sören Schmeling: When did you first know you wanted to become an illustrator?

Evelyne Laube: I first heard about the degree course in illustration when I came to an open day at the Lucerne School of Design, Film and Art. Pierre Thomé was speaking, and my heart started pounding; I had this intense physical reaction and just knew right away: «That's it; that's what I want to do!» I still have my application portfolio even now. When I'm on selection panels these days I'll sometimes go up to the attic, rummage around in my boxes and transport myself back to where I was back then; what I was thinking, the pictures I'd made and so on. That's how I remind myself of what to expect from students now, where they're at in their creative development.

Sören Schmeling: Illustrators don't always work alone. What does collaboration mean to you?

Evelyne Laube: Small social groups were really important to me. Both at primary school and later on, when I was studying at Lucerne, there were twelve of us. You could be yourself and still count on support from your peers. I started working in a duo while I was still a student; the idea of the solitary illustrator in an ivory tower was never for me. I worked better as part of a team, but with the option to withdraw. When you're doing illustration you need those uninterrupted moments of making, when you're in dialogue with your inner self, formulating things as you draw. The impact of what you make can really depend on mutual exchange, whether it's in a studio or in class. That feedback is hugely important. And that's why I try to think about social interaction and feedback methods when I'm teaching. Then again, Corona taught us a few things about the ways we work and learn. Some people work better without the pressure of social comparisons. But a sense of community can often act as an impetus. After college, my professional other half Nina Wehrle and I built on and elaborated this form of collaboration that had always been dynamic and agile. Now, within the BA Illustration team, it's important for me that we enjoy working together, with people who are at very

↓↗ **Figs. 1 and 2 Words of wisdom from the lessons of Pierre Thomé, noted and drawn by It's Raining Elephants, published in *Worte des Vorsitzenden Mao Tse-Thomé* on the occasion of the handover ceremony for the BA Illustration course, June 2023**

different points in their careers, that there's room to be different, that everyone can find their level.

Sören Schmeling: What's changed for you since you became the director of this programme?

Evelyne Laube: I come from creative practice, which I love. These days I have more organisational and administrative work to do, but I still get to enjoy moments of creativity with the students and lecturers. I continue to draw, which keeps me grounded. I don't do so well when I don't. When preparing classes and even during staff meetings we've started pointing out good working practices to each other. It's reassuring and it opens things up. When giving feedback to students you quickly get a sense of whether the result being presented is dynamic and challenging. It's hard work, but it's honest – even I don't get everything right – and that's how you make yourself transparent to others.

Sören Schmeling: When you took up your post you asked us, the staff, what we wanted from the collaboration. What do you want from your team, as people and as colleagues?

Evelyne Laube: For me it's important that people are happy and passionate about what they're doing. I'd like to create the right setting for that, together, not alone. I'd like to know that each of you has a healthy and active imagination, and that you're looking after it, because it's important and it often gets lost in our conversations, which tend to be based on facts and logic. I'd also like our students to discover, accept and trust their imagination. I've often underestimated how much that needs reinforcing at the outset.

Sören Schmeling: For me, developing the imagination has something to do with breathing. How do you work on that within a team that covers two subject areas – illustration for fiction and non-fiction – which are both integral to the superstructure of the school?

Evelyne Laube: I like the breathing metaphor. Together we're like a body, an organism that has to keep breathing. Containers and structures are always a bit of a paradox; they can help or hinder. What's important is that you play with them, move around in them, and also that you take a break every now and then! I'd like to introduce some rest too. We've got a high quality degree programme that works really well – thanks in part to Pierre and everyone who worked on it with him. We need to keep our basis in mind: the quality of our perception, how we read images, the way you construct a narrative, visually tell a story, knowing what a drawing can do. Because it's a language, with a grammar and a vocabulary that you can trust.

Sören Schmeling: And how do you create that trust?

Evelyne Laube: Actually that's one of the best things about my position, getting alongside people and encouraging them to immerse themselves in creative processes so they can fulfil their potential, surprise themselves and create something new, something they couldn't have known in advance. Pierre often used to say that if you haven't made anything, you've been picking your nose. It's about using your time in a meaningful way. But you also need to make room for projects that don't work out. Ultimately you have to take risks, own your successes and failures – we do it at every staff meeting, in every conflict, in every relationship.

Sören Schmeling: You can take risks with confidence or deference. Does having a strong sense of authorship make it more difficult to work collaboratively with partners and clients?

Evelyne Laube: You've got to be good at making your case in an argument, particularly when you're working in a team. For me it's important that students have the right vocabulary and can make visual arguments. Sometimes I get the sense that some students actually become less assertive, but for that they get better at community building. Our students and graduates have organised studio communities and group exhibitions, and they've also explored other forms of collective work, from the content to legal issues. How do you see our students?

Sören Schmeling: In my experience they're thoughtful and quite modest. They know what they can and can't do, and they don't usually...

Evelyne Laube: ...front?

Sören Schmeling: Exactly!

Evelyne Laube: Well, it's easy to see through that and it soon becomes tiresome...

Sören Schmeling: Do you find AI-generated illustration tiresome and transparent or does it still have the potential to surprise you?

Evelyne Laube: AI is still in its infancy, which is why I'd be cautious about any judgement I was going to make. There's a lot to observe and explore. I think AI is good for people who aren't able to draw. For some illustrators it could be a handy shortcut, a tool that could be used for joyful experimentation, without the fear. Many students still react to it with fear. I'd like to knock that on the head by integrating it into classes and looking at how to work with it. After that we can go back to pen and wash.

Sören Schmeling: Do you see AI as more of an aid?

Evelyne Laube: For dramatic, complex compositions, dynamic narratives or good representations of didactic contexts, AI hasn't so far had a lot to offer. It's good at generating visual resemblances, which is why different machines often produce similar visual outputs. What we're looking for, though, is variety and diversity. It's not yet clear whether we're witnessing the birth of a new standard that's going to impose new ways of seeing and thinking on us – which would also be pretty tiresome. A machine that turns quick scribbles into pristine drawings? If we go down that path we'll end up forgetting the craft of drawing, and those who can still do it will look like magicians. There's also an emerging field of new occupations, but efficient operation of AI – using prompts – also takes experience, so we shouldn't let our standards slip.

Sören Schmeling: So illustration will survive the shock of AI?

Evelyne Laube: Yes, so long as we still take pleasure in drawing and don't let anyone take that away from us. Because drawing is much more than just a means of representation; it's also an instrument for knowledge acquisition and a way of making contact with people. From outside, illustration is often regarded as a narrow discipline. It's so annoying! It's incredibly varied! I want to empower our students to explore and challenge the discipline. Nothing's set in stone. There's a lot going on in didactic communication at the moment, with live performances, graphic recordings and so on. These live elements could become more important because AI can't do them – so perhaps less of the loss and more building up of our own capabilities.

{ From ==> outside, illustration is often regarded << as a (narrow) discipline. It's so annoying! It's incredibly varied! }

Sören Schmeling: So would you give priority to the analogue?

Evelyne Laube: Even the most common applications – Photoshop, Illustrator etc. – have generative tools. The same applies here: play, use, evaluate, reflect. It's perfectly possible to make processes visible in analogue, whereas on a computer some of the intermediate steps get lost. People tend to look for imperfections, and these tools can't provide them. Drawing can. It's more human. There are lots of research papers about this need. Also, there are still lots of unanswered questions about AI. It's already generating profits, and we're only just starting to talk about the ethics, the legal issues, sustainability and wasting resources.

Sören Schmeling: When you talk about waste, are you just referring to energy consumption?

Evelyne Laube: No, not just that. Also the people who feed these machines, knowingly and unknowingly. As with any new technology, there are some pretty large grey areas and information deficits.

Sören Schmeling: You were talking earlier about fantasy and imagination. Could AI give us a little boost here?

Evelyne Laube: Does AI have an imagination? This is one of those classic «what if» questions. The world could be different if..., the school could be different if..., my day could be different if... — the important thing is to think in variants and alternatives. We need to appreciate, nurture and cultivate the power of the imagination. Things are rarely black and white. Illustration is a combination of text and image, and images can also be complex. They can even be ambiguous. I think this ambivalence and ambiguity is an important quality in illustration, and I haven't seen much of it in AI so far. These are human characteristics and qualities, and humans are never entirely predictable. They'll always be a little bit ambiguous and open.

←↓ **Figs. 3 and 4**
Words of wisdom from the lessons of Pierre Thomé, noted and drawn by It's Raining Elephants, published in *Worte des Vorsitzenden Mao Tse-Thomé* on the occasion of the handover ceremony for the BA Illustration course, June 2023

From Sketchbook to Animated Film

Experiments between Still and Moving Images, Inspired by Conversations with the Filmmaker Samuel Patthey and his Work

Adelina Lahr

At Kingston School of Art in London, illustration and animation are combined in one course. I spent a semester there as an exchange student in the spring of 2023 and I learnt how to switch back and forth between the two disciplines. I drew pictures from moving images, turned picture cycles into an animation and made an animation to go with an illustration.

Having arrived in this new city where I was due to spend the next six months, I started putting my impressions down in a sketchbook, as I usually do. I always record any interesting observations with a few quick pen strokes, then I can come back to them later. The result is a collection of drawings which, in retrospect, have coalesced into a composite picture of the place as I experienced it, spontaneously and intuitively (figs. 1 and 3).

{When you put pen to paper spontaneously ++ you get drawings => you could never have planned in advance.}

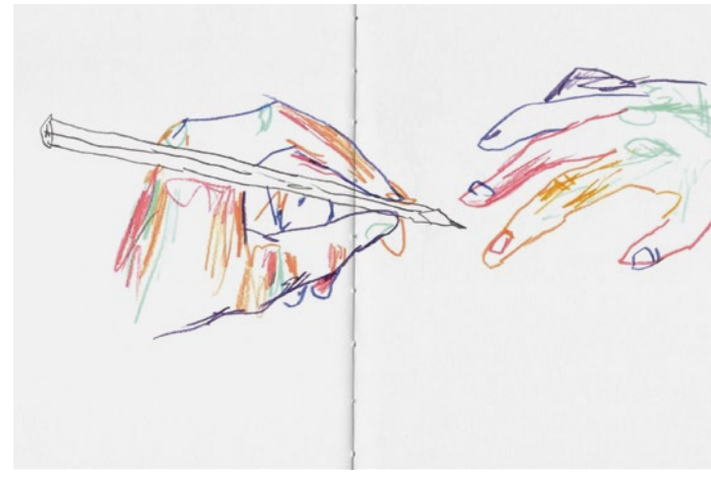
I liked the vitality of these drawings, which seemed to capture the peculiarities of the place and its population. At this point I asked myself how I could turn my collection of sketches into a coherent whole. I decided to «bring them to life» in the form of an animation – and that I wanted to explore the possibilities of that process.

For a seminar assigment pitched somewhere between theory and practice I made a video essay about this project. I analysed two films by illustrator and animator Samuel Patthey, and I was lucky enough to be able to interview him. His films are based on drawings made on the spot, and the animations retain the sketchy quality of the drawings. The author's sketchbook also features in the film, which often shows the binding of the sketchbook with figures moving across the gap between the pages (fig. 2).

I began by analysing *Travelogue Tel Aviv*, a six minute animated film documenting Patthey's own exchange trip to Tel Aviv. Patthey had recorded his impressions in sketches while he was there. When he got back to Switzerland he turned them into the film he submitted for his bachelor's degree at Lucerne School of Art, Design and Film. Patthey is good at bringing out the essentials, the atmosphere of Tel Aviv and the contrasts that make the city what it is. He told me how he started out wandering around the city without a plan, drawing scenes that interested him. «I trust that intuition, that the first drawing is an interesting drawing [...] because you're intrigued to understand something or because it's different to you. Most of the drawings, I understood them better afterwards, when analysing them.»[1] This approach does away with the pressure of having to start with a tight concept and leaves the door open to new experiences and chance encounters. When you put pen to paper spontaneously you get drawings you could never have planned in advance. Over time you learn to trust that a specific subject or theme will eventually emerge from all the material you've been collecting. The next step is to refine it by selecting, arranging and supplementing the sketches you've made.

Patthey's next project was called *Ecorce*, a film about a nursing home in Fribourg, its residents, ageing and death. It was made in collaboration with animator and illustrator Silvain Monney. In this project, too, the drawings were made in

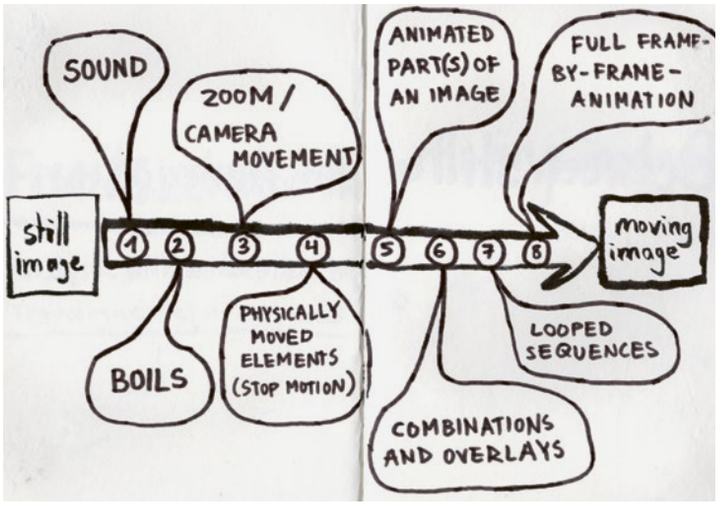
↑ **Fig. 1 Adelina Lahr, in situ drawing, London, January 2023**

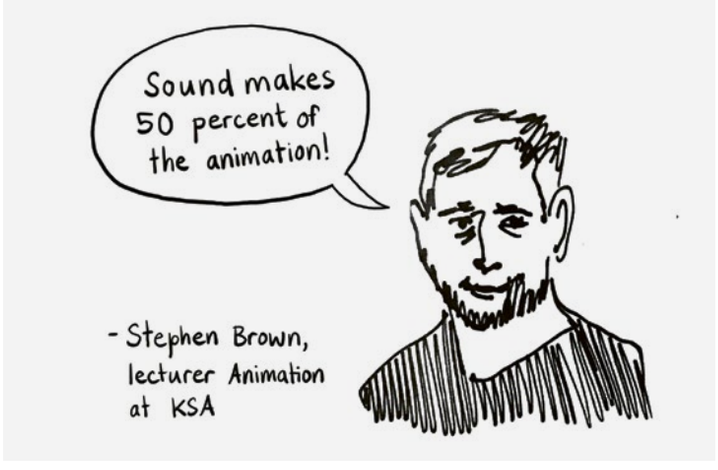


→ **Fig. 2 Samuel Patthey, still from *Travelogue Tel Aviv*, 2017**

↓ **Fig. 3 Adelina Lahr, in situ drawing, London, January 2023**

1 Samuel Patthey in conversation with the author, 9 March 2023.





situ then worked up into an animated film afterwards.

Through analysing Patthey's films, other animations and my own efforts I observed the various steps and stylistic devices that are involved in making the transition from still to moving images. I put them into categories and started experimenting with my own animations (fig. 4).

The sorcery of sound

The first thing I worked on was sound, because I noticed that the still images in Patthey's films were often brought to life by nothing more than the soundtrack. Sound brings the element of time to an image, which is a big step towards film. And when you're already immersed in a film, even the sound can become superfluous: «Silence, for me, is sound too», says Patthey. He talks about sound as a «meta-level» that can be added to the visuals. «It's a great inspiration to put sound on drawings and see what happens.»[2]

My lecturers at Kingston also emphasised the importance of sound (fig. 5).[3] I was fascinated by the way sound can influence and fundamentally change the mood and message of an image. The most exciting thing for me was laying sound over an image and seeing how the result would say something different to the image alone. You create new connections and stimulate the viewer's imagination. So an image of a woman sitting quietly becomes a stressful train journey when you put a loud noise in the background. And you can provide information about the people nearby and the geographical location by including a voice announcing the next stop (fig. 6).

For another experiment I animated an interview with the owner of a fish-and-chip shop. I discovered that while the interview I had recorded was playing in the background, I could change the image and therefore the focus of my film. This meant I could choose whether to illustrate the interview or tell a different story by setting his statements in a particular context (fig. 7).

I looked for other ways of using language and dialogue in film. In Patthey's *Travelogue Tel Aviv* I'd seen how pictorial elements on scraps of paper could be moved across the screen (fig. 8). I did the

2 Patthey, 9 March 2023.

3 Stephen Brown, «VINTAGE – The Pitch», animation lecture course, Kingston School of Art, 10 Jan. – 7 Feb. 2023.

↖ **Fig. 4 Adelina Lahr, sketch of stylistic devices analysed, March 2023**

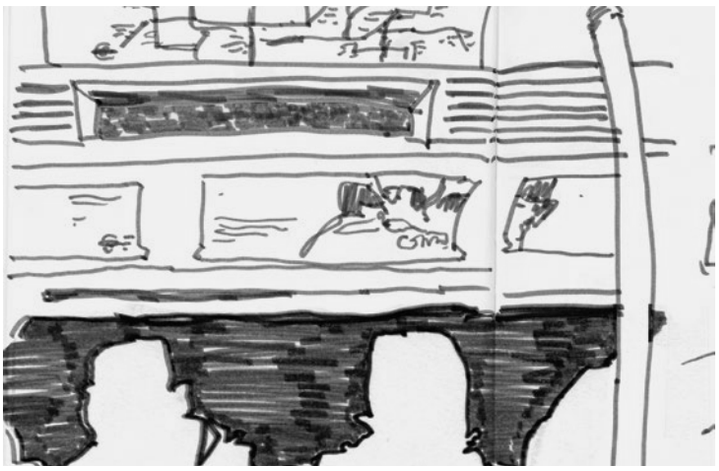
↖ **Fig. 5 Adelina Lahr, sketch from a lecture, March 2023**

↖ **Fig. 6 Adelina Lahr, in situ drawing, February 2023**

← **Fig. 7 Adelina Lahr, sketches made during an interview, March 2023**

↑ **Fig. 8 Samuel Patthey, a bike is ridden across the screen on a scrap of paper in *Travelogue Tel Aviv*, 2017**

↑ **Fig. 9 Adelina Lahr, experiments with moving text elements, March 2023**



↖ **Fig. 10 Samuel Patthey and Silvain Monney, sketchy mark-making in a scene from *Ecorce*, 2020**

↑ **Fig. 11 Adelina Lahr, still from an animation experiment where the background was animated with a boil, March 2023**

↖ **Fig. 12 Adelina Lahr, showing the sketchbook as an object, March 2023**

← **Fig. 13 Adelina Lahr, showing the sketchbook as an object, March 2023**

↗ **Fig. 14 Adelina Lahr, sketch from a lecture, March 2023**

same with pieces of paper inscribed with bits of dialogue. This gave the script a life of its own. I could move it around at will. The typography and the appearance of the paper also affected the optics of the scene (fig. 9).

The magic of dissimilar recurrence

One easy way to bring sketches to life is the «boil». «Boiling is the result of tracing image after image by hand; it is inevitable that there will be slight differences in the lines from one image to the next [...] it enlivens the image considerably.»[4]

With just three or four frames I had a sequence that could be used for a scene of almost any length. I experimented with different techniques and marks. A boil drawn in scribbled lines with big discrepancies between the individual frames has something nervous and irritating about it, whereas soft hatching in coloured pencil with minimal changes between frames produces a calm and pleasant boil. Here it's important to stick to the same visual language for each frame. When it worked, it was magic: my drawings suddenly came to life.

Here's what Patthey said about it: «I try to analyse what makes the initial sketch a sketch, and what makes it so authentic. [...] When I animate I really try for each frame to have those characteristics again. I don't try to redo a drawing, but to sketch it again» (figs. 10 and 11).[5]

In the film I ended up making, most of the animations are boils, a stylistic device well suited to the subject matter: people on the Tube. They just sit there, waiting, and almost nothing happens. Swaying knees. Furtive glances. And the rattle of the train, which only heightens the general sense of impatience and discomfort (fig. 11).

I also experimented with animations where the sketchbook remained clearly visible as an object. This allows you to establish a connection between the «real» world and the drawn world of the sketchbook, and to immerse yourself in the sketchbook as an object (figs. 12 and 13).

Between still and moving image

Over the course of this project I came to realise the importance of time and rhythm. I think this is the main difference between the still and the moving image. From the interview with Samuel Patthey I learnt that film lets you to determine how long an audience has to look at a certain scene or image. So a film can include still images, but they become film scenes because they're part of the film.

The longer an image is shown, the more significant it becomes. We look at it more carefully and discover more details. It might also be uncomfortable. Patthey and Monney play with this device in *Ecorce*: the very slow pace of the narrative suggests ageing and waiting for death. «You have to find the right balance,» Patthey explains. «I like to oblige the viewer to watch something that's not moving but still in a movie, to take time for that image. It's not like a book where you can just browse through the pages.»[6]

Russel Weekes, a lecturer at Kingston School of Art, also underlines the sense of uneasiness that often occurs when stills are used in a movie: «We're all much more comfortable if stuff is moving. Holding an image can be unsettling and interesting» (fig. 14).[7]

This experimental research project has broadened my understanding of illustration and animation; I enjoyed having the opportunity to do research while also working on my own practical project. It was inspiring talking to Samuel Patthey and exciting to discover the crossovers between animation and illustration. I've been able to refine my sense of timing and rhythm, which is something I'll put to good use in future projects, whether they're animations, publications or picture cycles. I also want to remain open to combinations of different media. That's something I learnt at Kingston, and it's expanded my horizons.

4 Scott Curtis, *Animation*, New Brunswick, NJ 2019, p. 27.

5 Patthey, 9 March 2023.

6 Patthey, 9 March 2023.

7 Russel Weekes, «Exploring Practice», lecture course, Kingston School of Art, 6–31 March 2023.

Animation

Between Dystopia and Optimism

New Ways of Teaching Animated Film

Jürgen Haas in Conversation with Jacqueline Holzer

Animation filmmakers rely on artificial intelligence in their everyday work. It automates repetitive tasks such as rotoscoping and cleaning up motion capture data, so it makes working processes more efficient. But film production companies are increasingly turning to AI software for the creative processes as well. Along with a willingness to throw yourself into experimental work and enjoy integrating new technologies into your working processes, the ability to keep learning is going to be crucial for the future. Giving students this sort of education calls for a collective setting where they have the confidence to try anything. Jürgen Haas, course director of the bacherlor's degree in animation, takes a long hard look at the future, with Jacqueline Holzer.

Jacqueline Holzer: Are you anxious about recent developments in artificial intelligence?

Jürgen Haas: Last summer I was alarmed. Now I'm a bit more relaxed. It's in our nature to be creative. Developments in computer animation technology seemed attractive at first, but the attraction wore off, and filmmakers consciously went back to analogue. So there's no need to panic.

Jacqueline Holzer: How did you regain your composure?

Jürgen Haas: Young people come here because they want to tell new stories and invent new worlds – it's an inherent need. Why would they let anyone take that away from them? That's why I'm optimistic. If AI takes control of certain production processes, we'll respond to that. Ultimately we're teaching our students the basic knowledge they need for animation. In practice that doesn't change. All the dynamic technological developments are happening at the top end of the spectrum. We're hardly going to get up to that level in the course of a three-year degree.

Jacqueline Holzer: How are you and your colleagues dealing with artificial intelligence?

Jürgen Haas: We've formed a working group with Stefanie Bräuer (media studies), Tim Markgraf (CGI), Justine Klaiber (2D animation), François Chalet (expanded animation) and myself. François and I have been experimenting with AI for some time, looking at its problems and potential. We're also about to enter into a strategic partnership with a production company from the Stuttgart region. They do a lot of work with AI, they're at the cutting edge of new developments and they're going to come and tell us about them.

↑ **Fig. 1 Matthias Schüpbach (director), *Searching for the 5th Direction* (still), BA Animation graduation film, 2023**

Jacqueline Holzer: How can you guarantee that students will be able to cope with these technological changes?

Jürgen Haas: There are no guarantees. It's down to the students. At the start of the course they panic because they can't figure out how to do the tasks they've been set. Towards the end of the final year they panic because they've got to decide what to do with their lives.

If you want to succeed in the field of animation in the future – and this is crucial – you're going to need curiosity, flexibility and passion. We have to encourage and exemplify these qualities in our research and our teaching. If you're not curious about the things that are transforming society, you're going to have a hard time even without AI. Maybe AI will help separate the wheat from the chaff.

Jacqueline Holzer: You mentioned the basic knowledge of animation. Does it have anything to do with craft?

{ If you want to succeed in the field of [animation] in future – and this is crucial – you're going to ==> need *curiosity*, flexibility (!) and passion. }

Jürgen Haas: Yes, a great deal. One peculiarity of animation is that craft and creativity are very closely connected. The profession is based on solid craft training. Filmmakers need to have a thorough understanding of how their chosen software works. Without it they lack any sort of approach to animation – particularly in a world of artificial intelligence. How are you supposed to feed an AI if you don't know the parameters for what comes out at the end? And we have a major advantage over AI: it can't do individuality. Producing something unique is only possible on the basis of an outstanding craft training.

Jacqueline Holzer: How do animation students learn to take risks?

Jürgen Haas: They're already taking a risk starting here! Maybe more so now than a couple of years ago. Studying animation is no direct route to success, no guarantee of a carefree future. But what is? The problem with our course is that there's very little time available to learn the craft. We do have experimental formats in the

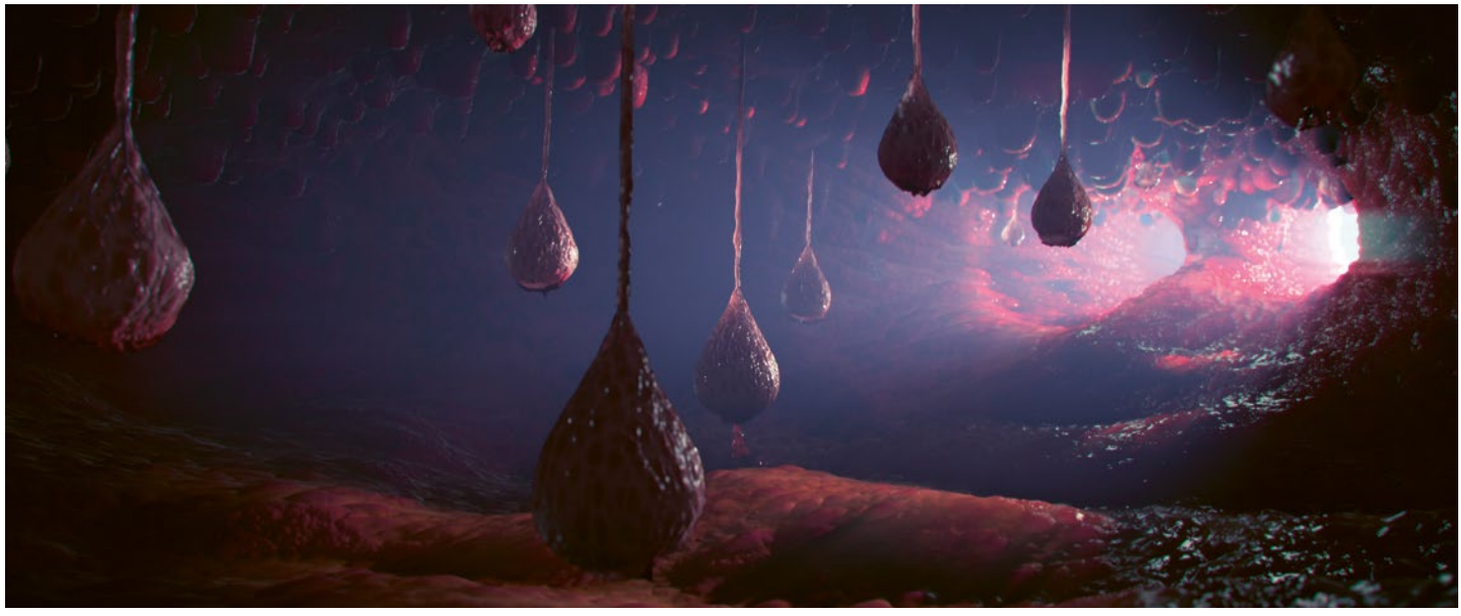
classes of Maya Gehrig and Gerd Gockell, but those aren't for everyone. You need time to take risks. I remember an experience I had when I first started teaching. One student proudly presented a solution she'd come up with for holding a stop-motion figure in place so she could make it jump. I looked at it and told her: «That's not going to work.» She tried to explain it to me again. I said: «It's not going to work.» She was bitterly disappointed. It was a strange moment. How was she going to learn when she didn't have time to test the method she'd devised? But I had to tell her that. If she had learnt during the animation process on set that it wouldn't work, the project would have failed. Sometimes students will only get the chance to try things out – and relish failure – once they've finished their studies.

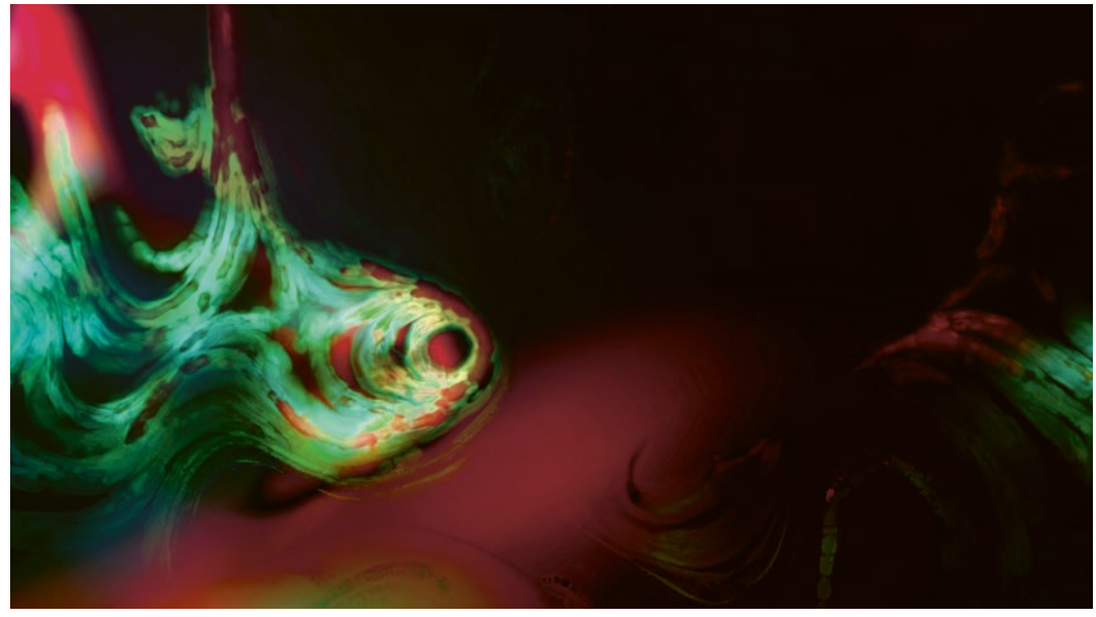
Some film schools like Potsdam, which is organised more like an art academy, allow five or six years of study. Students there have more time to fail. That's just not possible here, for all sorts of reasons.

Jacqueline Holzer: Should we be scheduling gaps in the three-year BA course so we've got time to respond to changes?

Jürgen Haas: Our students can do an exchange semester or an internship. The new subject modules in the first and second year are small slots. The +Colabor is an important break in the curriculum for some students. Others concentrate exclusively on the animation modules because they know they need them for their

↓ **Figs. 2 and 3 Jonas Bienz, *Boddyssey* (still), BA Animation graduation film, 2022**





→ **Fig. 4 Rahel Hunziker (director), Luca Koch (music), *ABSORBIT* (still), BA Animation graduation film, 2021**

professional qualification. To be honest, we need four years, but we'll not open that can of worms right now.

Jacqueline Holzer: Your animation course is highly successful. What's the secret?

Jürgen Haas: Partly good luck. On a training course in 2011 I was fortunate enough to meet two people who opened doors for me. And, yes, as a course director you have to be curious, flexible and passionate and you have to exemplify those qualities for your students. On top of that, we have a really good environment here at our university. I'm grateful for that.

Knowing the power of animation as a medium is fundamental. Though animation is represented in almost every field of communication, it's strongest on its own, as an isolated medium. The training has to take that into account.

It's also crucial that we're close to the sector and well networked with it; you're always going to need good, passionate lecturers. And – most important of all – you need the best students. Our students know they're passionate about animation and they show it in their studies. That's what makes the course a success.

And we shouldn't forget that doing animation is like going home. It's the medium of childhood dreams and youthful experience. That's got to be the greatest motivation for doing a course like this: that enthusiasm for comic-book heroes, stories, new worlds. Because then you can turn your own ideas, your own images, into animated films. And it's immensely satisfying when those films turn out well.

Jacqueline Holzer: Back to artificial intelligence. Is it possible that AI will make animated films on its own in future?

Jürgen Haas: Yes, that's going to happen. But then the AIs can watch their own films. There are certain jobs that aren't going to be around much longer in qualitatively high-end productions. AI enthusiasts refer to them as low-value jobs. Such awful arrogance! What's a low-value job anyway? In the film *Perfect Days* Wim Wenders tells the story of a Japanese man who cleans toilets for a living and says he's the happiest man in the world. Better put it like this: some people will lose their jobs – full stop. Some will do very well, some will do less well, some will lose out.

We're also going to see a further democratisation of the film industry. The same thing happened fifteen years ago with the compositing and editing programs,

← **Fig. 5 Marion Täschler (director), *Alleswasich-berühre* (still), BA Animation graduation film, 2020**

which made those processes significantly cheaper, so the studios could make ambitious products with few staff and low budgets. With AI they may be able to achieve better results for less.

In my view we need to give students the security and confidence they need to develop their own attitudes towards the world and their own work as creative individuals. They'll watch how AI develops. We're just starting to see the first AI-generated music clips, like the one by Peter Gabriel. It's novel, but when you take a closer look it's yawn inducing. It was much the same when they came up with morphing. The Rolling Stones had made a music video that seemed visually quite innovative, and initially everyone was really excited about it, but they soon got bored because ultimately it was just an effect. Maybe the same thing will happen with AI. Either way, there's going to be some sort of reaction, I'm convinced of that.

Jacqueline Holzer: When do you use artificial intelligence on your course?

Jürgen Haas: At the moment AI is most relevant in world-building. In the last curriculum development sessions we consciously ramped up the training for that in the first three semesters – a good decision. Students also work on this for a week and research it in their theory classes. In these learning formats they're supposed to figure out what AI has to offer by experimenting with Midjourney or DALL-E. Over time we'll do some evaluations and decide where and how to integrate AI into the modules.

Jacqueline Holzer: What skills are going to be most important for students in the future?

Jürgen Haas: There was a lot of talk about future skills at our annual management retreat in Engelberg a few years ago. One colleague was waxing lyrical about the «skills of the future», the 4Ks.[1] At that point 4K was just video resolution to me. When I thought about it I realised they weren't future skills at all. They were skills people have always needed, since time immemorial. I've said what I think the most important competences are: curiosity, flexibility and passion. If you carry these principles with you through university and life, the hard times will be easier.

{ I was ++ lucky enough to study in the 1980s. Many things ==> were significantly easier back << then. }

I was lucky enough to study in the 1980s. Many things were significantly easier back then. There's a wonderful book by Sibylle Berg, *Vielen Dank für das Leben*, where she gives a very funny description of the «easy» '80s, my student years. Basically she says that any dosser could become an art professor back then. The

’80s were a very comfortable time. But that all changed with the new technologies in the ’90s. The pace picked up, which made things more exciting again. And now it’s even more challenging.

Jacqueline Holzer: If you could do any kind of research assignment at all, what would it be?

Jürgen Haas: We tend to be interested in practically oriented research. The problem is, research at universities is generally organised into long-term projects. The topics that get the support don’t often coincide with the interests of our BA students. But I could imagine a framework where the short-term research and development interests of our BA students could be pursued without too much trouble. One example is a development of our motion control unit, a brilliant piece of work created on the initiative of one of our students by computer scientist Emanuel Buholzer. Unfortunately Emanuel can’t find time to publish the project properly. We could do with some help from the «real researchers» here. And we should be sharing it with other universities in order to promote that sort of practically oriented research.

The personal motivations for wanting to do this, as you may have guessed, are born of…

Jacqueline Holzer: …endless curiosity, flexibility and passion?! Is there anything you’d like to add in closing?

Jürgen Haas: I have the best job in the world, and even AI can’t take that away from me.

↓ **Fig. 6 Marion Täschler (director), *Alleswasich-berühre* (still), BA Animation graduation film, 2020**

1 Translator’s note: Kreativität, Kollaboration, Kommunikation and kritisches Denken = creativity, collaboration, communication and critical thinking.

Artificial Intelligence in Animation: Beast or Boost?

Tina Ohnmacht

Where do we stand?

Generative AI tools have raised many worries and insecurities among artists in film and animation, and we've seen the political manifestations of their fears in the Hollywood strikes in the past months. Even if *The Guardian* rates the outcome of the strikes as a success for the writers over AI,[1] the issue remains: will artists still be able to earn a livelihood with their creations now that generative AI tools can do much of the work faster?

Looking at contemporary papers on AI and animation, it's striking how vigorously many authors maintain that AI will replace humans in a lot of dull and repetitive processes while creative choices will still require conscious decisions made by humans.[2] However, especially in the craft of animating there has been enormous progress in recent years when it comes to creating animated movement with the use of AI and reference data. The movements of both anthropomorphic characters and quadrupeds can be created using systems trained on large amounts of movement data. And soon we'll no longer need motion capture systems; the movements will be extracted from existing video material. At the moment we still need artists to clean the data, tweak key poses and check the quality, speed and direction of a movement, but even without cleaning of the data by human intervention, a basketball player's movements with the ball can be automatically created, including smooth transitions between movements, sudden changes of direction and interactions with obstacles and other players.[3] When it comes to naturalistic movements where systems can rely on large amounts of existing audio-visual data, AI has already become very good at automating processes. Photoreal characters created with software like Metahuman very often look like the streamlined versions of faces we see on social media, enhanced by photo filters and plastic surgery. These seem to be to facets of one and the same cultural trope: a craving for perfection and normative beauty and the elimination of individual features and flaws. In the early years of 3D computer animation, artists worked hard to get those little inconsistencies and imperfections into their animations to make them look more natural, more like the analogue handmade stuff. We see similar manual readjustments in workflows where AI is used.

> {Will [artists] still be able to earn a => livelihood with their creations now that generative /*AI tools can do much of the work faster? }

At the moment, abstracted and exaggerated movements are still harder to generate automatically – there's just too much freedom in animation to let the imagination play beyond naturalistic movements: squashing and stretching forms, inserting speed lines or «animorph» frames,[4] morphing one character into a totally different one or anthropomorphising objects, plants, animals, forms. This boundless freedom ensures that animation will remain an art form where humans are indispensable when deciding which artistic direction to take. This freedom of choice is maybe the biggest advantage for animation.

What's at stake?

In the 1990s and the first decade of the twenty-first century, traditional hand-drawn 2D animation on cels and paper was gradually supported and then replaced by computer animation, and

2D animators were afraid of losing their jobs. Many did lose them. However, 2D animation did not die out. Can the situation today be compared with the transition to computer animation? I'm not so sure. Back then, people were replaced by people, or rather, their skills were replaced by other skills (many animators were retrained from 2D to 3D, where their core skills, creating convincing and relatable movements, were as important as ever). Today, it seems to many that people will be replaced by machines. As the podcaster and blender specialist Andrew Price puts it: «Any technology that makes things better, faster or cheaper will eventually become standard.»[5] In his view, creativity will be substantially supported by machine learning systems. AI functions will continue to be embedded in every software we use, not only in animation. Workflows will change more rapidly than before. The number of staff in a studio will probably decrease, while AI will also allow a greater number of smaller independent studios to emerge. And, as the European AI Act takes its first steps, regulations and laws will be created to set limits on the use of AI, especially regarding the use of copyrighted material to train the machines. There may come a time when we need more generalists again, people with a general understanding of movement, design, image creation and sound who can make informed decisions and implement an artistic vision.

What roads are open to us?

Artistic processes will rely on experimentation and chance much more than they did before. Coming across something you have not been looking for but which becomes essential: you might call this

{ We should (think) about including even more experimentation ++ in our modules and courses, encouraging students to tinker, try (!) things out, evaluate, try again. }

serendipity. Experiments can lead to new images, knowledge, movements, stories. We should think about including even more experimentation in our modules and courses, encouraging students to tinker, try things out, evaluate, try again. In traditional workflows, experimentation, according to Price, «eats up 50–70 % of the production time».[6] Using AI will save a great amount of this time and increase the number of variations. The artist's task remains to enable the machine to create the desired results and take the creative decisions.

Maybe a change of perspective will shed light on some other aspects. When artists experience the limitations of the tools they use they're invited by the software to experiment with it. The internet is full of examples showing the outcomes of bizarre AI-generated images or videos which glitch, flicker or show anatomical variations. AI-generated texts are used as prompts for the creation of im-

{ How is AI as a tool (not a concept) also // defined by its ++ manifestations in animation? }

ages which are then fed into the system again, creating more texts – and so on. Julia Eckel und Nea Ehrlich discuss how image-oriented disciplines such as animation studies have a role to play in conceptualising AI as a cultural phenomenon in image practices rather than just being a technological tool.[7] They consider the mutual influence of AI and animation, focusing not on how AI will influence animation but on how animation documents AI processes and makes them visible. To put it differently: how is AI as a tool (not a con-

1 Dani Anguiano and Lois Beckett, «How Hollywood Writers Triumphed over AI – and Why it Matters», in: *The Guardian,* 1 Oct. 2023, www.theguardian.com/culture/2023/oct/01/hollywood-writers-strike-artificial-intelligence (retrieved 16 Feb. 2024).

2 Qingke Liu and Hui Pent, «Influence of Artificial Intelligence Technology on Animation Creation», in: *Journal of Physics: Conference Series* 1881 (2021), The 2nd International Conference on Computing and Data Science (CONF-CDS 2021), doi: 10.1088/1742-6596/1881/3/032076 (retrieved 16 Feb. 2024);
Hitesh Sharma and Aarushi Juyal, «Future of Animation with Artificial Intelligence», in: *ShodhKosh: Journal of Visual and Performing Arts, International Conference on Emerging Trends in Design & Arts* 4 (2023), pp. 180–187, doi:10.29121/shodhkosh.v4.i2SE.2023.559 (retrieved 16 Feb. 2024).

3 Sebastian Starke, «Local Motion Phases for Learning Multi-Contact Character Movements», published on *YouTube,* 10 June 2020, https://www.youtube.com/watch?v=Rzj3k3yerDk (retrieved 21 Dec. 2023).

4 Norman M. Klein, «Animation and Animorphs: A Brief Disappearing Act», in: *Meta-Morphing: Visual Transformation and the Culture of Quick Change,* ed. Vivian Sobchack, Minneapolis 2000, pp. 21–39.

5 Andrew Price, «Will AI Replace Artists?», published on *YouTube,* 23 Dec. 2022, www.youtube.com/watch?v=Ao5aV4I4Ivw&t=1s (retrieved 16 Feb. 2024);

6 Andrew Price, «The Next Leap: How A. I. Will Change the 3D Industry». Presentation at Blender Conference 2018, published on *YouTube,* 5 Nov. 2018, https://youtu.be/FlgLxSLsYWQ?si=JVF-leQhgY8UTdTE (retrieved 16 Feb. 2024).

7 Julia Eckel, «Intelligence in Between: Documenting AI in Animation», in: *animationstudies 2.0,* 2 May 2022, www.blog.animationstudies.org/?p=4434 (retrieved 16 Feb. 2024);
Julia Eckel and Nea Ehrlich, «Minds in Motion: Some Basic Thoughts on AI and Animation», in: *animationstudies 2.0,* 10 May 2022, www.blog.animationstudies.org/?p=4437 (retrieved 16 Feb. 2024).

8 Eckel, «Intelligence in Between: Documenting AI in Animation». In: *animationstudies 2.0,* 2 May 2022, www.blog.animationstudies.org/?p=4434 (retrieved 16 Feb. 2024).

9 Ibid.

cept) also defined by its manifestations in animation? «In how far is animation a documentary medium for AI?»[8] In a video given as an example, a user shows how a painted abstract landscape is turned into a photoreal image. In order to create a film sequence, this artist first creates a series of

> { For Eckel, AI-generated // animations become a form of [documentation] of the AI itself, which => allows us to glimpse into the *black box* of the technology. }

still images from his abstract source image, then feeds them into the AI individually in order to stitch them together again and create a series of moving images. This is inherently an animation process – breaking movement down into parts and putting it back together in artistic form. The resulting sequence doesn't look naturalistic at all; it shows glitches, sudden jumps and artefacts which make the algorithmic and machine processes visible: «The ‹robot brain›, so to say, becomes visible in the clashes of the frames.»[9] Eckel observes that animation and AI are not only linked on a technological level, but also aesthetically. Her claim is that in order to really grasp the scope of how AI will influence creation in the future, we cannot be satisfied with single images but have to see them moving – we have to animate them. For Eckel, AI-generated animations become a form of documentation of the AI itself, which allows us to glimpse into the black box of the technology.[10]

Where do we go from here?

What does this all mean for us? I think we should focus on creating spaces where students are encouraged to play and engage with new processes without fear of forfeiting their status as artists. Maybe we'll have to question the status of the artist in the animation film-making process (again): the myth of the «auteur» film might once more be at stake (if it wasn't a fantasy all along, since it always neglected the creative impact of team members and collaborative processes). But would that be so bad? We should be using animation as a matrix for discussing AI as a cultural practice of image making, both now and in the future.

In order to reflect on what AI means in our visual culture we need to make room for discussions like the one initiated by Eckel and Ehrlich. We need to reflect on animation as an image practice where processes involving AI become visible and available for creative uses or hacks.

As a basis for practical research in animation at HSLU we should be encouraging experimentation (with or without AI) in order to connect the practical work of students, lecturers and professors to new knowledge and innovation in the field of animation.

At animation lucerne there's a growing focus on experimentation in practice and theory. Students are starting to engage in practical research without having theorised what it means. For example, practical searches for new solutions when creating sounds and images could be used as a basis for written and practical BA work. However, this openness to alternative production workflows shouldn't mean that we give up the finished film, the product, for the sake of the process. Ultimately it's the audio-visual outcome as a manifestation of the process which communicates with audiences – that's what films are made for.

At the same time, as a school of design, film and art, we need to be aware of the political situation and get involved when laws and regulations are being drafted to protect the copyright on artistic creations. It's an exciting time, and nobody knows what will happen next, so we'd best face it with curiosity and the creative power we have.

10 Eckel and Ehrlich, «Minds in Motion: Some Basic Thoughts on AI and Animation». In: *animation-studies 2.0,* 10 May 2022, www.blog.animationstudies.org/?p=4437 (retrieved 16 Feb. 2024).

Artificial Intelligence and Storytelling in Animation

Justine Klaiber in Conversation with Jacqueline Holzer

Animation filmmakers tell stories – that's not about to change. People have the capacity to invent new things, design new worlds, and AI is not going to usurp that competency. The stochastic parrot (Emily M. Bender) leaves listeners cold. As it always has, auteur cinema will continue to thrive on its creativity and narrative power. But it's important for the film industry to reflect on the opportunities and risks of AI in the field of commercial filmmaking. AI is showing great promise in this area, where AI tools make production processes faster and cheaper. This conversation considers the opportunities and risks for the field of animation and considers the implications for teaching. One thing's clear: teaching will have to be flexible for the future.

Jacqueline Holzer: How concerned are you about developments in AI storytelling?

Justine Klaiber: Sometimes more, sometimes less. It really depends on what I'm reading, what podcast I'm listening to, what sort of mood I'm in. There's still a lot of uncertainty and anxiety around this topic, but I believe storytelling and creativity are a big part of us as humans. Good stories need passion, they deal with things that matter to people, they reflect our common past. Sure, AI can generate stories, but they're often superficial and they usually use stereotypes. It's not capable of producing emotional depth or creating anything genuinely new completely by itself. It does however generate a lot of content in very little time. So, in order to stand out from the sea of AI-generated material, creatives must provide something truly original.

Jacqueline Holzer: How would you describe an AI-generated story?

Justine Klaiber: The examples I have seen were formulaic, conventional and heavily influenced by the mainstream.

Jacqueline Holzer: Have you started experimenting with AI in your 2D teaching?

Justine Klaiber: Not yet – and that's a conscious decision. When students start out, they first need to acquire a solid set of skills and they have to develop intui-

tion through experimentation, feedback and reflection. In their first semesters students spend time developing the ability to make decisions as artists.

Jacqueline Holzer: Are the students themselves starting to use AI in their own work?

Justine Klaiber: As far as I know, the students aren't using AI for storytelling yet. However, they use AI tools to simplify or speed up certain production processes. I imagine they'll start using AI for storytelling too. I don't think they'll use it to generate entire stories out of nothing, but they might use it to test plotlines and check for stereotypes or discrimination.

Jacqueline Holzer: How can students learn how to use AI tools in a meaningful way?

Justine Klaiber: They need certain digital skills, for instance how to formulate prompts. Students need to know about the technology that's available and they need to learn how to use it effectively, without becoming dependent on it. They also need to consider social and ethical issues. It's crucial that they reflect on the uses of AI tools and on the data that's used to train the AI.

{ Students ++ need to know about the (technology) that's available and they need to => learn how to *use it* effectively, without (!) becoming dependent on it. }

Jacqueline Holzer: AI is now capable of producing a recognisable aesthetic, which could be quite useful for commercials, for instance. Should we let AI do advertisements?

Justine Klaiber: A good advert stands out. For that you need a strong concept and fresh ideas that are tailored to the product. Clients appreciate that advice because it goes hand in hand with quality and uniqueness. So it makes sense to train directors and art directors for this sector.

Jacqueline Holzer: Have you ever asked an AI to come up with a unique commercial?

Justine Klaiber: Not yet! I've tried using AI to elaborate on a world I created, but I haven't had any good suggestions back so far.

Jacqueline Holzer: What aspects of animated film production will be done with AI in future?

Justine Klaiber: AI is already being used for basic production processes like automated subtitling, rotoscoping and designing backgrounds and matte paintings. The 2D animation sector already has tools for colouring and generating in-betweens (intermediate images). These production capabilities are only going to expand. Eventually we'll probably be able to animate figures with nothing but prompts. But animation is about conveying emotions, infusing characters with emotions. Animation is more than just movement; it's about breathing life into the character. We want to see figures with hopes, fears and feelings. An animated film is given life by the individual artists. Ultimately, we don't know for sure how AI will change the future. But as creatives and artisans, we need to ask ourselves what kind of future we want and try to work towards that.

Jacqueline Holzer: And where do you stand on that?

Justine Klaiber: As an artisan who likes working with her hands and creating things from nothing, I'm naturally a bit critical. There's something meditative about a basic production process like painting a background. I think we need to distinguish between commercials, the entertainment industry and short films. The latter aren't after commercial success. Artists tell their stories, their visions. How they choose to produce them, with or without AI, is entirely up to them.

Jacqueline Holzer: Where do you see animation ten years from now?

Justine Klaiber: AI will be able to do routine production processes perfectly. Many filmmakers will be glad to offload these tasks to AI. Will there be a radical shift that completely changes the film industry? That's hard to say. For the big production companies, it certainly means a streamlining of production processes and the ability to work with smaller teams. That's commercially attractive.

Jacqueline Holzer: Then you could focus even more on artistic work?

Justine Klaiber: Absolutely. When cameras made certain types of painting superfluous, the artist's vision became more relevant. But the loss of these basic production processes means losing a source of indirect funding for other creative projects.

Jacqueline Holzer: What role does craft play in education?

Justine Klaiber: Certain technical skills are becoming less important in the industry because they can now be automated. But there's still a place for good solid craft, particularly in transitional periods when new technologies are still in development. Craft is also very important for the auteur film. Students need to develop their own visual language, whether it's analogue or digital, with or without AI.

Jacqueline Holzer: Do the craft skills that students acquire impact their approach to AI? What sort of visual language would they develop if they were only shown AI-generated animation?

{ In their first week, students start animating on paper [...] This (exercise) connects students to the /* history of animation. }

Justine Klaiber: As in Plato's cave? That's an interesting question. There'd be a lot of repetition in a closed system like that. Also, the visual language would probably be very homogenous and mainstream. Or perhaps a countermovement would develop at some point? Naturally, the skills and experiences students have affect their approach to AI. And any other approach for that matter. To give an example: in their first week, students start animating on paper, though very few of them will ever do that in their working lives. But this exercise connects students to the history of animation – and shows them new perspectives and possibilities. For most students it's an enriching experience that might in some way influence their later work. And I find that many good ideas and connections happen when you're physically making and drawing. I'm not sure it's possible to achieve the same kind of free, organic workflow when you're working with AI, but there'll certainly be some new and interesting approaches.

Jacqueline Holzer: How do we incorporate new technological developments?

Justine Klaiber: Through skills-based classes that address contemporary issues and include speakers with expertise on cutting edge technologies. In open workshops the students can use their projects to explore new things and decide what they want to focus on.

Jacqueline Holzer: Like an open project module?

Justine Klaiber: Yes, it would be great to have more space for students to develop their own visual language, their own creative voice, particularly for those who want to focus on auteur film rather than going to work in the animation industry. There's more time to experiment with new technologies in that format.

Jacqueline Holzer: What do you want to see in the future?

Justine Klaiber: We need a labour market that artists can help to shape. Artists still need to be acknowledged for their work. There's the risk that AI will devalue human creativity because seemingly everything can be done at the push of a button. It's also important that we clarify the legal basis of copyright. What source material is being used to train the AI? Whose rights are infringed by that? This will remain a grey area until those legal foundations are clarified.

{ There's the risk that AI will => devalue (human creativity) because *seemingly* everything can be done at the push of a button. }

Jacqueline Holzer: What's going to be the most important thing for training animators in the future?

Justine Klaiber: New technologies need to be adopted sensibly and critically. At the same time, it's important that we concentrate on developing creative capabilities and creative intuition. This way, students learn to tell stories, to find their own expression as artists, to make artistic decisions and to judge whether what they have created is coherent or not.

Jacqueline Holzer: What skills do we need to cultivate?

Justine Klaiber: Independent, active learning is crucial. Technologies are changing fast and we need to be able to adapt.

Jacqueline Holzer: We've spoken about the dangers of AI. Do you see potential too?

Justine Klaiber: AI has brought about a democratisation of tools and processes in the film industry. Film production is becoming cheaper, animated films can now be made by smaller teams. This is an opportunity for individual artists, who are now able to tell their stories because the financial and technical hurdles are lower. The downside of this: quantity over quality. However, our training here is of a very high quality, and we're proud of that. I believe it will continue to be successful in the future.

Revisiting the Universal Fantasy Machine

Axel Vogelsang with Yaniv Steiner

In 1997 Janet Murray imagined a «universal fantasy machine» as the potential outcome of a digital foray into storytelling.[1] As a digital media theorist and professor at the Massachusetts Institute of Technology in Boston and later at the Georgia Institute of Technology she laid out her vision in the seminal book *Hamlet on the Holodeck*, the holodeck referring to the hologram-based virtual reality that featured in the science fiction series *Star Trek* as early as 1974. In her book Murray envisions a digital space of possibility from which narratives emerge and which allows for interactions of autonomous characters, both synthetic and human.[2] Instead of watching actors play out pre-scripted stories, the audience would be immersed in an emergent story space, a mix of cinematic experience and improvised, participative theatre. In recent years AI has become increasingly capable of providing support at every stage of a film production, so it's time to take another look and ask how close we've come to Murray's vision.

Originally I intended to answer this question with reference to state-of-the-art computer-generated narratives for film and stage. But the development of AI tools is currently taking off at an amazing speed, and attending Yaniv Steiner's workshop on «Cinematic Narratives with Generative AI» in December 2023 made me hesitate. Yaniv predicted «a drastic change to the way that we interact with the world through this use of technology. Just like a tsunami is going to have a dramatic impact. And once you understand how deep this rabbit hole is, you understand that a tsunami is an understatement.»[3] It was clear that my text would be obsolete even before it went to press. So instead I decided to talk to Yaniv about the future potential of generative AI for film and stage scripting, because the script is usually the essence of any time-based narrative, whether in cinema or theatre. The central points of our conversation, which I will present thematically, interspersed with my own narrative and reflections, are the writing, or, perhaps more accurately, the development of a story and the interplay of human and artificial authorship and how this might lead to emergent virtual narratives.[4]

AI is now heavily used at almost every stage of a film production. With regards to script writing, tools based on large language models (LLMs) such as ChatGPT are already capable of supporting character development and world-building. They can even generate their own scripts. They're also used to analyse existing scripts according to sentiments and plot developments, which benefits dramaturgy.[5] Experiments with AI-based scripts have been going on for some years now. Between 2016 and 2018 the project «Benjamin the AI» by Therefore-films, for example, produced three short films based on various forms of AI support.[6] More recently, Netflix claimed to have produced the first horror movie «written entirely by bots», the 2021 short film *Mr. Puzzles*.[7] Recent digital tools for generating theatre scripts, at least partially, include Dramatron

1 Janet H. Murray, *Hamlet on the Holodeck,* Cambridge, MA 1997, p. 17.

2 Ibid., p. 233.

3 Yaniv Steiner, conversation with the author, 8 Jan. 2024.

4 Alex Frohlick, «The Possibility of an AI Auteur? AI Authorship in the AI Film» (2020), doi:10.13140/RG.2.2.20085.19687 (retrieved 6 March 2024). Frohlick's article brilliantly describes the theoretical implications of AI authorship.

5 Sentiment analysis is about analysing mood and emotional tonality to understand how a text affects the reader. It also helps with the development of nuanced and emotionally appealing characters. See Brad Conlin, «Machine Learning Meets Movies: How AI is Transforming the Film Industry», on: *LinkedIn* (2023), www.linkedin.com/pulse/machine-learning-meets-movies-how-ai-transforming-film-brad-conlin/ (retrieved 6 March 2024).

6 See www.thereforefilms.com (retrieved 6 March 2024).

7 See www.youtube.com/watch?v=WZzbxNoMjGM (retrieved 6 March 2024).

and TheAItre.[8] The results of these experiments are at best reminiscent of abstract, expressive theatre, and are sometimes quite comical.

I asked Yaniv how he would use AI, e. g. for a film script. He said: «I wouldn't want to completely change the way I work or sound; rather, I'd want to integrate the tool into my process. The idea is to create this kind of counter-entity. I'd program the LLM to critique my ideas and elaborate on them, aligning with the LLM inner mechanics. In the field of data science, there's a concept suggesting that from existing data, additional data can be generated, thereby enhancing the overall dataset or context in this case.» I asked Yaniv whether he would still see himself as an author in such a process, or perhaps as more of a curator. «It's like calling a friend and saying, ‹What do you think about this idea? Can you criticize it or give me some insights?› Currently, I believe it's this type of integration. Looking ahead, the focus would revolve around the synergy between the digital and humans until they converge.»

Another conceivable strategy for scripting with the help of AI is derived from so-called role-playing games (RPGs), in which synthetic and human players act alongside each other. While RPGs are games with clearly defined tasks within worlds with clearly defined rules and characteristics, one could imagine a similar strategy being used to automatically generate a script with more complex dialogues. The human «author» defines a story-world and detailed synthetic characters who live out relationships and conflicts within that world. The characters are trained with individual datasets so that they develop a kind of personality that gives them a form of agency, allowing them to resolve predefined conflicts relatively freely while further developing their relationships on that basis. The resulting narrative could be called, with Aylett and others, an «Emergent Character Based Narrative».[9] The author thus becomes more of a director or conductor of a life improvisation by artificial actors.

I asked Yaniv what the challenges of such an approach would be. «If I would approach it today, I'd focus on the memory and dialogue context challenge. Each character would need to have a predefined knowledge base about itself embedded in the model. Later you direct the model to generate content based on this knowledge.» How far can such synthetic characters be differentiated, and will they resemble human actors in the dialogues they develop, I wanted to know. «Will it function flawlessly like a human? No, because humans think and operate on a far broader dataset than written

↓ **Fig. 1 Image generated by playgroundai.com in January 2024, prompted and edited by Yaniv Steiner**

language alone. But consider this: what if a multitude of connections, similar to those found in large language models, trigger a phenomenon we could at least label as language or logic? Furthermore, could this neural-like network of associations lead to a complexity approaching the richness of a human mind, or even surpass it?» Taking this further, one could imagine a group or even a multitude of such emergent intelligent characters being orchestrated to churn out scripts representing complex human relationships.

This raises many questions about aesthetic qualities but also about the relationship between humans and artificial intelligence and the authenticity of human experience. Nick Cave, the Australian musician and writer, picks up on these issues on his blog, *The Red Hand Files*, where in January 2023 a follower asked for his opinion about a song that ChatGPT had written «in the style of Nick Cave».[10]

↑ **Fig. 2 Image generated by playgroundai.com in January 2024, prompted and edited by Yaniv Steiner**

Cave's assessment of the song-writing qualities of ChatGPT was not particularly encouraging: «This song sucks. What ChatGPT is, in this instance, is replication as travesty, [...] a kind of burlesque.»[11] Cave is convinced that good songs are born out of inner struggle, out of deep human suffering, and that the listener can see their own emotional world reflected in them, experiencing a moment of transcendence. However, since code has no authentic human experience – «data doesn't suffer»[12] – the products of such software will always be mimicry. Yaniv's take on this: «If I went to GPT-3 and said ‹write me a song in the style of Nick Cave›, it would be like visiting the biggest, most sophisticated ice-cream shop in the world and saying ‹I would like an ice cream›. The guy serving the ice cream doesn't have time for questions, so he gives you the vanilla. That said, assuming we write a better prompt, will the current LLM be able to write a song as good as Nick Cave? And in my opinion, the answer is still no. Why? Because an LLM is knowledgeable about language, the construction of sentences, and the interplay of words, the machine possesses knowledge in these domains. In contrast, Nick Cave has undergone his unique set of experiences, related to themes of murder, betrayal and various human emotions in his songs and therefore he's talking from something that he experienced himself, even if it's in thought alone. Let's call it ‹Nick Cave's dataset›. This type of dataset is not represented in a large language model.»

Cave, for his part, admits that there may come a time when LLMs will write poetic texts that are superficially indistinguishable from «the real thing».[13] And while creativity often bears a relationship to human suffering, not everything that is written is fully autobiographical or based on the experience of the author. More often than not it's an act of the imagination. According to Yaniv, these fictitious events are still experienced to some extent by the author in a kind of simulation. And yet, while LLMs still might not be capable of deeper empathic imagination, they al-

8 For Dramatron see Piotr Mirowski, Kory W. Mathewson, Jaylen Pittman and Richard Evans, «Co-Writing Screenplays and Theatre Scripts with Language Models: Evaluation by Industry Professionals» in: *CHI '23 Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems,* New York 2023, pp. 1–34, doi:10.1145/3544548.3581225 (retrieved 6 March 2024); for TheAltre see Rudolf Rosa (ed.), *THEaiTRE: Generating Theatre Play Scripts Using Artificial Intelligence,* Prague 2022, https://ufal.mff.cuni.cz/books/preview/2022-schmidtova_full.pdf (retrieved 6 March 2024).

9 Ruth Aylett, Sandy Louchart, Anders Drachen, Michael Hitchens, Rui Figueiredo and Carlos Delgado-Mata, «Managing Emergent Character-Based Narrative», in: *2nd International Conference on INtelligent TEchnologies for interactive enterTAINment,* n. p. 2008, https://eudl.eu/doi/10.4108/icst.intetain2008.2468 (retrieved 6 March 2024).

10 Nick Cave, «I asked Chat GPT to write a song in the style of Nick Cave and this is what it produced. What do you think?», on: *The Red Hand Files* (2023), www.theredhandfiles.com/chat-gpt-what-do-you-think/ (retrieved 6 March 2024).

11 Ibid.

12 Ibid.

13 Ibid.

ready seem fit for use in highly stereotypical commercial products, delivering variations on the same theme, as in daily soap operas or off-the-shelf animated film series.

If AI-generated scripts are phase one, we have just entered the next phase in the lead-up to Murray's universal fantasy machine: Sora by OpenAi was released in early 2024, shortly before this article went to press. Sora is a powerful text-to-video conversion tool that enables the instant generation of moving images from text instructions. If we now imagine that these text prompts are scripts also generated by AI, the only limit for the emergence of cinematic narratives in real-time – one of the preconditions of Murray's idea – will be computing power.

It's almost as though the weakest link in this concept is the audience. How will humans interact with such environments? How will clumsy 3D headsets and joysticks affect the experience? Are there different ways of immersing ourselves in such narratives? Yaniv: «What's the next step? It is not watching in front of the box, it is being inside the box, which is no different than any other experiences that we are perceiving, both in the book example and the film, but also, if you like, in a natural example: dreams.» This is where Yaniv's vision departs from Murray's original concept. For him, a direct brain–computer interface will enable a dreamlike cinematic scenario where the fourth wall collapses and we're left in the middle of the action, perhaps part of it. The crucial difference is that this isn't a holographic play that's acted out around us. Now it takes place in our minds.

← **Fig. 3 Image generated by playgroundai.com in January 2024, prompted and edited by Yaniv Steiner**

Teaching and Learning History with a Video Game

Design Experiment for When We Disappear

Peter Gautschi

Video games on historical themes are booming. With all these games, the question arises as to whether they can also contribute to history education. This was the reason for the development of *When We Disappear* by means of a design experiment. It was done in the conviction that it is worthwhile for history educators to develop a video game themselves in order to make the best possible use of the potential of video games for histotainment.[1]

Video games and history education[2]

That visual art can make a big contribution to history education is uncontroversial. People can learn a lot about the past through painting and architecture, photography and film, either from the works themselves or in their contextualisation. But as with any new medium – television or comic books for instance – there is initially a lot of scepticism, both among the general public and in the teaching profession, as to whether young people will be able to derive any benefit from them in terms of learning about the universe of history. Will the new medium lead to unhealthy dependencies? Will it present a distorted view of history? Will it be overwhelming? Do the dangers and disadvantages outweigh the potential gains? These and other questions are now being asked in relation to video games.[3]

To answer some of these questions, the Institute for History Education and Memory Cultures[4] was happy to accept an invitation to collaborate with interactive storytelling studio Inlusio[5] on a project about «flight» entitled *When We Disappear*.[6] It seemed a good opportunity to actively explore the potential and challenges of using video games for history education.[7] The expectations for the new game were that it would provide a self-contained educational setting that would allow users to access history education without the need for accompanying materials or contextualising communication.

History education aims at a competent approach to history, a responsible approach to society and a reflective approach to oneself. With principles specific to history, these three dimensions can be concretised, differentiated and visualised in the illustrated model (fig. 1).

So, if a video game is to contribute to history education it needs to embody several of the aspects indicated in figure 1, and all three of the above-mentioned dimensions need to be considered:

– Contributors to competence in dealing with history include, for instance, the thematisation of basic narratives, the realisation of narr-

1 Histotainment is a portmanteau of history and entertainment; see «Histotainment», in: *Wikipedia,* https://de.wikipedia.org/wiki/Histotainment (retrieved 14 Jan. 2024).

2 For further discussion of this subject see Peter Gautschi, Jasmine Steger and Hans Utz, «Historische Bildung mit dem Videogame ‹When We Disappear›», in: *Historisches Lernen für das 21. Jahrhundert,* ed. Sven Neeb et al., Frankfurt am Main, forthcoming 2024.

3 See Alexander Preisinger, *Digitale Spiele in der historisch-politischen Bildung,* Frankfurt am Main 2021.

4 See www.phlu.ch/ige (retrieved 14 Jan. 2024).

5 See www.inlusio.com (retrieved 14 Jan. 2024).

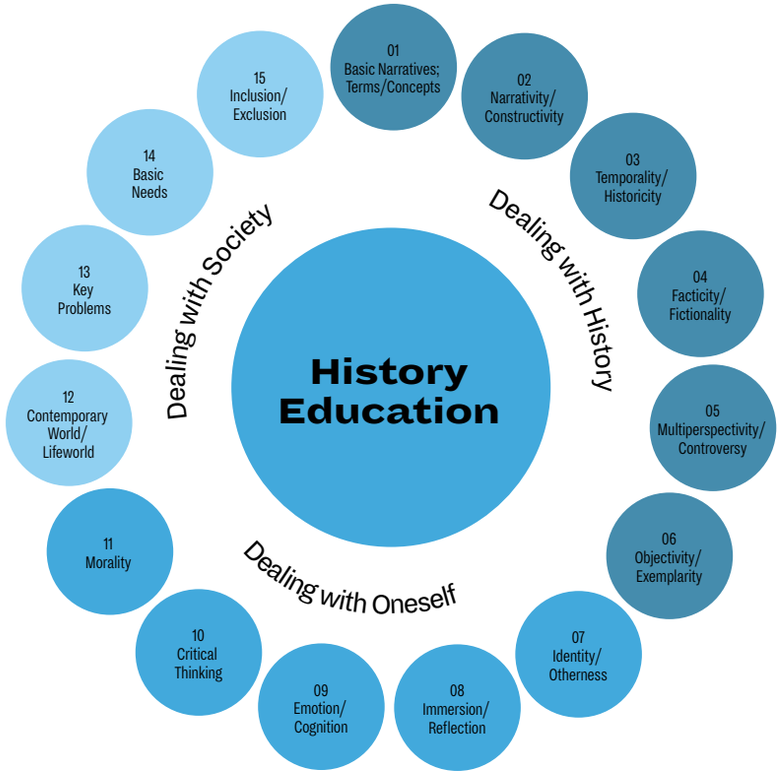
6 See www.whenwedisappear.com (retrieved 14. Jan. 2024).

7 Anne Schillig and Astrid Schwabe, «Der Laborversuch ‹When We Disappear›. Über Serious Games und historische Bildung», in: *Digital Public History. Analytische Perspektiven und Lernpotenziale,* eds Christine Gundermann, Barbara Hanke and Martin Schlutow, Berlin and Frankfurt am Main, forthcoming 2024.

ativity, temporality and historicity, consideration of facticity and fictionality, multiperspectivity and controversy, objectivity and exemplarity.

- Responsibility in dealing with society will be promoted if the video game plays on the contemporary world and the lifeworld of the gamers, on key problems, basic needs or inclusion and exclusion.

- Reflection in dealing with oneself is triggered in gamers when moral issues are addressed, critical thinking is encouraged, immersion and reflection as well as identity and alterity or emotion and cognition are enabled.



↑ **Fig. 1 History education, the development and state of an individual in three dimensions: dealing with history, with society and with oneself**

That the high expectations of history didactics do not coincide with those of game developers, concept artists or historians is not surprising – and is constitutive of the development processes of any educational media. These are always transdisciplinary because successful educational settings for history cannot be developed exclusively by history didactics. And so, with the development of such educational settings, it's a case of establishing a process such that, firstly, the different ideas of people from different fields and disciplines positively propel and promote the development rather than hampering and disrupting it so as to create, secondly, an iterative cycle of reflection, innovation, action, revision and further reflection and innovation so as to create, thirdly, good links between theory, empiricism and practice: «The theory must do real work.»[8] A design experiment achieves this.

Transdisciplinary cyclical development with a design experiment

A design experiment is a process by which a new educational setting – for example the video game *When We Disappear* – is developed, tested and evaluated.[9] Design experiments make contributions to both practice and research, they implement «design science» and usually run through a cycle of six phases, which are repeated several times.[10]

1. *Identify education problem and define or refine theme*
   The success of a design experiment depends largely on the theme and the question posed. Ideally this will be a fundamental contemporary social question such as «flight». The question also has to motivate users to take a closer look.

2. *Study of practice, theory and research*
   Studying the literature helps with the elaboration of a broad and deep view of the question, which, for the teaching of history, requires input from several disciplines. It also helps with the identification of a core concept for the education setting. In this case the core concept is to confront users with dilemma situations that invite deeper study of the context, speak to fundamental beliefs and facilitate history education.[11]

3. *Plan educational setting*
   The educational process should then be considered in advance, primarily from the perspective of the user. What will gamers do, and in what order? What will they encounter? It is also necessary to ascertain exactly how the game is constructed – *When We Disappear* is a mixture of adventure and jump and run. This third step results in a first storyboard.

4. *Develop educational setting*
   This phase sees the elaboration of the «episodic game» – in our case the first chapter – which defines the style of the game. The design is established – in the case of *When We Disappear* a rather sombre and spooky atmosphere is achieved with black-and-white drawings. The mechanics of the game are realised, the individual scenes researched and constructed.

↑ **Figs. 2 and 3**
Screenshot from the video game *When We Disappear,* 2024

8 Paul Cobb, Jere Confrey, Andrea diSessa, Richard Lehrer and Leona Schauble, «Design Experiments in Educational Research», in: *Educational Researcher* 32, no. 1 (2003): The Role of Design in Educational Research, pp. 9–13, esp. p. 10.

9 Hugh Burkhardt and Alan H. Schoenfeld, «Improving Educational Research: Toward a More Useful, More Influential, and Better-Funded Enterprise», in: *Educational Researcher* 9 (2003), pp. 3–14, esp. p. 4.

10 Herbert A. Simon, *The Sciences of the Artificial*, Cambridge, MA 1963. See also Alain Findeli, Denis Brouillet et al., «Research Through Design and Transdisciplinarity: A Tentative Contribution to the Methodology of Design Research», in: Roman Aebersold, Bettina Minder et al. (eds), *«Focused» – Current Design Research Projects and Methods, Swiss Design Network Symposium 2008, 30–31 May 2008,* Berne 2008.

11 Eleni Apostolidou, «Moral and Cognitive Dilemmas in History Education», in: *Public History Weekly* 5, no. 29 (2017), https://public-history-weekly.degruyter.com/5-2017-29/moral-and-cognitive-dilemmas-in-history-education/ (retrieved 14 Jan. 2024).

5. *Test educational setting*
   The developed material is then tested in educational practice and evaluated with regard to the objectives set.

6. *Analyse, interpret data and draw conclusions*
   An important result of the design experiment are the data-based analyses and interpretations of the educational setting. These are developed together in interpretation workshops and compared or underpinned with theoretical models and empirical studies. Conclusions are drawn and recommendations made on the basis of the analysed and interpreted data.

This six phase cycle is repeated several times. As mentioned, this is how the episodic game was first developed: Hannah, the protagonist, is fleeing Amsterdam through buildings and over roofs. She jumps from one roof to the next, climbing up a drainpipe and down a cable. At the end of the game she has to decide whether to flee Amsterdam or hide in Amsterdam. The second chapter of the game narrates Hannah's escape to Switzerland, again on the basis of documentary evidence. She is first arrested and then deported. She escapes from the train and, with other deportees, flees across Germany with the aim of reaching Switzerland. Hannah arrives at an escape route marked «Eiserne Hand» – a thin strip of Swiss territory. Here, at the end of the second part, she has to make another decision.

Design experiments generate experience and research results from one cycle to the next, and these entail numerous changes which in turn have implications for the ongoing development. So the development of the second chapter also involved modifications to fundamental aspects of the first. This calls for flexibility on all sides, openness to change and, in particular, curiosity – a desire to know what works and what doesn't. During a concert in Cologne, the German poet and songwriter Wolf Biermann apparently stopped halfway through a song and said: «Well, sometimes I don't share my own opinion anymore.»[12] This can happen quite often during a design experiment.

Experience, findings, perspectives

The period in which this article was written (January 2024) coincided with the start of the next stage of development. For the moment, the following points should be taken from previous experience and findings:

1. Survey responses from gamers show that the video game *When We Disappear* promotes all three dimensions and at least four of the essential characteristics of history education: understanding of history, narrativity, consideration of facticity and fictionality as well as the contemporary world and the lifeworld. This occurs during gameplay, i. e. without contextualisation or didactisation, which demonstrates that, as a game, *When We Disappear* itself has potential for history education.

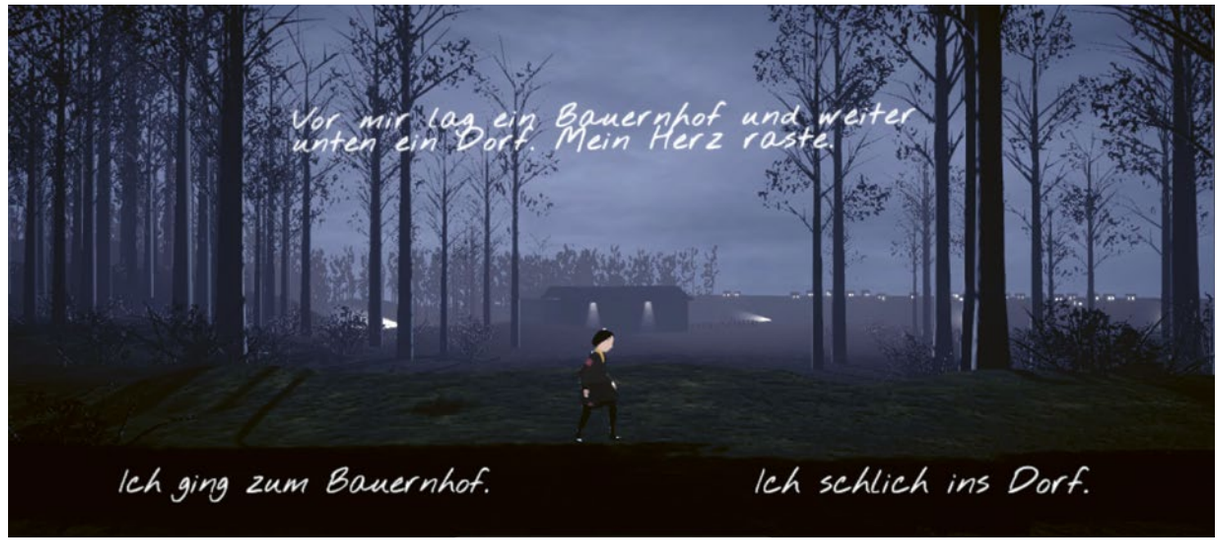
2. So although history education certainly worked within the game, it was nevertheless inspiring and auspicious when, having experienced the game, gamers reflected on their experiences with other gamers. This led to several interesting encounters and further learning opportunities.

3. Of particular value for history education are dilemma situations. Whenever gamers are presented with different alternatives for continued play – for example, whether to flee Amsterdam or hide in Amsterdam – essential thought processes that promote history education are triggered. It was also interesting to find that those who knew the history of Anne Frank were in favour of fleeing Amsterdam, while the others decided to hide there. This of course illustrates what we already know: those who already have a fundamental history education respond differently to new opportunities for history education. Education is a highly individual, lifelong process.

4. Design experiments work. A cyclical process of theory, research and practice is facilitated in order to develop new education settings that are theory based, evidence oriented and practice tested.

12 Quoted from President Horst Köhler's eulogy to Wolf Biermann on the occasion of the latter receiving the Commander's Cross of the Order of Merit of the Federal Republic of Germany on his seventieth birthday; see www.bundespraesident.de/SharedDocs/Reden/DE/Horst-Koehler/Reden/2006/11/20061115_Rede.html (retrieved 12 Jan. 2024): «Na ja, manchmal bin ich nicht mehr meiner Meinung».

→ **Figs. 4–6 Screenshots from the video game *When We Disappear,* forthcoming 2024**



[Curation]

Hyperscapes Revisited

Virtual Landscapes as a Place of Longing?

Nicolas Kerksieck, Christian Schnellmann, Marlene Wenger

Our eyes take a moment to adjust to the subdued light. Isolated projections and computer screens provide the only points of orientation. They open like little windows onto parallel universes. The room is filled with the whispers of visitors and exhibits. There's a hum of ambient music in the air. It's coming from the huge projection in the middle, where two viewers on a sofa are being guided through a fantasy world by a samurai figure. Obviously a video game. One of many here at the Hyperscapes exhibition.

The exhibition «Hyperscapes – Virtual Landscapes as a Place of Longing?» at the Kornhausforum Bern was a presentation and spatial encapsulation of the results of an in-depth research project investigating the different ways we envisage landscape in virtual space, how we construct it and move around in it. Can a digital landscape be a place of longing like a real-world landscape? The exhibition was conceived as an experiment, a self-reflective experience. Those who came to the exhibition were asked to explore the titular question of whether a virtual landscape could be a place of longing for them. To facilitate direct experience of virtual landscapes in physical space the curatorial team chose a scenography based on the idea of a hike. With map in hand, visitors were sent on a journey through seven perceptual states: prologue, escape, immersion, meditation, reflection, foresight and Echo Space. This written account of the exhibition takes the same experiential approach: we're going to take you on a walk through Hyperscapes. Let's go![1]

Escape and contemplation

As we continue through the exhibition space we soon come across an old iMac from the early noughties. There's a gentle whirring. We stop at the first video game station; we sit and wait. *Deer Hunter* (1998) claimed to be the first computer game to achieve a realistic simulation of the hunting experience. A bold move. Video games had previously been regarded as light entertainment and were still trying to shake off their association with children's toys. Even among the programmers who worked on *Deer Hunter* there was initially some scepticism about creating a game «that consists mostly of sitting and walking around in the woods for hours on end, waiting for a passive animal to show up so you can shoot it.»[2] The unexpected success of the game demonstrated that certain audiences were surprisingly enthusiastic about nature experiences without all the high-octane action. Will we have enough patience to wait until a deer comes into our sights? We move on. Our curiosity has been roused by the reconstruction of an alpine hut further on down the gallery.

> {The unexpected *success*
> of the [game] demonstrated
> that certain audiences
> were ==> surprisingly
> enthusiastic about /*nature
> experiences without
> all the high-octane action.}

The work *Landschaft* (2000) by Studer / van den Berg was inspired by the Swiss Alps. The computer simulation on the little table outside the hut shows a virtual mountain idyll where we see the same alpine hut as the one we've just seen in the gallery. On entering the hut we again find the screen we've just been watching – and the loop starts again from the beginning. The game we're playing here is disconcerting because we experience the same situation over and over. The only things that change are the weather and the time of day.

Perhaps this is a reference to the paradoxical fact that the alpine landscape seems almost immutable to the human eye, that time seems to stand still, even though, as a result of global warming, the Alps are subject to some of the greatest changes of our age. Monica Studer and Christoph van den Berg have worked as a collective since 1991. Their artistic practice focuses on digital media and internet art.

Immersive landscapes

After a few more steps and a leap forward some twenty years we're standing in front of the large projection *Ten Lands* (2021). We take a seat on the sofa and pick up the controller. The anonymous protagonist is wearing a full body suit of heavy armour. But the character's apparent combat-readiness is deceptive; players of Mélanie Courtinat's *Ten Lands* are not about to be ambushed by the undead – this isn't *Dark Souls*. We're just taking a walk here. And when we stand still for a moment, the figure crosses its legs and sits down to meditate. *Ten Lands* is both a video game and an interactive music video. There are ten virtual landscapes to explore, all created by the artist as visual counterparts to ambient music by Yatoni, so players of this game move around in a landscape that's both visual and acoustic. The vast structures of the various levels refer to fantasy worlds that Courtinat and Yatoni themselves once explored in video games. *Ten Lands* could be classed as a «walking simulator» – a genre designation with ironic undertones.[3] This is what we call games where there's not a lot to do besides exploring the virtual environment. The landscape is the protagonist.

But what exactly is this thing we call the landscape? When we look at woods, rivers, hills and mountains, we don't see wilderness, we see postcards – places seen from a human perspective. However unspoilt or adulterated it may be, what we perceive as a landscape is in the eye of the beholder. The filter of perception prevents us from penetrating to the «nature» we're longing for. We're denied access by its chaos and disorder. As soon as we try to grasp a piece of nature it's already been changed, anthropocentrically estranged. It's people who turn nature into a coherent image, into a landscape. «To conceive of a piece of ground and what is on it as a landscape, this means that one now conceives of a segment of nature itself as a separate unity.»[4] Encounters with nature occur in the constitution, formation, alteration, imagination, manipulation and exploitation of the landscape. This is apparent in agriculture, in the commercial use and exploitation of natural resources, in the domestication of nature through human intervention, in the colonial transfer of biomass and in the styling, romanticisation and intrumentalisation of nature in art.

↖ **Fig. 1 Exhibition view of Hyperscapes with alpine hut by Studer / van den Berg on the left Photo: Kornhausforum**

↗ **Fig. 2 Installation view of David O'Reilly, *Everything*, video game, 2017**

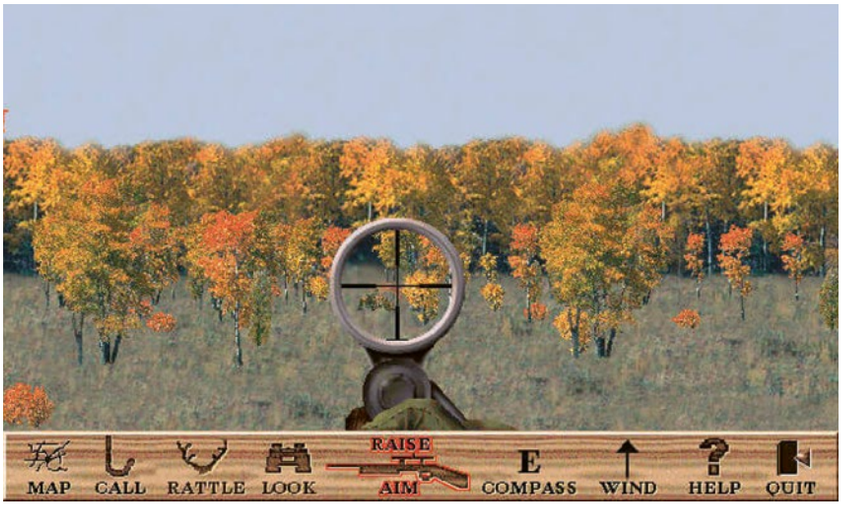
The exhibition Hyperscapes concentrated on landscapes as idealised dream destinations. In particular it explored how this idealisation of landscape is disseminated in the digital realm. Starting with the observation that the virtual spaces of digital art and video games tend to be designed as natural landscapes, the exhibition took a closer look at the characteristics of these artificial landscapes. It identified two main tendencies: on the one hand, highly mimetic, naturalistic or even hyper-realistic landscapes that hark back to traditional landscape painting and representations of the natural world which to us look as faithful and accurate as they could possibly be. In the exhibition this tendency was exemplified by the likes of Pascal Greco's in-game photographs, which seem real enough at first, though on closer inspection they turn out to be photographs taken in the virtual world of *Death Stranding*, a video game. At the other end of the spectrum the design of digital landscapes is freer, left entirely to the imagination; such designs do away with preconceptions and known physical laws to create new, speculative

1 For an especially immersive experience we'd recommend listening to the album Ten Lands by Yatoni as a soundtrack to the article. As part of the piece by Mélanie Courtinat, this music supplied the acoustic backdrop to the exhibition.

2 James Boer, «From Concept to Retail in Three Months: The Making of Deer Hunter», in: *Game Developer* (December 1998), www.gamedeveloper.com/programming/from-concept-to-retail-in-three-months-the-making-of-i-deer-hunter-i- (retrieved 2 Feb. 2024).

3 The genre name «walking simulator» can be traced back to games such as *Dear Esther* (2012) and *Proteus* (2013). A recent study of the theme can be found in, e. g., Melissa Kagen, *Wandering Games,* Cambridge, MA, 2022.

4 Georg Simmel, «The Philosophy of Landscape» trans. Josef Bleicher in: *Theory, Culture & Society* 24, nos 7 and 8 (December 2007), Annual Review, pp. 20–29, esp. p. 22.



← **Fig. 3 Screenshot from *Deer Hunter,* 1998**

↓ **Fig. 4 Mélanie Courtinat, *Ten Lands* (screen-shot), video game, 2021**

↓ **Fig. 6 Alice Bucknell, *The Martian Word for World is Mother* (still), three channel video, 2022**

landscapes. In the digital realm these new liberties are taken so far that the landscape has become detached from nature and now conforms to the personal desires of its designers. In *HanaHana*, for instance, a VR installation by Mélodie Mousset, users were able to construct their own landscapes via the digitised hands of the artist.

Imitation of nature

Slowly peeling ourselves off the couch, we move on to *Liminal Lands* (2021), a VR work by Jakob Kudsk Steensen. Immersion in a natural landscape can be very meditative. People have always turned to the natural world for places to recharge with calming energies. In *Liminal Lands* Steensen explores one such place in the Rhône river delta: the wetlands of the Camargue. The landscape of Salin-de-Giraud has been transformed by sea salt extraction, but in the Neolithic there used to be a lake here. Virtual reality lets us see the most minute details of the place – we're immersed in a world of algae, bacteria and micro-organisms that would otherwise remain imperceptible to the human eye. The installation generates a peculiar proximity

> {We're immersed in a world of algae, bacteria and [micro-organisms] that would => otherwise remain imperceptible to the human eye.}

to the microscopic scale of the landscape. What are the salt crystals telling us? Can we even understand them? Steensen's immersive installations are the product of extensive research into natural ecosystems that he then represents in photographs, 3D animations and impressive soundscapes.

Our trek through the virtual worlds of Hyperscapes ends with a three-channel video installation by Alice Bucknell: *The Martian Word for World is Mother* (2022). In this piece the artist takes us on a journey to Mars and presents us with three scenarios that might result in the colonisation of the red planet. This complex film, which has the aesthetics of a video game because it was made using the game engine Unity, takes a speculative but unsparing look at the absurdity of space colonialism and the exploitative behaviour of mankind. But there's a glimmer of hope in the last of the three scenarios, when we leave the alien landscape of Mars to its inhabitants and their agency. The landscape then bursts out in a profusion of fantastic forms and colours, literally inventing a new Martian language of its own.

→ **Fig. 5 Exhibition flyer**

Bucknell's piece is a fine place to bring this journey to an end because it reminds us that nature's so much more than just a dream destination for humans. We'd do well to listen up and understand what it's telling us.

«Hyperscapes. Virtuelle Landschaft als Sehnsuchtsort?», 25 November 2022 – 29 January 2023, Kornhausforum Bern, in cooperation with the Berner Design Stiftung

Exhibitors: Alice Bucknell, Mélanie Courtinat, Wizard Works (*Deer Hunter*), Dribnet, Pascal Greco, Gabriel Lory (father and son), Mélodie Mousset, David O'Reilly, Christiane Peschek, Studer / van den Berg, Jakob Kudsk Steensen, Free Lives (*Terra Nil*), Tracy Fullerton and the Walden Team (*Walden, a Game*)

Sounding board / external consultants: Christian Etter (designer), Nina Roehrs (gallerist, Roehrs & Boetsch), Maike Thies (academic associate, Zürcher Hochschule der Künste), Boris Magrini (curator, Haus der elektronischen Künste Basel)

Some Thoughts on Exhibiting Narrative Art

Anette Gehrig, Director and Curator, Cartoonmuseum Basel – Centre for Narrative Art

What do we hang on the wall when we exhibit narrative art such as graphic novels, comic strips or cartoons?

Graphic novels, comic books, illustrated children's books and cartoons are graphic narratives of varying length, which until quite recently have primarily been conceived for printed books or magazines. In this form they are printed sequences of reproductions, series of copied originals. Traditionally, an exhibition of narrative art would show a selection of the originals upon which the printed books were based. This has been the standard approach to exhibiting comic books for some time, and it can provide interesting insights into the artists' working processes. These are often additive by nature and sometimes wholly unconcerned with the original, which for the narrative artist is just a means to an end – i. e. the book. Original drawings usually reveal the entire working process and give some sense of how the drawing in the finished book came about.

Although their craft-based origins lie in the pen-and-wash drawing, many comic books these days are coloured on computer. More recently, images, comic strips and graphic narratives have increasingly been created in the digital realm, i. e. they start out as files on a computer. There are no originals in the classical sense here. Now, these works are being joined by digital works that are no longer made by people using digital tools; instead they have their origins in artificial or artistic intelligence, which generates works on the basis of verbal prompts from humans. These digital works can really only be exhibited as printouts – either that or they're displayed on screens.

High quality printouts can be fantastic images, but they lack the aura of the original, the multiple layers that reveal how it was made and give us a sense of watching the author at work. But since it was never the artist's intention to reveal the originals and their working process, you could argue that a good print actually comes closer to the artistic intention – i. e. the book – than the original does, because the original was only ever intended as an intermediate stage. To exhibit originals of narrative art in elaborate mounts and frames is to pay special attention to them. Sometimes this will be justified by their artistic value, sometimes it will seem strange in light of their original purpose.

Presenting narrative art on a screen introduces the additional qualities of movement and change. On-screen images can be shown one after another, they can build on one another, they can alternate, engage with the audience and much more besides. With works of narrative art that were always intended for the screen and so really only work in that medium, questions about the original become completely redundant.

Unlike originals, printouts and on-screen presentations of works can be scaled up or down; they can be put to the audience on tiny screens or expansive walls, and this opens up all sorts of exciting creative potential for the exhibition makers.

It's also worth remembering that prints often seem flatter and weaker than their actual representatives in the digital realm. For exhibition makers this poses completely new questions about the relevance, selection and presentation of digital narrative art.

What particular challenges are there when exhibiting narrative art?

Besides the issue of deciding what the work actually is – the original drawing or one of the many printed copies of the end product – there are also questions around the appropriate treatment of the original. Should it be styled and presented as a uniquely valuable work of art or should it be shown and protected in a less ostentatious way? Also, the original will often be a pen-and-wash drawing which, once the book is finished, has been assembled on one page and then coloured by hand or on

a computer. So between the original pencil sketch and the wash drawing, all the potential edits, the completed and coloured pages and the text inserted in speech bubbles (which changes with the language) there are countless intermediate stages that together constitute the original. The curators of the exhibition have to make a selection from those stages. On top of that, different artists take different approaches to their originals: some painstakingly archive them while others sell them off as individual pages (often the best ones) or even whole books. This can make it difficult to select and compile works for an exhibition. And sometimes the curators have to work with many different lenders – assuming they can be identified and are willing to lend the works they own.

In terms of availability, exhibitions that rely more heavily on printouts are easier to plan and significantly more flexible, but they also have to accept a reduction in relevance – especially if the artists are renowned for creating brilliant originals. Exhibitions based primarily on screen-based narrative art have the advantage here because they can show the work for what it is. The challenges in this case tend to be technical and financial: the necessary technology is often very expensive and may call for levels of expertise that simply aren't necessary with more traditional forms of curating.

Another major issue is the fact that larger works such as graphic novels can only be exhibited in part or in sections due to spatial constraints, manageability and availability. A partial exhibit like this may provide some insight into the work, but it can only ever scrape the surface of the narrative itself, which is often complex and multifaceted. Here there are questions of selection (single image or image cycles); presentation (configuration, reading direction etc.); and comprehensibility (speech bubbles are usually blank in original drawings). Such exhibitions can often end up working like film trailers: they familiarise visitors with the protagonists and give them a basic outline of the plot, but the work itself has to be experienced after the exhibition. Particularly demanding comic books and graphic novels are essentially short stories or novels that work with both text and image. They frequently deal with socially relevant themes that then have to be addressed alongside the artistic aspects of the work. For this reason, exhibitions of narrative art have to engage with the public on the levels of form and content simultaneously. So there's a lot of potential for creativity – but that creativity is also necessary if you want to do justice to the art form in all its complexity and breadth, from the original to the multiple and from the detail to the whole.

{ Experimental // exhibition design is perhaps more ++ feasible in ≈ the field ≈ of *narrative art* than elsewhere because there's still (!) no fixed canon to observe and adhere <= to. }

Where are the areas of opportunity in exhibitions of narrative art?

One significant difference between contemporary art and serious works of narrative art is that most narrative art wants to be understood. In principle, many of these works are readily accessible to audiences: they're figural, comprehensible and they tell stories – without being banal. They don't tend to be too cryptic, so visitors are never left wondering what's going on; they're presented with subjects and themes that are relevant or interesting to the reader. This is a gratifying basis for exhibitions that want to create trust and close connections with audiences that are often very broad.

It's also the case that narrative art, particularly the comic book, is a relatively recent art form, and many of the artists exhibited are still alive. This opens up all sorts of possibilities for the curator. Many of the works (though by no means all of them) are quite reasonably priced and can still be shown without the cost of vast insurance premiums. And the artists want to be present at the exhibition previews, where the public are able to meet them.

Experimental exhibition design is perhaps more feasible in the field of narrative art than elsewhere because there's still no fixed canon to observe and adhere to. Sketches, photographs, originals, printouts, artistic processes, models, books, texts and films can be combined in ways that are more improvised and experimental than would usually be the case at an art museum. There's no one correct approach; cultural history is just as acceptable as art theory. There are many reasons for this freedom, but one of them is certainly that this young, vital and not yet entirely commercialised art form is constantly changing. Right now, with the leap into the digital age, it's producing countless new branches, and the many ways of exhibiting them are yet to be researched and explored. It's an art form with close ties to its audience, a popular art in a positive sense, one that lives not just in the museum but also at festivals, in nurseries, in cafés, in libraries and galleries, on Instagram and YouTube. What curator wouldn't want to be working in a creative context – whether analogue or digital – that's so closely allied to contemporary society.

Insights into the Public Education Programme at HEK

Patricia Huijnen

The themes addressed at HEK (House of Electronic Arts) in Basel are always situated at the interface of art, technology and society. The public education programme at HEK takes its themes from artistic projects and develops formats for them: programming clubs for kids, tech brunches for adults or digital workshops for school groups.

Aquariums supervised with the help of deep-learning technologies; Instagram posts localised using visual data from Google Earth; blockchains as hiding-places for human bodies or places to immortalise fictive memories; plants that make sounds when touched; robotic handshakes.

The themes negotiated at HEK (House of Electronic Arts) in Basel are always situated at the interface between art, technology and society. With five exhibitions per year, HEK presents contemporary art that uses electronic or digital media and reflects how these media are used and how they impact society. Exhibitions alternate between thematic and solo displays. In 2023, for instance, exhibitions on «Collective Worldbuilding» and «Exploring the Decentralized Web» looked at blockchains and the metaverse, while «Earthbound» in 2022 had focused on the interactions between technology and ecology. Since 2022 HEK has also been populating its online exhibition platform – virtual.hek.ch – with exhibitions of work from the permanent collection.

This is the context of the public education programme at HEK. It takes its themes from artworks and creative projects while establishing connections with design, media technologies and media culture. The education programme has a wide audience: children, young people and adults, individuals and groups, laypeople, amateurs and professionals. Our varied educational activities – such as the BitFabrik programming club for kids, the do-it-yourself workshops, creative coding workshops and guided tours of the exhibitions – offer various opportunities for visitors to familiarise themselves with media technology and expand their knowledge and skills in this field.

The education programme is designed by two experts with different specialisms: on the one hand, pedagogical know-how and experience of educational contexts, on the other, knowledge of media art and familiarity with the discourse of media cultures. Development and implementation of the programme is supported by a team of contractors working in education, media studies, design and informatics. Artists and creatives bring their unique perspectives to specific projects and targeted formats.

The aim of our public education programme is to promote an independent, creative and critical approach to media technologies and media culture. Important principles are «do-it yourself» (DIY) methods and, following on from that, a «do-it-together» approach where people create, explore and discuss things together. The DIY approach is empowering; it reveals the workings of things and offers solutions with accessible materials. It also shows that things don’t always have to be high tech. The 2022 workshop «Kraut Source Energy – Re-think the future and build a battery out of sauerkraut» by artists Miranda Moss and Maya Minder presented participants with a new approach to electricity generation – via micro-organisms in

↑ **Fig. 1 Trash Bot Workshop, HEK Museum Night, 2023 Photo: Moritz Schermbach**

↗ **Fig. 2 Kraut Source Energy Workshop, Cultural Capital Esch 22, 2022 Photo: Lea Cheymol**

fermented cabbage – and recast electricity as an organic product. One idea that underpins public education at HEK and derives directly from DIY practices is working with open-source tools and, wherever possible, using resources that are freely accessible online. This often calls for intensive research and expert input.

The artists' works serve as inspiration for a reflexive, communal and creative approach to technology. The strategies of media artists bring alternative perspectives to digital technologies and the social change they engender. In this way these strategies contribute to the general culture of working with digital tools. The artworks themselves might be activist pieces with close ties to a particular social or temporal context, or they might deal with questions about the development of new technologies on a more reflexive level. So every work of art opens an exciting window onto a creative and, above all, sensory engagement with contemporary issues.

On our guided exhibition tours, visitors from every age group encounter subcultures, internet cultures and research projects in the museum context. It can be really good fun when you're talking about fan fiction or Tamagotchi cemeteries and the distinctions between high and low culture start to break down. There are usually various ways of relating to the lives of each individual visitor and several opportunities to start conversations with them, as in *Vote Auction*, for instance, a work about the American presidential elections of 2000 by artist duo UBERMORGEN, or the work *Who the f*** is Karen (don't show feelings)* by emerging artist Johanna Müller, about the Karen meme. Works like these serve as a reminder that all technology is closely bound up with a particular time and culture and that it's not neutral and doesn't come out of nowhere. Some works challenge conventional ideas about categories. The work *Homeschool* by artist Simone C Niquille, for instance, shows that the way image categories are used to train devices such as robotic vacuum cleaners «reveals cultural context, a set of references and personal beliefs.»[1] In dialogue and conversations about technology, precise language is really important. What do we mean by «AI»? What metaphors can we use to explain technological systems? In our conversations we often describe AI as a data-based system and blockchain as a tally for recording transactions.[2]

In 2023 the public education programme at HEK focused on two projects: the development of a workshop format for Web3 technologies and the development of digital storytelling projects for children and young people.

CryptoBrunch

As part of the transformation project «HEK-Connect», the public education team looked at Web3 technologies. After all the NFT hype of 2021 it was time to figure out how our workshops could address these complex blockchain technologies in

1 Simone C Niquille in conversation with Eleanor Rosch, «Tomatoes are Fruits and Other Tales from Category-Land» (2021), https://202122.transmediale.de/almanac/tomatoes-are-fruits-and-other-tales-from-category-land (retrieved 3 March 2024).

2 Thanks to Julia Schicker for this analogy.

ways that were creative and playful, but also critical.[3] For this it was absolutely essential to do some internal training and form our own opinions about the new technology. Like artist and author James Bridle, who built his own self-driving vehicle, we needed to «give it a go».[4] The result was the CryptoBrunch format: themes that are complex and «difficult to digest» are served up to participants with coffee and croissants. To develop and implement this new format HEK educator Isabella Maund worked together with artists and professionals

{ The result was the CryptoBrunch format: themes that are ~ complex ~ and «difficult to digest» are served ++ up to participants with coffee and croissants. }

who have an interest in public education and make things accessible in creative, sensory and playful ways. It was often a case of doing exactly what you shouldn't to be doing: stealing each other's NFTs and openly sharing so-called seed phrases, the keys to digital wallets. Once this discursive workshop series had got underway it soon became clear that our low-level formats were very popular among adults. The CryptoBrunch now lives on as the TechBrunch, which focuses on current issues in the wide world of technology.

Storytelling for the digital future

In her texts and interviews, biologist, feminist, scientist and storyteller Donna Haraway has said that we need to come up with new narratives for survival on this planet. This imperative provided the inspiration for the project «Storytelling for the Digital Future». What stories can we come up with using digital tools? How can we can make the most of their narrative potential? How can children and young people use them creatively? Together with various artists and creatives, this project explored the narrative potential of the free, web-based exhibition platform «common.garden», which was developed by artist Constant Dullaart and now serves as the basis for the HEK online exhibition space, virtual.hek.ch. It's easy to use and can be populated with all sorts of digital formats: photographs, videos, digital links and audio. It also has a portal function – a large black circle – which takes visitors to another common.garden site with one click. This makes it easy for children and young people to explore themes like «worldbuilding», the process of designing varied digital worlds. The resulting digital «planets» and environments combine thoughts about the current state of the world with individual experiences and the use of digital design tools like GIFs, stop-motion animations and 3D scans. «The idea was for the kids to work together on a story with various narrative stands running in parallel. Instead of narrating the story of a single hero figure, the new planet tells of various entities and how they live together.»[5] For the design of this format HEK educator Patricia Huijnen worked together with digital dramaturg Yves Regenass, artist and educator Andrea Fortmann and sci-fi artist Manuel Guldimann. «Will you find the cat in the hill? Do you understand what the flowers in the woods are talking about? There are habitable mushrooms in the cave world, but who lives in them?»[6] Have fun exploring![7]

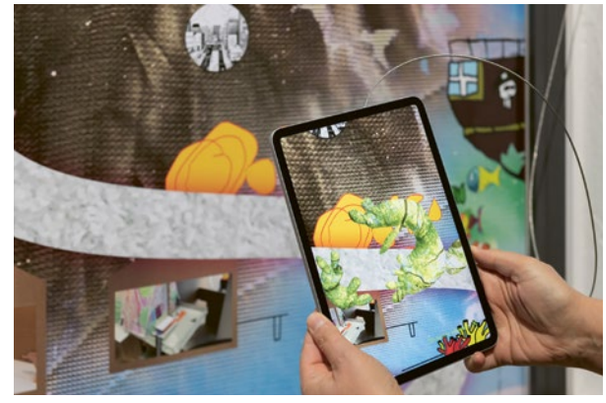
3 «Broadly speaking, a non-fungible token (NFT) is a unique digital asset recorded on blockchain proving ownership of a digital work of art or a digital collector's item. ‹Non-fungible› means non-exchangeable, i.e. that such a token is unique and can't be replaced by something of identical appearance or value. Each token contains information describing itself along with a link to the data source of a digital object. The owner and price of an NFT are traceable via its blockchain record.» Excerpt from the gallery handout to the exhibition «Art in the Metaverse», HEK, Basel 2023.

4 James Bridle, *Ways of Being: Beyond Human Intelligence,* London 2022.

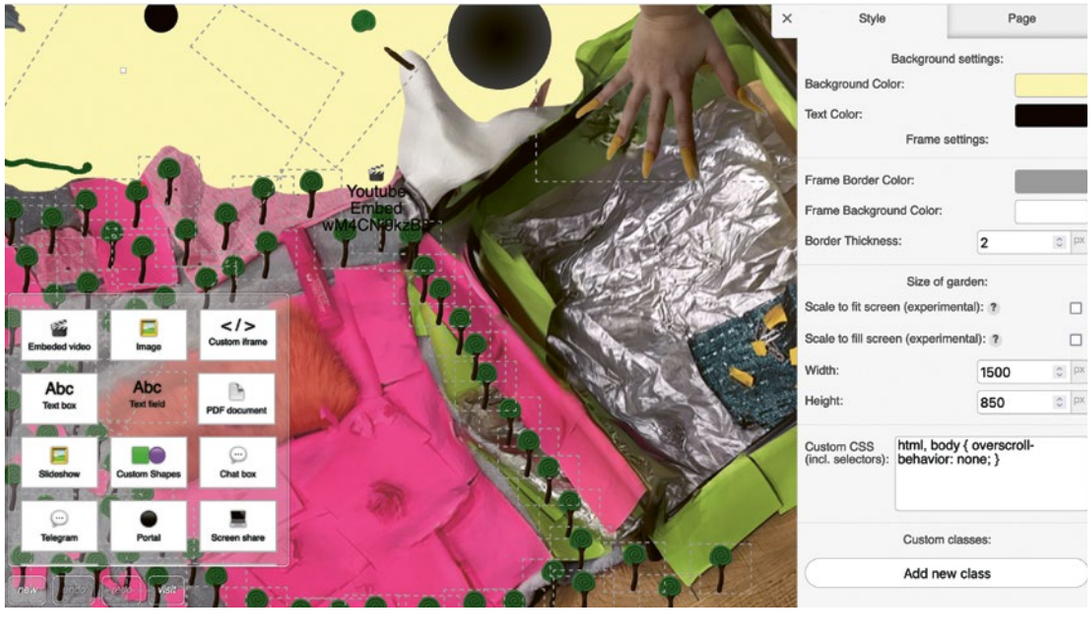
5 Andrea Fortmann, «Portale in digitale Welten», on: *Hek share – das Blog* (2023), https://share.hek.ch/de/portale-in-digitale-welten-surfen-auf-dem-planeten-wek/ (retrieved 30 Jan. 2024).

6 Ibid.

7 See https://hek-planetb.common.garden/ and https://hek-kritter.common.garden/

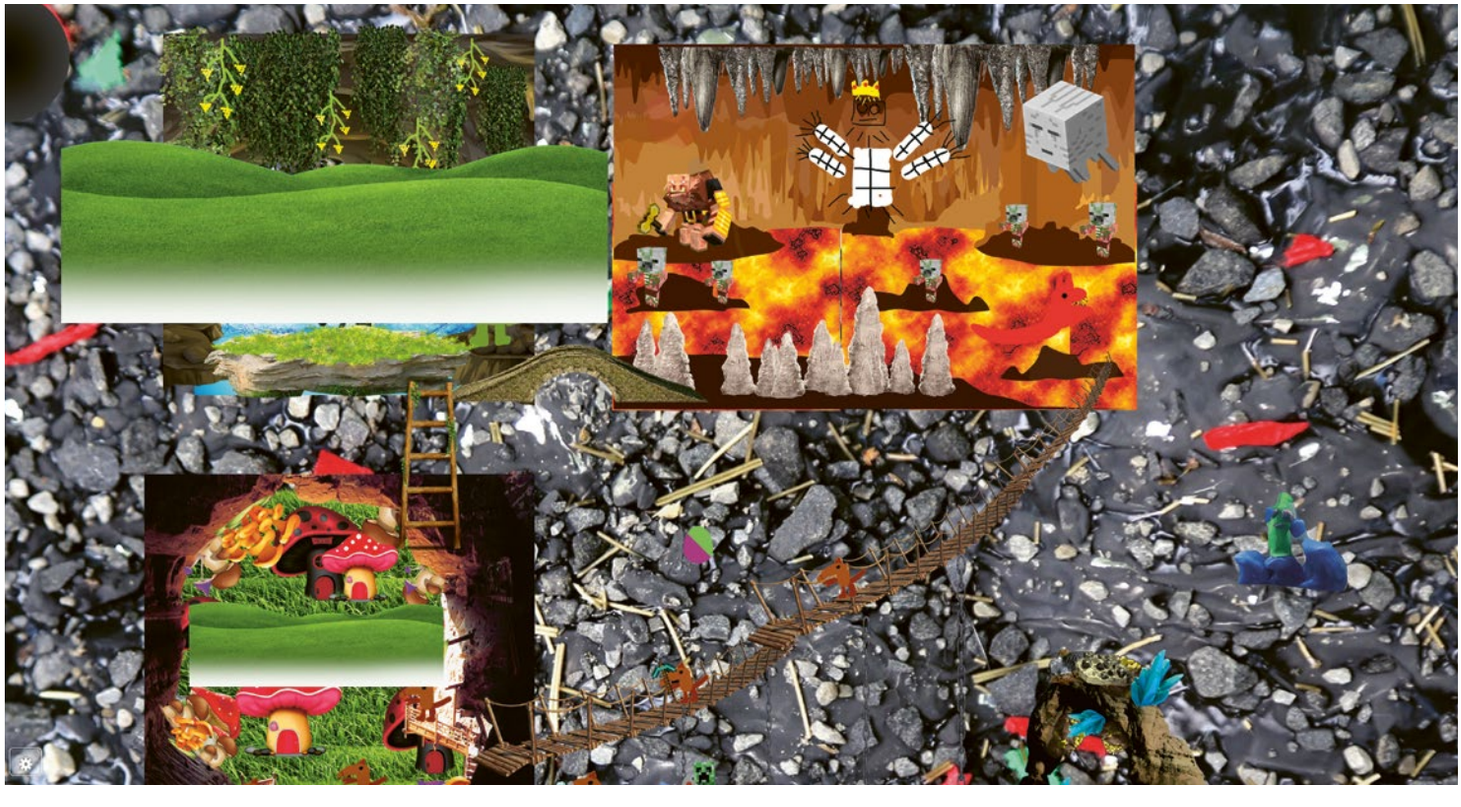


↑ **Fig. 3 CryptoBrunch workshop, HEK, 2023**
Photo: Moritz Schermbach



↖ **Fig. 4 Storytelling for the Digital Future, AR wall sticker, 2023**
Photo: Franz Wamhof

← **Fig. 5 Storytelling for the Digital Future, project studio, Erlenmatt Primary School, screenshot of the common.garden web admin page, HEK, 2023**



↓ **Fig. 6 Storytelling for the Digital Future, holiday pass for portals to digital worlds, screenshot of the earth's interior, HEK, 2023**

Contributors

Thomas Albdorf studied Transmedia Art at the University of Applied Arts in Vienna, where he graduated in 2013. He was selected as one of thirty international «Artists to Watch» by the *British Journal of Photography* in 2014 and won the UNSEEN Amsterdam Talent Award in 2016. His first institutional solo exhibition «Room With a View» opened at FOAM Amsterdam in June 2018, followed by his solo exhibition «Mirror Mirror» at Museum Folkwang in Essen in 2019. His work has been exhibited in galleries in Europe and the United States and he has featured in magazines such as *FOAM Magazine,* the *British Journal of Photography,* the *New Yorker, The New York Times,* the *Guardian* and many others. He lives and works in Vienna.

Ann-Christin Bertrand is a curator, author and lecturer in photography. She has been head of the BA Camera Arts programme at the Lucerne School of Design, Film and Art since 2022. As a curator she has organised numerous group and solo exhibitions with emerging international artists. She has introduced several programme formats that discuss the future of photography and explore the profound changes that the medium has undergone since the onset of digitalisation. She also lectures on the MA Photography programme at the ECAL/University of Art and Design Lausanne.

Stefanie Bräuer is an art historian, media studies scholar and educator. She studied in Jena, Berlin, Basel and Siena. After contributing to a project on ultrashort audiovisual forms (2014–17), she was a guest researcher at the German Centre for Art History in Paris (2017–18). Her doctoral thesis explored the implementation of oscilloscopic imagery in early 1950s experimental film (University of Basel, 2021). Currently she is working on a historical network analysis of 1980s and 1990s video practice and net activism. She teaches courses on audiovisuality and digitality and coaches students for their written BA theses.

Orlando Budelacci is vice dean of the Lucerne School of Design, Film and Art and chair of the HSLU Ethics Commission. He deals with questions of artificial intelligence, creativity and ethics and is author of the book *Mensch, Maschine, Identität. Ethik der Künstlichen Intelligenz* (Basel 2022).

Magali Franov completed her bachelor's degree in Illustration Fiction at the Lucerne University of Applied Sciences and Arts in 2023. Since then she has been working as a freelance illustrator in Basel. She is currently working on her first picture book, *Das Haus auf der Klippe*. The project was awarded the Buntspecht Picture Book Prize in 2024.

Peter Gautschi is head of the Institute for History Teaching and Memory Cultures at the University of Teacher Education Lucerne. His research areas include teaching history, public history and the design of curricula and educational media. He has taught at different school levels, publishes regularly in several languages and is co-editor of publications and serials on the teaching of history.

Anette Gehrig is an art historian and has been director and curator at the Cartoonmuseum Basel – Centre for Narrative Art since 2008. She has curated exhibitions on Christoph Niemann, Joe Sacco, Aline & Robert Crumb, Chris Ware, Posy Simmonds and Catherine Meurisse and is head of publications. The exhibitions at the Cartoonmuseum Basel cover the entire spectrum of narrative art and touch on related fields such as animation and visual arts.

Jürgen Haas studied at the Academy of Fine Arts in Stuttgart and was co-founder of Studio Film Bilder. He worked as a freelance animator, director and producer for thirty years and has headed the BA Animation programme at the Lucerne School of Design, Film and Art since 2014. The BA Animation programme was honoured as the best animation school at Animafest Zagreb in 2021.

Dario Haux is a postdoc at the University of Zurich and a bar exam candidate. As a researcher in the field of intellectual property, information technology and life sciences law at the University of Basel and legal scholar in the field of legal theory at the University of Lucerne he has published papers on artificial intelligence and adversarial attacks as well as a dissertation on digital commons and music sampling.

Jacqueline Holzer has been dean of the Lucerne School of Design, Film and Art since March 2022. Before taking up this post she was vice dean for Interdisciplinarity and Transformation. From 2013 to 2020 she was head of the Theatre programme at the Zurich University of the Arts. For a period of ten years she was a professor at the Lucerne School of Business. In 2009 she was a visiting professor at the University of Edinburgh. She has conducted research on cultural studies and the sociology of science and innovation.

Patricia Huijnen studied visual arts in Strasbourg and Vancouver. She is a qualified art teacher and holds a Certificate of Advanced Studies in museums education. She has gathered international experience in art education at MUDAM Luxembourg, the Casino – Forum for Contemporary Art Luxembourg, CAG (Contemporary Art Gallery) in Vancouver, the Aargau Art Gallery and the Biel / Bienne Festival of Photography. Patricia has been part of the museum education team at HEK (House of Electronic Arts) since 2018.

Nicolas Kerksieck has been director of the Kornhausforum Bern since 2021. As a lecturer, researcher and curator he has organised numerous exhibitions and mediation projects in Switzerland and abroad. He studied art history, musicology and business administration at the Humboldt University in Berlin and sculpture with Professor Tony Cragg at the Berlin University of the Arts. From 2011 to 2016 he was a lecturer at the Institute of Art at the Academy of Art and Design in Basel. From 2016 to 2020 he was a lecturer and head of university development at the Lucerne University of Applied Sciences and Arts – Design, Film and Art.

Justine Klaiber studied animation at the Lucerne University of Applied Sciences and Arts and in Angoulême in France. She gained experience on international film and television productions in France and Germany. She has been a freelance animator and director in Zurich since 2016 and is co-founder of the successful creative collective Team Tumult. She has been teaching 2D animation at the Lucerne School of Design, Film and Art since 2019.

Adelina Lahr is studying Illustration Fiction at the Lucerne School of Design, Film and Art and is due to graduate in 2024. In the spring semester of 2023 she completed an exchange semester at the Kingston School of Art in London, which inspired her to create the work printed here.

Evelyne Laube is an illustrator and lecturer in illustration. Since graduating from Lucerne she has been drawing under the names It's Raining Elephants and hoi Keramik. As a duo with Nina Wehrle she has already won several top international awards. She has taught workshops across Europe and in South America. Evelyne Laube has been head of the BA Illustration programme at the Lucerne School of Design, Film and Art since 2023.

Simone C Niquille is a designer and researcher based in Amsterdam. Her practice technoflesh Studio investigates the representation of identity and the digitisation of biomass in the networked space of appearance. Her work has been exhibited internationally and she has published writing in *Volume Magazine*, *AD Architecture*, *e-flux* and elsewhere. In 2016 she was a research fellow at the New Institute in Rotterdam. In 2018 she was commissioned to contribute to the Dutch Pavilion at the Venice Architecture Biennale. She received the Pax Art Award in 2020. From 2021 to 2023 she was a Mellon Researcher at the Canadian Center for Architecture. In 2023 she founded the Parametric Truth Lab for the MA Information Design programme at the Design Academy Eindhoven. She is currently investigating the architectural and bodily consequences of computer vision and researching the politics of synthetic training datasets.

Tina Ohnmacht is a lecturer and the co-ordinator of the MA Animation programme at the Lucerne School of Design, Film and Art. Tina studied literature, art history and media studies in Constance and Dublin and worked with animation film students at the Baden-Württemberg Film Academy for twenty years. In 2022 she was awarded a PhD for a study on water in animated films. In her teaching she tries to connect animation theory to practice.

Oliver Reichenstein is the founder and CEO of iA, a software company based in Tokyo and Zurich. Oliver studied philosophy in Basel and Paris and started working for a brand agency after graduating. In 2003 he moved to Japan where he founded iA. In his work Oliver always tries to make the connection between design and philosophy.

Christian Ritter is vice dean of the Lucerne School of Design, Film and Art. He was director ad interim and, before that, head of the research area art, media and design at the Collegium Helveticum of ETH Zurich, University of Zurich, and the Zurich University of the Arts. He has conducted research and curated exhibitions on digital and visual culture.

Zoe Röllin is a freelance VR artist who works with immersive drawing tools to bring stories to life in VR. She has worked on a variety of animated VR pieces in collaboration with clients such as Meta and Atlantic Productions and is teaching VR art and storytelling as a guest lecturer at the Lucerne University of Applied Sciences and Arts, from which she graduated in 2019. Her directorial debut, *Perennials*, premiered at the Venice International Film Festival in 2023.

Sören Schmeling studied art history, German literature and business administration at the universities of Freiburg (Germany) and Basel. As former head of the photo archive at Kunsthalle Basel (2012–20) he initiated the preservation and digital accessibility of visual cultural assets, a main impulse of his exhibition activities. He has taught in the art history departments at the universities of Freiburg, (Germany, 2011–12) and Zurich (2017). Since 2018 he has been a lecturer at the Lucerne School of Design, Film and Art and been head of theory on the BA Illustration programme since 2023. His research interests lie in artistic and political activism and the perception of nature in art and science.

Christian Schnellmann studied philosophy at the University of Bern and at the Sorbonne in Paris, specialising in philosophy of language and political philosophy. After working in the advertising industry and at the Bern Art Museum, he now works in communication and research at the Lucerne University of Applied Sciences and Arts, where he is particularly interested in augmented and mixed reality for spatial planning and cultural mediation. He has been involved in this area since 2023 as co-founder of the BLOP Space start-up.

Yaniv Steiner is an AI specialist with extensive experience in interaction design and human computer interaction, focusing on natural language processing, machine learning and data-driven design principles. In recent decades his work has sought to bridge the gap between humans and computers, helping people, companies and governments to connect with their purpose, tap into their creativity and design meaningful and fulfilling interactions. He has also worked as a senior information architect at the European Commission and taught at key design institutions.

Pierre Thomé studied visual arts and art education at the Academy of Fine Arts in Stuttgart. He worked as a freelance illustrator for many years before taking over as head of the illustration programme at the Lucerne School of Design, Film and Art in 2002. His work has focused on authorship, i. e. drawing as a language. He further developed his understanding of drawing in encounters with practitioners by teaching at other schools, such as the National Institute of Design in Ahmedabad, publishing books such as *Draughtsmen as Reporters* and co-organising exhibitions and symposia. In one way or another, all these activities have dealt with the theme of craft thinking. In 2023 Pierre Thomé stepped down from his role as head of illustration at Lucerne. He continues to work as a lecturer.

Axel Vogelsang is a communication designer with a PhD from Central Saint Martins, University of the Arts London. Since 2008 he has been teaching and conducting research at the Lucerne University of Applied Arts and Sciences, where he is head of the Visual Narrative research group, which explores contemporary practices of image making and storytelling in linear and non-linear media. His personal research focuses on the use of digital and social media at cultural institutions.

Birk Weiberg studied art history, media theory, philosophy and media arts in Karlsruhe and Berlin. He earned his PhD in art history from the University of Zurich with a thesis on the development of optical effects in Hollywood cinema. He has done research and teaching at the Zurich University of the Arts and the Lucerne School of Design, Film and Art. His current research interests include the histories and aesthetics of photographic images, post-digital culture, artistic practices and research and the digital transformation of research practices. At the Lucerne School of Design, Film and Art he is project head for Interdisciplinarity and Transformation and teaches on the BA Data Design + Art programme.

Marlene Wenger studied art history at the University of Bern and the Free University of Berlin and completed her doctorate in March 2021 with a thesis on post-digital display strategies. She has worked for Art Basel Unlimited (2013/14), at the Migros Museum of Contemporary Art in Zurich (2014–15), as an assistant at the City Gallery in Bern (2015/16) and as curator of the private collection of Carola and Günther Ketterer-Ertle, focussing on video art (2016–19). From 2020 to 2023 she worked as a curatorial assistant in the contemporary art department at the Bern Art Museum. She currently works as a curator and programme director at the House of Electronic Arts in Basel.

Ruedi Widmer is a graphic artist, cartoonist and satirical columnist based in Winterthur. He has been drawing cartoons regularly since 2000: for the weekly *WOZ*, the *Tages-Anzeiger*, *DAS MAGAZIN*, the German satirical magazine *Titanic* and others. In 2022 he was named Swiss Press Illustrator of the Year; in 2023 he received the Culture Prize of Winterthur. He has also been working with AI illustration tools since spring 2022.

Nummer

The *Nummer* series covers current focus areas and developments at the Lucerne School of Design, Film and Art. It is published in loose sequence at a rate of approximately one issue per year. The publications bring together texts and images from various contexts of research, higher education and further education along with features on special events, conferences and anniversaries.

Series editor
Lucerne School of Design, Film and Art,
Jacqueline Holzer

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Cover Illustration

The cover image by Jiyan Schmidiger was created in the spring of 2024 during a workshop with the artist Mélanie Courtinat. A group of students from the BA Camera Arts programme explored computer-generated imagery using scanned or downloadable models. Jiyan Schmidiger's image depicts a network of neurons, intricately weaving connections and propelling information along neuronal pathways. Within this realm, consciousness – and potentially imagination – emerges, crafted from the intricate interplay of parallels and polarities within the nervous system.