

The Nexus of Education, Climate Crisis, and Digital Media Revolution: An Examination of Future Scenarios

Paper to The NordMedia 2023 conference - Technological Takeover? Social and Cultural implications – promises and pitfalls. Norway, Bergen 16 – 18 August 2023.

By Jesper Tække, Associate Professor, Ph.D., Department of Media Studies at Aarhus University. Web: <http://www.jespertaekke.dk> Mail: imvjet@cc.au.dk

Abstract

Under the impression of the climate crisis, documented through one IPCC report after another, as well as under the impression of problems related to the ongoing digital media revolution, this paper poses the question of what role the education system can play in equipping the next generation to address these problems. In other words, the paper combines these two issues based on the assumption that society, including the education system, cannot contribute to solutions by observing the problems in isolation. This is based on the assumption that society, fundamentally, rests on a sociotechnical foundation that inherently has a destructive influence on its environment (Tække 2023). To answer the research question, after providing an initial introduction to the interweaving of the problems, the paper seeks to outline the two major traditions within education, namely Literacy, and Bildung. This part of the paper aims to describe and analyze what each of these traditions can contribute and identify where they contrast and appear inadequate in their current form. Subsequently, three future scenarios are presented for possible forms of the digitized society, which are then discussed concerning the climate crisis, a more adequate view of humanism and society, and the literacy and Bildung traditions.

Bildung, Literacy, the Environment, and digital media

This article delves into the concept of Bildung and its comparison to Literacy, considering the need for its revision in the context of the climate crisis and the digital media revolution. Traditionally associated with holistic personal development within a humanistic framework, Bildung emphasizes cognitive skills, social responsibility, and democratic values. However, the challenges posed by climate change and the complexities of digital media necessitate a reevaluation of the Bildung concept.

Drawing upon the historical influence of printing technology on education, this article underscores the need for a revision in light of the current digital media revolution. While digital media offer significant advantages, they also bring forth new challenges such as hate speech, threats to democracy, and privacy concerns.

Moreover, the urgency of addressing the climate catastrophe calls for an expansion of the Bildung concept to incorporate a biospheric perspective. Education must move beyond anthropocentric views and acknowledge the interdependence between humans and the natural world. By nurturing an understanding of the biosphere's needs and promoting

sustainable living practices, future generations can become responsible environmental stewards.

Given these challenges, this article advocates for a reconceptualization of Bildung that recognizes the dual context of the climate crisis and the digital media revolution. The revised concept should equip individuals with critical skills to navigate and evaluate digital information, fostering digital literacy and ethical digital citizenship. Simultaneously, it should cultivate a sense of global responsibility and ecological awareness, encouraging sustainable practices and embracing the biosphere's perspective.

While literacy remains a crucial foundation, Bildung offers a more comprehensive framework that encompasses social, ethical, and democratic dimensions of personal development. However, in light of the climate crisis, it is imperative to further evolve the notion of Bildung by integrating a biospheric perspective. By doing so, we can shape the next generation to become empathetic, responsible citizens, and guardians of the biosphere, ensuring a sustainable future for all life on Earth.

Later in the paper, it will be argued that it is overly simplistic to hold individuals solely responsible for the climate crisis. Consequently, viewing literacy and Bildung as direct solutions is also naïve. Taking a sociological perspective is necessary since it is at the societal level that norms and behavior are regulated. However, it should be noted that individuals and their literacy and Bildung still play a crucial role as a condition basis for society in its adaptation to the environment.

Literacy

Literacy traditionally encompasses the skills of reading and writing literature. However, due to theoretical advancements and technological progress, in today's world, it extends beyond that and includes interpretive and communicative abilities related to various forms of written and multimodal symbolic systems, including digital media (Hobbs 2016). Literacy is perceived today as the ability to create meaning by acquiring knowledge and participating in society via cultural texts and symbols. Within educational research, the concept of literacy is particularly discussed in connection with reading, writing, and media pedagogy (Olesen 2020).

Literacy is about competencies, both operational, cultural, and critical (Green 1988). As an educational tradition, it has developed after the invention of the printing technology, and later theoreticians have aimed at developing the tradition to consider new media i.e., new media literacies. In New Literacy Studies, a socioculturally situated literacy pedagogy has been developed under the concept of multiliteracies, which refers to the diversity of communicative practices that result from multimodal electronic and digital media (Olesen 2020). In this perspective, it is crucial to develop basic IT operational skills adequate for the digital media environment. As the new digital public sphere offers both new opportunities for participation and problems, e.g., surveillance capitalism (Zuboff 2019), there is also a significant need for critical digital literacy (Pangrazio 2016). In this context, literacy must focus on the collection of personal data and algorithmic personalization, where information is filtered and personalized based on hidden parameters, placing users in a vulnerable position to opaque commercial influences, propaganda, and fake news (Hobbs 2020).

Literacy is an Anglo-American tradition and in the main hegemonic conception, it has a strong focus on the individual who is the one who must be taught and learn to get the competencies that society needs. Anyhow, a minority of theoreticians and teachers have aimed at literacy as a solution to societal problems, including environmental problems (Rowe 2002), and in contrast to the leading conception, construe it as a vehicle for collective action, or individuals working together toward a common good (Ardoin et al. 2023). This minority conception of Literacy image parts of the European concept of Bildung.

Bildung

The Bildung concept can be defined as "the process of becoming a person who thinks and acts autonomously, in collaboration with others, based on an enlightened and justified assumption of what is in the common good in relation to a given matter" (Paulsen & Tække 2018). If we distinguish between the process as the acquisition of Bildung and the product as the possession of Bildung, the process describes the shaping of the spirit that creates itself, while the product describes the mature, enlightened, self-governing, critical, yet attentive and responsible citizen. Societally, there is a close relationship between democracy, freedom of speech, media, and Bildung, as the citizen with Bildung is a prerequisite for free public discourse and liberal democracy.

The concept of Bildung has in recent years been emphasized as a reaction to a political and educational focus on competencies, because Bildung differs from literacy, which more narrowly focuses on skills and competencies, while the concept of Bildung also includes the development of the whole person and its self-creation while considering others.

The formative aspects of Bildung are central to the humanism of the Enlightenment era, with thinkers such as Kant, Herder, Humboldt, and Hegel (Klafki, 2014). In the case of Kant, this is expressed through numerous pedagogical endeavors aimed at eliciting spiritual and practical capacities and a distinctly human character (form). Thus, Bildung fundamentally concerns what it means to be human, what image it should be shaped in, and how the shaping should take place. As an example, Kant (2012: 26) points out that a child should not only be shaped for the present society but "children ought to be educated, not for the present, but for a possibly improved condition of man in the future; that is, in a manner which is adapted to the *idea of humanity* and the whole destiny of man." In other words, for a better society in the future, which can only be achieved through this process—a notion that remains relevant today (Klafki, 2014).

In terms of freedom of speech and democracy, Bildung as an enlightenment concept must be understood in light of the increased complexity that the print-technology gradually brought to society. As the Norwegian historian Kjetil Jakobsen (2016: 18) writes: "Freedom of speech presupposes Bildung and good manners, and is based on expression culture and expression responsibility."

Klafki (2014: 66-96) formulates six essential characteristics of Bildung (See Paulsen and Tække 2017) where the fourth is of high relevance for this paper: Students should learn to think and act in a universal sense by engaging with epochal key issues. These are common issues that apply universally and touch each individual. Klafki mentions peace, the

environment, inequality, communication media, and the I/You relationship (such as questions regarding gender) as examples. This means that both digital media and the environment are included in what humans should consider as parts of the common good in a Bildung context.

Just like in the aftermath of the printing press, we now find ourselves in a new and uncertain situation with the emergence of digital media. Consequently, the question of what Bildung entails in relation to the digitalized society becomes significant. On the one hand, society is facing a new media environment characterized by a weak expression culture, resulting in conflicts, misinformation, and hateful speech, and structural societal issues such as surveillance capitalism. On the other hand, there are significant opportunities for development (perhaps opportunities to create a better society?). Bildung for the digitalized society, therefore, requires both the acquisition of appropriate skills and knowledge and the development of the ability to consider the perspective of others and the common good in this new media environment (Paulsen & Tække 2022).

According to my interpretation of Klafki (2014) and Biesta's (2012) theories, Bildung for the digitalized society must entail not only the development of skills to handle algorithms (instrumental skills) but also the ability to take responsibility for what they mean for others and for the common good. It also involves existentially reflecting on how one's engagement with digital technologies shapes one's own identity as a human being (Paulsen & Tække 2022). Digital media should be integrated into education as an epochal key issue and used in teaching if students are to be formed into mature, enlightened, self-governing, critical, and at the same time attentive, and solidaristically responsible citizens in the digitalized society (ibid.).

In conclusion, Bildung takes a much more solidary, responsible, and humanistic view than mainstream literacy which can be observed as directly dangerous for society e.g., Klafki (2014) emphasizes that the instrumental competencies must not be separated from, but must always be embedded in, teaching with a humanistic, emancipatory, and democratic aim. This means that literacy can be dangerous since competencies, for instance, engineering can be used for building a bomb, or to recklessly build technology that destroys the climate or that helps to monitor citizens with negative consequences for them as a result.

Literacy and Bildung in Relation to the Environment and digitalized society

The notion of literacy has long been associated with the acquisition of reading, writing, and numerical skills. Today it represents a fundamental aspect of education, empowering individuals with the ability to comprehend and communicate through various media. However, Bildung encompasses a broader understanding of education and personal development. Bildung goes beyond mere literacy, considering the holistic development of individuals, their engagement with society, and the nurturing of democratic values. While literacy focuses primarily on cognitive abilities and academic knowledge, Bildung emphasizes the cultivation of empathy, ethical sensibilities, and social responsibility. It encourages individuals to explore their own identities, engage with diverse perspectives, and understand their roles within a larger community (Biesta 2012). In this way, Bildung provides a framework for education that promotes intellectual growth and the development of

empathetic and responsible citizens (Paulsen and Tække 2022). Nevertheless, it is crucial to recognize that Bildung, as traditionally conceived, is rooted in an anthropocentric worldview. Developed within the framework of humanism, it often fails to consider the interconnectedness of humans with the broader natural world. As we face the looming climate catastrophe, it becomes evident that Bildung must be reconceptualized in a way where the environment is not just a subordinate subsection.

This expanded notion of Bildung could help empower individuals to make informed decisions that consider the long-term well-being of not only human societies but also the health and balance of the planet as a whole. This would maybe have a chance if we lived in a true individualistic society which both Literacy and Bildung build on, being defined in the aftermath of the printing technology. Seen from a sociological systems theoretical view society is not governed by individuals but by social systems deciding the values, laws, and norms we live by (Luhmann 1995). As I shortly will elaborate on in the next section, humans because of the acquisition of spoken language were captured by the social level of system formation, which can be described theoretically as a machine, which can be observed as the real subject for social structures and processes (Tække 2023).

The environment and communication media can only be underestimated as what Klafky (2014) describes as two epochal key issues. Where the environment includes and fosters the biosphere, the communication media transforms the human population, organization, and behavior. Therefore, the relation to the environment and the role of the media must be evaluated in a tight relation. In the next section, I will try to give a short introduction to the interplay between media and humans in their interaction with their environment.

The sociotechnical origin of the Human and the environmental problem

If we discuss the evolution of human beings from a media perspective, the role of language must be highlighted as a crucial factor (Tække 2023). Along with tools, meat, fire, and in the long run also the domestication of plants and animals, it was spoken language that made it possible for the social level of systems formation to become the over-ruling entity that is organizing the cooperation of the human population. The emergence of language allowed for a societal operational closure i.e. made the social level of systems formation self-reflective as oral language made it possible to communicate about communication (Luhmann 1995). The other side of the coin was that after the acquisition of modern language society quickly developed logics and norms that are harmful to its living environment (and thus to its own conditions of existence). Only in recent times humanity has begun to observe this problem, naming our recent epoch the Anthropocene.

Following Fitch (2010: 428) we have inherited the Machiavellian intelligence of primates (ibid), but with sociotechnical development, this "intelligence" is multiplied many times over. Towards the end of the Pleistocene (the long epoch preceding the Holocene), Homo sapiens spread out of Africa and across all continents except Antarctica. Wherever they went large parts of the megafauna were exterminated. Barnosky (2008) estimates that two-thirds of all mammal species and half of all other species weighing more than 44 kg were extinct by the end of the Pleistocene. Turvey and Crees (2019) estimate that almost two-thirds of the world's megafauna were extinct by the end of the Pleistocene. The extinction of the megafauna had fundamental effects on the structure of ecosystems, seed dispersal, surface

albedo, and biogeochemical cycles, such as nutrient transport across landscapes (ibid). Other studies show that humans already burned forested areas in the Pleistocene (Hunt et al 2012).

Following Tække (2023) It is probable that the “success” of humans began at the end of the Pleistocene, approximately 40 – 45.000 years ago, when we see an explosion in cultural production (e.g., cave paintings), tools production, the spreading to all kinds of climate, and the extinction of the megafauna. Also, it is probable that there is a time coincidence between this “success” and the acquisition of modern language. According to Tække (2023), each later medium revolution (writing, print, electronic, and now digital media) has accelerated the destruction of the living environment. With the burning of cold the traces of human activity is observable as sediments at the surface of the earth, why geologists have named the period after 1850 the *Anthropocene*. As a critic of this term echo- Marxists point out that it is misleading because it is not the human as such, but a system, the capitalist system, that is the cause of the destruction of the biosphere, why the right term should be the *Capitalocene* (Malm 2016). Tække’s (2023) argument is, that the capitalist system only is possible, sociologically seen, as a subsystem of the functionally differentiated society, and because of the basic sociotechnical “nature” of the societal steering system.

In this perspective, the social level of systems formation is self-organizing through communication in the medium of oral language. This means that the values, norms, laws, and what individuals crave as success criteria are socially constructed, and that individuals are subjectivated by the social, and lastly, that it is the social level of systems formation that is the power holder that decides what humans do. Following Luhmann (2012) society structures itself through the communication media it has at its disposal (not meaning that society is determined by technology; only society itself decides which forms are condensed in society (Luhmann 2012 vol 1: 249)). In the interpretation of Tække (2022) society differentiates internally in a tight coupling to the medium matrix it has at its disposal, and society differentiated into segments in the first medium society where it has only oral language at its disposal. Further, differentiate society into strata with the acquisition of writing and was functionally differentiated with also the printing medium as part of the societal medium matrix. Now with digital media, the situation is open and Tække (2022) makes it probable that society with digital media will differentiate in such a way that it will structure in a tight coupling to algorithms. Even though this probably will be the future, for now, it is not possible to outline how it will perform empirically (it is not easy to predict the future), why this paper will look at three parallel empirical developments, showing that society begins to structure in a tight coupling to digital media.

The three scenarios of a digitalized society.

In contemporary society, there are numerous different strategies for and views on digitalization i.e., big data, AI, and machine learning algorithms, on the political and societal level and therefore also on the educational level. For the purposes of this paper, I will discuss three different scenarios or models: a state model, a market model, and a democratic model (Paulsen and Tække 2022). The aim is not to comprehensively describe what is happening in China, the US, the EU, or anywhere else. Instead, the aim is to highlight *tendencies* and speculate about the implications of these tendencies as possible scenarios for the future. The goal is to show that the way societies respond to digitalization is important to

environmental issues and has implications in relation to Bildung and Literacy. This is because education essentially involves modifying citizens and/or encouraging and supporting citizens to modify themselves for the better (whatever this may be). I will therefore examine whether the respective models imply that digitalization is used to modify citizens educationally in a certain way decided before education begins or to modify citizens educationally, to take the perspective of the common good (potentially also to take the perspective of the biosphere). This examination opens for a later discussion about sustainability in relation to the different scenarios of societal digitalization.

The state model is a certain political and educational way of responding to digitalization. The core premise of the state model is that the state should collect, own, control, and use big data to profile citizens to control their behavior and thus maintain order. This includes profiling and controlling students and thereby shaping citizens. China is developing a "social credit system" that awards points to each person based on the person's observed behaviour. Against this background, citizens can be rewarded, punished, or prevented from taking part in various activities (Zuboff 2019 455). For example, parents with poor credit scores might be prevented from enrolling their children in certain schools (Fan et al. 2018; Backer 2018). Inspired by China, this model can be seen as a totalitarian surveillance state, where citizens are nudged and coerced through registration and calculation using a form of social points, that determine the privileges, opportunities, and punishments citizens receive. Here, it is the state that decides which values and logic, that governs the activity in society through digital media, including how education is carried out. In relation to teaching what kind of subject the student should become is decided before education begins both in terms of behaviour and knowledge. In the state model they try to produce system conform citizens that comply with what the state wants.

The market model, inspired by the USA, can be seen as both neoliberal (Han 2016) and surveillance capitalism (Zuboff 2019). The "big five" (Meta, Amazon, Apple, Microsoft, Alphabet) decide the apps, social media, shopping options, transportation options, and information options available to citizens (Dijck et al. 2018). Similarly, the societal institutions are overwhelmingly commercial businesses, so the healthcare system, banking system, transportation system, and education system operate through Silicon Valley and are based on profit motives. Citizens live in apparent freedom but are profiled and nudged to an extent that rivals the state model. Also, Byung-Chul Han (2016) writes about a *banopticon*, where, for example, you can only get a loan or insurance if you are profiled as worthy of it. In the book *Big Data in Education*, based on a very large empirical basis, Ben Williamson describes how the development of big data takes place within teaching. According to Williamson, the system normalises surveillance, and because the reward is based on visible behaviour, what is involved is raw behaviourist nudging, designed to get students to conform to specific behavioural norms. Like in the state model what kind of subject the student should become is decided before education begins both in terms of behaviour and knowledge.

The third model is conceived as *the democratic model*, inspired by the EU, where digital media are used in a transparent and democratically determined manner. The state model increases the power of the state, and the market model increases the power of the big companies, and both decrease the power of citizens. They, therefore, undermine and weaken "the power of the people" (i.e. democracy). The core of the democratic model is

that citizens and students are protected against states and big companies and empowered to be on guard and act collectively both with and against digitally based systems. Ideally, this would be done deliberately so that those who are profiled, along with their allies, such as guardians of schoolchildren and e.g., psychologists, can determine who has access to big data, what should be measured, and with what consequences. In this model, education requires students to learn to take a critical stance (Bildung) and have the necessary knowledge (Literacy), to adopt a perspective of the common good, and to existentially choose whom they become through their actions (Bildung). In this scenario what kind of subject the student should become is decided through education by the student itself guided by teachers, parents, and other humans, and by algorithms in a transparent and democratic process, where the student finds their own voice in balance with other humans.

Discussion: Education, the three scenarios and the biosphere

The observation of the environment is an epistemological problem as the theory that is used here is Luhmann's form of social constructionism. In this theory the environment is silent, and no contact is possible, while observers argue. Knowledge is only possible because of the decoupling between the system and its environment (Luhmann 1995b: 7). This does not mean that perception is impossible, but that the interpretation of it goes through language and what is always already constructed as knowledge through earlier observations and reflections. What is known through language is not a representation of the environment as it is, but an internal construction. In the current society with its functional differentiation, it is the scientific system that through its own constructions, methods, apparatus, codes, programs, and media decides what is true. This is a paradoxical situation since other functional systems also construct their own outlook; create each their own environment through their respective semantics. In the economic system, the code is the difference between what pays and what does not pay, and its medium is money. When an economist looks at society, he sees an economic cycle. In the legal system, the code is given by the difference between legal and illegal, while the medium is the law. In the political system, the medium is power, and the code is the difference between position and opposition. In a democratic society, the environment is voters and elections but in the state model of an authoritarian system which is not fully functionally differentiated, the code is more like the difference between the power holder and terrorists. Luhmann (2012 vol 2) points out that functional differentiation makes a collective effort to avert the impending ecological catastrophe impossible, highlighting the need for planning and coordination (ibid: 108). However, there is no coupling system (ibid: 115), no coordination of irritation, no central monitoring (ibid; see also Jönhill 1997). Earlier in the book, Luhmann (2012 vol 1: 182; 249) speculates that digital media (the computer) can affect the social structure. Tække (2022) suggests algorithmic differentiation as a new fundamental form of differentiation that aligns with the previous forms of differentiation. A new algorithmic differentiation does not mean that the observation of the environment jumps from social construction to a kind of realist epistemologically situation, but it does mean a new situation for societal possibilities for coordinating and organizing efforts in relation to the scientific observations of the environment (social scientific constructions like the Anthropocene and the IPCC-reports).

Review of the state model

In relation to the state model, a scenario could be an alliance between the top of the autocracy and algorithms coordinating the law and the economy in accordance with the

scientific prescriptions. As citizens are only observed as tools that through profiling, nudging, and coercion theoretically would be able to govern, it would be possible in a world without other competitors (the other two models), to act timely to save the climate and biological diversity from a human survival perspective (Nature probably would regenerate again in a posthuman era). In the state model students do not learn to decide for themselves, or only to do that to comply with what is decided by the state. Therefore, literacy is enough, the system does not want Bildung and critically autonomous thinking and deciding individuals. Conversely seen, in this model the state in accordance with algorithms can decide rules and laws which is obeyed, for the protection of the environment, escaping human irrationality and greed. However, while the climate disaster has been known and manifested and negotiated by the UN, China has become the largest emitter of CO₂, which indicates that the state model has failed when it comes to keeping the temperature rise below 1.5 degrees Celsius. It is more important for a country like China to become an economic and military superpower than to save the climate for its own population and the populations of other countries, even if in the state model it would be possible to turn the tide and set a good example for the rest of the world. Maybe this indicates a scenario with a few superhumans in the head of the party, leaving the rest of humanity at an evolutionary dead end. There is no doubt that world leaders (and very rich people) always have gotten the best medical treatment, or that they ally with every biological and technical/digital enlargement of their health, intelligence, strength, and longevity.

Review of the market model

In the market model, a scenario could be an alliance between a few multi-billionaires and algorithms, with the super-rich growing into a kind of superhumans (in the state model such a group are just not from a capitalistic top level, but from the party). This would not result in a situation where it would be probable that these few would safeguard the environment, but more probable that they in alliance with algorithms would find a way of saving themselves and their relatives in some kind of secured enclave, while the rest of the world's living creatures would become extinct or live miserable lives. In this model, the logic is purely capitalistic, and every resource (including ordinary humans like in the state model) that can be exploited would be exploited, with little regard for anything other than the satisfaction of the super-rich's own needs. In this model, there is a strong belief in market forces and in the right of personal property.

As China has never really been fully functionary differentiated, the same can be argued for the USA, because the economic subsystem is so strong, that it in an alliance with the political system (it is impossible to be elected without enormous financial power in the US) and law (defending the market forces and the right of personal property) overrule the other systems. This model is also alienated from Bildung and only finds purpose in Literacy, in the instrumental competencies separated from humanistic aims.

Even though the market model does not develop into a dystopian society with a few superhumans the tendencies still go towards a societal model where algorithms with capitalistic norms and values and not human teachers decide over students, and where children are conformed to slide uncritically into an ultra-capitalist system. According to Williamson (2017: 146) the datafication of the children's non-cognitive learning in the US is part of a biopolitical strategy designed to shape the citizens' subjectivity to pathology-

secured individuals who have the capacity to handle, on their own, the stress and anxiety created by behavioural and economic thinking (ibid). The systems also use non-cognitive methods in learning such as academic persistence, self-regulation, engagement and motivation (ibid., 135), and up to 100 emotions have been identified (ibid., 137) that can help to improve student performance through appropriate practices (ibid., 135). Various measurement techniques can reveal the learner's emotional attitude, for instance, facial expressions monitored by a webcam, eye tracking, and skin temperature and conductivity (ibid). This is the production of a quantified self who (based on behaviorist rationales) must align with an individual who is subjectivated to enter the capitalist system with an emotionally appropriate mindset and the right cognitively confirming settings. According to Williamson (2017, 145), the US is approaching an actual *nudgeocracy* and philosopher Byung-Schul Han points to a system of neoliberal *psycho-policy* (Han 2016).

In such a system it would be possible to provide the citizen (subjectivated in the education system) with the necessary literacy and to organize them to an effective effort to save the environment. But for now, the capitalistic competitive situation both internally in the US and in relation to the rest of the World makes such a scenario unprobeable. It is also hard to follow the logic of an individual subjectivated to obey neoliberalist norms and values of personal freedom to conform to anything else than what would pay for themselves in the short term.

In this model, norms, and values for the exploitation of natural resources in the capitalist competition are implemented in the algorithms that govern not only teaching but in the media that make knowledge available to the population and that support decisions, e.g., regarding investments, whom to vote for, what to eat, where to shop, etc. Even though there is a minority in the education system arguing for environmental Literacy and green movements the US just like China has failed to keep the temperature rise below 1.5 degrees Celsius.

Review of the Democratic model

The democracies of continental Europe with their Bildung tradition might stand up to the challenge of shifting to an algorithmic-based organization and at the same time saving the environment. Like the rest of the world, i.e., the two other models, the EU is embracing the algorithms, though not intending to make the union into an authoritarian state-union, but because algorithms seem necessary if the EU wants to stay on top of things. The 2021 EU regulation of AI, for instance, put different kinds of use of AI into different categories from high risk to no risk. This means that the EU, as the most critical political mover in the world, embraces AI, for example, in the health care system, and in the social care system. That also the EU embraces AI means that the EU also is of the opinion that computers better than humans can regulate human conditions including the climate crisis. In the current situation, the political power of the EU is trying to regulate companies' use of algorithms and AI, not to put an end to AI and algorithms, but to control the algorithms and regulate them democratically. But even as the EU is the forerunner both in democratic regulation of algorithms and in setting high standards for climate action with high reduction targets for CO2 the EU is also not alone on the planet but is in a situation of competition with other systems (other models). The EU is not "all in" for saving the environment and there are big differences in the level of ambition between the different countries, and even Denmark who

try to maintain a narrative about being the greenest and most sustainable economy in the world is not doing enough. The politicians look at re-election and competition with other economies and, for instance, as an old farming country Denmark fails to regulate the agricultural industry with a big negative influence on the emission of CO₂, the destruction of the marine environment, poisoning of the groundwater, and, not least, harmful to the diversity of fauna and flora.

In Denmark, we have the German tradition of Bildung, and every citizen through their schooling has been met with the Bildung ambition and not only the Literacy ambition. This means that the old concept of Bildung and its implementation in education has failed in relation to the environment; the nature that humans themselves are dependent on. As stated at the beginning of the paper the concept of Bildung must be reconceptualized to consider the environment. Bildung is part of the Enlightenment movement and humanism which means that reconceptualizing must go deeper than just one concept. Our outlook and self-understanding must also include the environment as an inseparable and indispensable part of what humanity is. My take on this necessary development would be that our understanding of humanity must reflect our contemporary knowledge (theories) about what society and the social level of systems formation is. Sociology has since thinkers like Foucault and Luhmann (maybe since Durkheim, but I am not going into that discussion here) been post-, or anti-humanistic. This means paraxially that our most adequate knowledge about humans is sociological, and after what theory that is put forward, means that it is either discourse, field, actor-network, or system that is the real subject (power holder) both in relation to epistemology and to human behaviour.

Earlier in the paper I have described the problems with acting in relation to the environment systems theoretically, as a problem inherent to the functional differentiation of society. This would be an adequate place to begin if we want to form an understanding of what it means to be a human and what image we want to shape the next generation in (Bildung). Our society is led by different functional systems which provide us with some specific problems, where the most important in this paper are the new media systems (including also mass media), politics, law, and not least the economy. It is impossible to go into detail here, but for instance, the strong economic dominance where farmers do not see the environment as environmental sustainability like they do in science (e.g. biologists) or in the green movements. For a Danish farmer, the environment is not part of a larger context where the common good is equal to environmental sustainability, but a matter of economy, and the common good is only what is good for the farmers and their internal farming culture. The politicians are afraid of the agricultural competition from abroad and the local Danish economy and in that relation their own re-election. In this situation, adequate Bildung would call for producing the next generation of farmers, politicians, and journalists to have a more sustainable outlook including the environment as an essential prerequisite for humanity.

From the sociological perspective, it would be naïve to think that individuals can make a difference because the power holder is located on the superhuman sociological level of analysis. Still, it is a societal effort to educate the population, to provide them with a Bildung including the sustainability dimension as an inseparable part of being a human and a citizen. This would be a necessary political and educational decision that would not make a

difference if it stood alone. The whole political and cultural analysis must level up to the sociological level, including the sociotechnical dimension.

The sociotechnical dimension means that the social system as the power holder, even when differentiated out in different functional systems, is a superhuman level that works as a hybridization of communication and a matrix of media. As its environment, it is primarily dependent on biological brains and bodies and psychic consciousness (developed in co-evolution with language as the structural coupling). Secondary, but as important, is the biosphere and the climatic conditions on the earth. Here the most important point is the hybridization, making the human with its structurally coupled parts of its environment into a totality, into what Tække (2023) defines as a sociotechnical autopoiesis machine. This machine transforms its environment for its own purpose. This way of using the environment to grow has now, according to natural science reports, reached its limits when it comes to sustainability.

A logical conclusion would be to program AI and algorithms to not only take an isolated human perspective i.e., growth, competition, and egoistic national and organizational interests. In this perspective, the adequate concept of Bildung plays a role in “programming” engineers, decision-makers, and e.g., financiers to construe the common good as also including the environment. Theoretically seen the social level of systems formation could be reprogrammed in the hybridization process with digital media and provide us with an algorithmic differentiation not meaning the state model or the market model or the inadequate democratic model, but a model based on the reconceptualized Bildung concept. Such a scenario is of course an utopia, but what should be the alternative to aim at?

It is an utopia because of many reasons like the immature discussion culture in digital media, bad representation in the democratic systems, the great social and economic inequalities, the competition with other models, etc. But the starting point for obtaining the goal is to rethink the theoretical statuesque: the inadequate understanding of the sociotechnical human dimension, what the power holder of society is, what the status is in society (the functional differentiation), the problem with the anthropocentric humanism which is the same as the lacking understanding of the environmental problems and the likewise inadequate concept of Bildung.

Conclusion

This paper has sought to discuss the challenges of transitioning society to the digital media environment and the environmental problems in relation to literacy and education. It has concluded that society can be observed as the actual actor. This actor is perceived as a nonhuman sociotechnical closed and preprogrammed entity that developed its basic values and norms in a distant past when humans had to survive in a harsh environment. Society, which functions through communication, emerged with spoken language and has become more efficient in exploiting the environment with each media revolution. This development has now reached a level where the environment can no longer sustain it. The issue puts the analytical abilities of humans to the test as all individuals and groups of individuals (families, organizations, countries, and unions) constantly seek to optimize their own conditions. What eludes contemporary analysis is that humanity must be considered as a whole, not just in relation to each other, but also in relation to the environment, which is their own basis of

existence. Action is currently rendered impossible by the overarching social level, as society is functionally differentiated, thus blocking a unified societal action.

However, there is a potential opening as society has previously shifted its form of differentiation as a consequence of new fundamental communication media, which have provided society with new possibilities for structuring itself. The opening lies in the fact that digital media with machine learning algorithms, AI, and big data can help coordinate different functional systems if successful programming is achieved with fundamental norms aimed at sustainability.

Upon closer analysis of various current trends in societal digitization, this opening diminishes into a rather unlikely scenario, into a utopia. The paper discusses three different scenarios or models: a state model, a market model, and a democratic model. When it comes to the environment, the state model may appear to have the greatest potential as it can enforce sustainable behavior upon individuals. However, the problem here is that a digital autocracy seems quite unsettling and not something a modern human would likely appreciate living under. The market model also has its advantages since it ultimately wouldn't be profitable to destroy the environment. However, one of the problems is that shorter-term investments align better with an individual's lifespan than the more long-term investments that are needed. Capitalists will compete to sell the last barrel of oil while standing knee-deep in water. Furthermore, the current trends of digitization in the market model seem to lead more towards nudgeocracy and governmental psycho-politics rather than Bildung and critical reflection. The democratic model suffers from a lack of popular support, as seen in Germany, where the population may support the green transition with a two-thirds majority in theory but hesitates to support it in practice, such as when it comes to replacing oil or gas heating with a heat pump.

However, there is a glimmer of light or hope in the democratic model, that the Bildung tradition with an update at the same time could lead to both a beneficial and helpful digitization and the necessary stewardship and protection of the environment. The concept of Bildung must be reconceptualized to include the environment as an essential part of humanity, which means that humanism must be reimagined at a sociologically adequate level. The individual is not the sole subject of what they think and do - all of this is socially constructed, but therefore also open to reprogramming. The fundamental selfish survival strategies of animals, as evidenced by current climate and environmental research, have proven to be a failure. The reprogramming of inadequate survival strategies can theoretically go hand in hand with a democratic and Bildung-oriented digitization of society. If Europeans truly desire survival (like a third of Germans, for example), except when it means limitations on their own consumerist pursuits, it is likely due to the outdated perception of what constitutes the common good and a lack of a posthumanist understanding of Bildung.

In a possible democratic and algorithm-controlled society, sustainability could be incorporated as a constitution in algorithmic governance while humans can receive as much help and support from artificial intelligence as will be possible.

In the current situation in the USA, there is an inherent tension in literacy efforts between the digital realm with algorithm-based education and critical environmental literacy, as

algorithms are geared towards growth rather than the environment. "Change agent skills are not included in most academic programs" (Rowe 2002). However, with the concept of Bildung, it is more natural to educate the next generation to consider the environment as part of the common good, with the aim of creating a better world than the present one.

Simultaneously, a democratic and transparent digitization could also alleviate the significant problem of inequality that, for example, leads to the protests of the French *yellow vests* against environmental measures. With an algorithm-based democratic or even deliberative model, representation and distribution of resources could be realized (such as proper calculations determining who actually overconsumes and should pay proportionally for it).

However, algorithmic governance must be transparent, and the population must be properly educated and have literacy in order to critically understand the programming of AI. For instance, the algorithms that drove the calculations of climate models until recently were programmed based on capitalist norms and values – let's burn off now and pay later (Watson et al. 2021).

References

Ardoin, N.M., Bowers, A.W. & Wheaton, M. (2023). Leveraging collective action and environmental literacy to address complex sustainability challenges. *Ambio* 52, 30–44 (2023).

Backer, L. C. (2018). Next Generation Law: Data Driven Governance and Accountability Based Regulatory Systems in the West, and Social Credit Regimes in China. July 7, 2018. SSRN: <http://dx.doi.org/10.2139/ssrn.3209997>

Barnosky, A. D. (2008). Megafauna biomass tradeoff as a driver of Quaternary and future extinctions. *PNAS*, August 12, 2008, vol. 105, suppl. 1, 11543–11548.

Biesta J. J. Gert, (2012). *Læring retur – demokratisk dannelse for en menneskelig fremtid*. København: Unge Pædagoger.

Dijck, J. v., Poell, T. and Waal, M. D. (2018). *The Platform Society*. New York: Oxford Uni. Press.

Fan, L., Das, V., Kostyuk, N. and Hussain, M. M. (2018). "Constructing a Data-Driven Society: China's Social Credit System as a State Surveillance Infrastructure." *Policy & Internet*, Vol 10, no 4.

Fitch, W. T. (2010). *The Evolution of Language*. Cambridge: Cambridge Uni. Press.

Green, B. (1988). Subject-specific Literacy and School Learning: A Focus on Writing. *Australian Journal of Education*, 32(2), pp. 156-179.

Han, Byung-Chul (2016). *Psykopolitik. Neoliberalisme og de nye magtteknikker*. Forlaget THP.

- Hobbs, R. (2016). Literacy. in Jensen, Klaus B. & Craig, Robert T. (editors). *The International Encyclopedia of Communication Theory and Philosophy*. John Wiley & Sons, Inc.
- Hobbs, R. (2020). Propaganda in an Age of Algorithmic Personalization: Expanding Literacy Research and Practice. *Reading Research Quarterly*, 55(3) pp. 521–533.
- Hunt, C. O., Gilbertson, D. D. and Rushworth, G. (2012). A 50,000-year record of late Pleistocene tropical vegetation and human impact in lowland Borneo. *Quaternary Science Reviews Volume 37*, 22 March 2012, Pages 61-80.
- Jakobsen, K. A. (2016). *Etter Charlie Hebdo – Ytringfrihetens krise i historisk lys*. Trondheim: Forlaget Press.
- Jönhill, J. I. (1997). *Samhället som system och dess ekologiska omväld*. Lund Dissertations in sociology 17.
- Kant, I. (2012). *Om pædagogik*. Aarhus: Klim.
- Klafki, W. (2014). *Dannelsesteori og didaktik – nye studier*. Aarhus: Forlaget Klim.
- Luhmann, N. (2012). *Theory of Society. (vol 1 & 2)*. Stanford, California: Stanford Uni. Press.
- Luhmann, N. (1995). *Social Systems*. Stanford: Stanford University Press.
- Luhmann, N. (1995b). Why “Systems Theory”? in *Cybernetics & Human Knowing vol 3, no. 2, 1995*.
- Malm, A. (2016). *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming*. New York: Verso Books.
- Meyrowitz, J. (1994). Medium theory, in D. Crowley og D. Mitchell (red.): *Communication theory today*, Polity Press, Cambridge, UK, 1994, pp. 50-77.
- Olesen, M. (2020). Literacy. In *Organisationskultur. Medie- og kommunikationsleksikon*. Agger, G., Nørgaard Kristensen, N., Jauert, P. & Schrøder, K. (red.). Frederiksberg: Samfundslitteratur.
- Pangrazio, L. (2016). Reconceptualising critical digital literacy. In *Discourse: Studies in the Cultural Politics of Education*, 37(2), pp. 163-174.
- Paulsen, M. and Tække, J. (2022). *A New Perspective on Education in the Digital Age - Teaching, Media and Bildung*. London: Bloomsbury. Open access: [10.5040/9781350175426.0009](https://doi.org/10.5040/9781350175426.0009).
- Paulsen, M. and Tække, J. (2018). *Digitalt understøttet faglighed og almindannelse – Bog 1: et overblik*. København: Unge Pædagoger.

Paulsen, M. and Tække, J. (2017). Main Features in the Concept of Digital Bildung. Paper to The NordMedia 2017 conference “Mediated realities – Global Challenges” Division 5: Media Literacy and Media Education. At University of Tampere, The School of Communication, Media and Theatre. 17. – 19 August

2017. http://pure.au.dk/portal/files/119525702/NordMedia_2017_JT_MP.pdf

Rowe, D. (2002). Environmental literacy and sustainability as core requirements: success stories and models. In *Teaching Sustainability at Universities*, 2002, Filho, W. L. editor, New York: Peter Lang.

Turvey, S. T. and Crees J. J. (2019). Extinction in the Anthropocene. *Current Biology* 29, R942–R995, October 7, 2019.

Tække, J (2023). The Environment as the Anthropocene – the Sociotechnical Autopoiesis Machine. Paper to the Luhmann Conference 2023 on “Environments. Observed with social systems theory”. Inter-University Centre (IUC), Dubrovnik, Croatia. 12-15 September 2023. https://pure.au.dk/portal/files/328000037/Taekke_Dubrovnik_2023.pdf

Tække, J. (2022). Algorithmic Differentiation of Society – a Luhmann Perspective on the Societal Impact of Digital Media. *Vol. 18 No. 1 (2022): Journal of Sociocybernetics*. <https://papiro.unizar.es/ojs/index.php/rc51-jos/article/view/6225>

Watson, Robert, Knorr, Wolfgang and Dyke, James (2021). Climate scientists: concept of net zero is a dangerous trap. In *The Conversation*: <https://theconversation.com/climate-scientists-concept-of-net-zero-is-a-dangerous-trap-157368>

Williamson, B. (2017). *Big Data in Education*. London: SAGE.

Zuboff, S. (2019) *Overvågningskapitalismens tidsalder*. [The Age of Surveillance Capitalism - The Fight for a Human Future at the New Frontier of Power]. København: Informations Forlag.