Hacking Innovative Pedagogy: Innovation and Digitisation to Rewild Higher Education

A COMMENTED ATLAS

HIP

DIGITAL EDUCATION REWILDED

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Hacking Innovative Pedagogy: Innovation and Digitisation to Rewild Higher Education - A Commented Atlas

Content

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A COMMENTED ATLAS

How can we improve digital capacity and build digital readiness in higher education institutions (and beyond) by using different and transformative modes of interactions and activities? To respond to this challenge, we want to **"rewild"** higher education, by focusing on just and fair pedagogies using bottom-up selected digital tools. By "rewilding" higher education pedagogy we understand the rediscovery of ways that support the complexity of human learning, that take note of inequalities generated through human/digital technology relationships, with the overall aim to reduce the negative impacts of industry driven digital environment building. This means that we want to return to the nested ingenuities communities of teachers and students carry with them. Instead of managing education from the top down, we want to set up systems and opportunities that include stakeholders and support the experimenting, (co-)creating and sharing of digi-tech solutions from the bottom up. The opportunities we are looking for are not necessarily mainstream but responsive to the teaching and learning of different communities, responding to disciplinary needs, diversity of learners and focus on just access to education. Rewilding institutional infrastructure through digital enhancements is a response to education being a cause of unsustainable human activity, while also providing the transformative potential for more sustainable ways of life.

Persistent narratives of university leadership about the effects of technological development are often uncritically accepted by policy designers, decision-makers, and individuals as inevitable and often assumed to be determinedly positive in nature. In the absence of critical awareness and dissent, many now equate any technological innovation and development with the rhetoric of progress. The pervasiveness of the digitalisation processes in higher education requires frameworks that challenge existing ideas, moving away from questions of technical implementation of technology to questions of value driven use of technology, by proposing new critical post-digital positions:

1. 'Technology is NOT neutral';

2. 'Placing technology into university environments DOES NOT lead to automatic learning gains'

3. 'Giving teachers access to educational technology DOES NOT make them automatically more professional and efficient';

4. 'Equipping universities with increased ICT DOES NOT lead to university improvement';

5. 'NOT ALL students need to be techno logical literate in order to be employable, participate in society or be a critical thinker'.

The issue is that modern universities are often driven by a liberalist ideology that is used to justify a market driven agenda. The danger thus is, that this may result in academic teaching monocultures that ignore or replace the global cultural commons and complexities. What we fear is being lost in the university context, is the nested knowledge and experiences that could

provide alternatives to the growing pressures on the needs of a diverse society. For this reason, we are looking at ways to rewild university teaching by challenging and disrupting conventional ways to think about professional development for European University teachers in a post-COVID period utilising a "Hacker Pedagogy" approach.

HACKING INNOVATIVE PEDAGOGY – TOWARDS A COMMUNITY DEFINITION

We deliberately do not want to provide a definition for what we mean by "hacking innovative pedagogy" so we remain open to what is "out there" in the messy everyday of those actually engaged in innovative pedagogical practices. Also "hacking innovative pedagogy" is entangled with the social-cultural-historical context in which concrete practices take place and therefore contains a sea of historical meaning – as any historical concept does (Adorno, 2003, p.53). Definitions define and delimit, they also identify a finite line, countering the objective to explore and stretch boundaries.

"There is a sense here that in seeking to define and pin down the terms by which we describe the field, the authors fall into the trap of unintentionally working against these very aspirations. To define a field is necessarily to put boundaries around it, to determine which writings, conversations, people are 'inside' and which are 'outside' (Gourley et al., 2021, p.333).

Hence, we decided to discuss the central ideas that for us fall under the umbrella of "hacking innovative pedagogy". In order to open a dialogue, we asked ourselves as a team to spontaneously comment on ideas in order to move towards a "community definition" (Gourley *et al.*, 2021).

"Innovative Pedagogy for me is not about new methods or technology, but would somehow allow to crack open the competitiveness present even in critical educational settings and move beyond the often paralyzing and limiting fear. Also, for me innovative pedagogy has to do with creativity, a creativity that does not necessarily result in some product, some innovative teaching success story, some project (haha). Rather it can be a transient thought, some feeling or encounter, the experience of doing something a little different in your everyday and maybe not letting anybody know about it. I guess, to me, innovative pedagogy is ultimately about the imagination and hope that things can be changed in a good way." (Iris)

"For me innovative pedagogy under the current conditions of rapidly changing world is about meeting needs. There shouldn't be the gap between the external everyday reality and inner teaching and learning practices. When life circumstances change (during the periods of crisis), new needs emerge, innovation includes openness to changes, sensitivity to needs and the courage to take risks. So, usual everyday practices reveal new ways of approaching teaching, for example, digital tools and media can be adjusted for educational purposes – WhatsApp messenger can transform into a platform for lecturing, commented document can grow into educational discussion." (Olena)

"For me, hacking innovative pedagogy means using existing methods or tools, spicing them up with creativity and curiosity and then using them to find new, exciting, or out-of-the-box solutions. It fosters experimentation, exploration, collaboration, and the integration of technology to promote critical thinking, problem solving and other key 21st century skills." (Michael)

"To hack is about tinkering with existing ideas and practices. Some of them might be tried and trusted, even old fashioned, but in the context of some teaching episode, they make so much sense. To hack your own pedagogy is to dig deeply into the reasons why some things work and others not and find inspirations in the examples that other teaching approaches may present. Real innovation for me is to pick out the jewels from my own or other examples (they may not always come from traditional classroom teaching) and adapt them so they work in the context of my own teaching." (Kathrin)

REWILDING – EDUCATION BEYOND SUSTAINABILITY

To "rewild" education is utilising terminology borrowed from biology to be used as metaphors for e.g., collections of technologies (ecosystems) and postdigital understandings of the digital vs analogue (ecotones) (e.g., Ryberg, Davidsen, Bernhard & Larsen, 2021). Similarly, the term rewilding has been used as a pedagogical and organisational metaphor that should help to think about how to restore and reclaim human connections with non-humans and the natural environment. In its core, rewilding is about restoring ecosystems from intensively managed environments that created monocultures and transform them to less managed ones that allow the return to conditions that provide and sustain more diverse cultures (Weller, 2022).

"Rewilding pedagogy to me means letting go of control and trusting in the relationality of existence. Exhaustion and regeneration are central in my understanding of "rewilding" – slowing down, sleeping, refraining from doing anything, sounds easy and utopian at the same time." (Iris)

"This non-doing that Iris advocates is critically important so as to counter the relentless outputting of the academy which can be a type of pathological extroversion" (Eamon)

"Find your niche" is a metaphor that is associated with rewilding for me. Rewilding implies preserving of the diversity of the ecosystem where the species are in comfortable and authentic conditions. Through the lens of digital education, rewilding is about not imposing "niche" that should be occupied and giving freedom to choose digital technology that is meaningful, corresponds to the educational purpose of each person, preserves the digital multitude." (Olena)

"Olena's idea of finding a niche resonates with me. I can see how educators can grab a foothold somewhere just as lichen might find a space to grow on a window ledge 20 stories up. Can we concentrate, as teachers, on some small core practices and nurture and grow those without getting caught up in the monoculture?" (Eamon)

It is fundamentally different in its holistic focus on preserving/restoring patterns of abundance and dynamics in whole ecosystems compared to atomistic approaches focusing on parts or items of an ecosystem (Carver *et al.*, 2021). The emphasis is on the shift from human-centric to an ecocentric approach that can be successfully implemented if we connect education with the broader socio-ecological context. In practice, rewilding thus entails rethinking and -organising digital education in multiple ways at multiple levels, including management, infrastructure, capacity and readiness and involves learning about complex human and non-human interrelationships and learning to recognize the connectedness and co-existence of humans and/within ecological systems (Powell & McGuigan, 2022).

"Rewilding digital pedagogy focuses on the use of technology to connect people and to use digital tools and resources for hands-on learning experiences that foster empathy, creativity and critical thinking." (Michael)

The key idea of rewilding is therefore on restoring ecosystems, by preserving diversity and moving towards self-sustaining nature that is resilient and anticipatory to future challenges (Carver *et al.*, 2021).

"Carver et al.'s point of creating more resilient and anticipating ecosystems is key to me when I think about rewilding digital education. We do not know challenges and needs of the future. Therefore, I see monocultures as very fragile to unforeseen futures that will need prompt responses as experienced in recent time. We need a humanity that is diverse and innovative also in more digital futures of education." (Niels)

Macgilchrist (2021) explains that rewilding technologies serves a public good; is about education beyond sustainability; and focuses on awareness of educational technology within global human relations. Herbrechter (2022, *https:// stefanherbrechter.com/unlearning-to-be-humanist/*) writes that "to have a future, it seems that "we" are having to unlearn everything "we" know and believe about humans, human nature and humanity. This unlearning process, if it is not to be a mere dehumanising self-annihilation, however, will have to be carefully and critically thought through. Unlearning to be human, in fact, amounts to nothing less than the deconstruction of humanism in all its guises."

"This idea from Herbrechter, about the need to relearn is for me the important part. By the time we enter tertiary education, several systems have shaped our ideas about learning. If I want to rewild education, I need to remember the moments where my students and I made educational things work very well. Put in the context of this project, I am interested in those instances where digital technology gave us opportunities that would go beyond what analogue tools might be able to offer." (Kathrin)

HACKER PEDAGOGY AND STORIFIED LEARNING

Hacker pedagogy evokes a critical perspective that questions the status quo and many taken for-granted assumptions about effective teaching practice. It challenges educators to seriously question some of the sacred cows about good teaching, learning and assessment and explores the new terrain of digital disruption to help reimagine the art of the possible. In this sense, 'hacker pedagogy' is a mindset rather than a well-developed theory or tangible concept that embraces more creative, disruptive and playful ways of teaching and learning spaces that push traditional boundaries within a larger and more complex education system. It explores and navigates inherent tensions between: big EdTech and little EdTech; centralised EdTech and localised EdTech; commercialized EdTech and free and open EdTech.

An underlying assumption of hacker pedagogy is that EdTech is not neutral and needs to be understood as part of wider social practice. From this perspective, it seeks to give voice to critical educators who work at the margins of EdTech. Hacker pedagogies invite participants to experiment with tools and methods that can be adapted to different educational contexts and bridge between physical and online learning spaces.

Hacker pedagogies confront the institutional rhetoric and inherent tensions in the language of promoting innovative teaching and learning transformation through new digital technologies in traditional systems. It argues this is an oxymoron. The system always constrains the scope for disruptive innovation, pushing boundaries and breaking new ground. On the other hand, it is problematic for hacker pedagogies to break entirely free of the system, which suggests a dynamic relationship exists between leading-edge innovation and the state of the actual. Thus, hacker pedagogies are entangled in a complex nest of dependencies influenced by traditional norms. Threads will need to be pulled from initiatives that aim to make more inclusive hacker spaces moving away from "technology-centric activities, welcoming artistic or activistic practices and crafts that have not commonly been considered hacking" (Richterich, 2022, p.12).

"At first, I understood hacker pedagogy as tuning or performance enhancing existing practices in the same way as a mechanic can pull out a bit more performance of a factory car, or how IT specialists can overclock CPUs to run a bit faster. Now, though, I believe it goes beyond that. It is a mindset that involves critically questioning doctrines that limit and conform us in general and encourage us to completely reimagining how things could be." (Niels)

Storytelling is an important part of hacker pedagogy. Whilst students should be given clear (and concise!) descriptions of learning and its desired outcomes, hacker pedagogy recognises that these are not the full story. All of the answers may not be in the course textbooks, lectures, or other official doctrine. Students will inevitably need to find workarounds and strategies to navigate the system that ultimately help them make sense of the system.

"Isn't a rich (or terrible) educational experience in reflection all about storytelling? The events when we made meaningful connections that involved our own stories old and new and were able to apply understanding. Far worse are the hours spent in educational settings that seemed to have come and gone without much of a trace. Times spent just waiting for things to be over because we were so bored and disconnected." (Kathrin)

In Orr's (1990) seminal study of photocopy repair technicians he noted how they navigated the official bureaucracy of their supervisors and plugged gaps in the manuals by exchanging stories with each other about their success in fixing machines.

Likewise, students will hack their learning, telling each story as acts of educational sense-making. Students will forage for solutions to educational challenges alone, together and under the guidance of their teachers at different junctures. We ward against systems and theories that rely on "extractive logic, focus on a person-in-situation, depend on binary definitions and assume that information interaction changes people's lives for the better" (Costello & Floegel, 2021). Students will navigate choppy online seas of misinformation, bots, social media toxicity, essay mills, paywalls and pyramid schemes in order to find small sunlit islands of conviviality. On such islands of connection students will sift and build temporary knowledge structures, integrating as much of them as they can before they return to their formal educational assessment spaces and requirements. Students will also need to hack their official institutional infrastructure where it is coercive, inaccessible, exclusionary or just annoyingly difficult to use. Moreover, in order to solve the huge challenges, we face students will need to think beyond the box and the boundaries of conventional wisdoms:

"The facts, alone, will not save us. Social change requires novel fictions that reimagine and rework all that is taken for granted about the current structure of society. Such narratives are not meant to convince others of what is, but to expand our own visions of what is possible." (Benjamin, 2016)

Hacker pedagogy will involve telling stories about almost impossibly hopeful educational futures (Houlden & Veletsianos, 2022) or dystopian ones which could be acts of care (Ross, 2022).

TECHNO-FEMINISM AND ECOLOGIES OF CARE

Techno-feminism pays attention to the relation between gender and technology, highlighting the social and political implications of technology. Non-human elements (technology) seen through this lens, appear in new configurations of notions of care and responsibility (Pujol & Montenegro, 2015). The techno-feminist turn critiques traditional concepts of technology that are based on male activities and traditions that define technology design and the development of artefacts (Wajcman, 1991). Gendered misconceptions shape technology development and roll outs (Shevinksy, 2015). It is therefore interesting to examine exceptional spaces such as feminist hackerspaces, since they illustrate alternative forms of practical and critical engagement with technology and how "women devise, choose, and discuss technology to facilitate their creative practices and learning efforts" (Knopke, 2012, p.4).

"To me the techno-feminist approach is anti-egalitarian and pro-wellbeing of teachers, students and citizens, it is about critiquing normative models of abilities." (Kathrin)

Techno-feminism intersects with crowdsourcing in networks such as FemEdTech which has given rich cases studies of "shared curation, collaborative writing and purposeful reflection as contested fields of action" (Beetham *et al.*, 2022). Building solidarity and shared resources in open networks are seen as "'holding up' the flow of knowledge in networks, potentially redistributing the capital of attention and connectivity".

Techno-feminism may also offer insights into how identities are constructed and negotiated in ways that move beyond male-female dichotomies. As such feminist perspectives are relevant beyond questions of gender and women. They may call us to have regard for those most vulnerable, with least power and most in need, in situations close enough for us to attend to. They call for ecologies of care (Rübner & Zechner, 2020). Such ecologies will be composed of elements that call for rewilding approaches to our entangled (Otrel-Cass, 2019) and often problematic relationships to technology (Macgilchrist, 2021).

FROM CROWDSOURCING TO COMPANION LEARNING

Crowdsourcing or the 'wisdom of crowds' (Surowiecki, 2004) is based on the idea that some tasks can be best completed by large groups working together. This idea is informed by the concept of 'collective intelligence' (Levy, 1997). Put into an educational context the idea is to employ voting possibilities that allow to source critique or gain feedback on content or methods. It makes space for hearing different views and should include steps that allow participants to create or provide solutions to each other's problems (Farasat *et al.*, 2017). Initial hopes for the wisdom of crowds however have been tempered by the realities of hostile online environments, that can be hacked by black hat forces or captured by groups that are

hostile to creating genuine open and safe educational spaces that are inclusive and accepting. The FemedTech Network is one example of an initiative that seeks to grow and sustain safe spaces (see for example Atenas *et al.*, 2022). This collective seeks to enable curation and collaboration as activism.

In addition, crowd learning intersects with virtual companion learning. AI reaches further into every aspect of learning now. We can see AI as a form of assemblage or entanglement of algorithms and crowds for all AIs are trained on a data set that was manually generated by human bodied beings. AI augmentation, or virtual companion learning, will be one the most challenging issues for students and educators to tackle as AI advances. As hackers should we embrace this challenge with open arms? As the authors of the Manifest for Teaching Online have it: "Automation need not impoverish education: We welcome our new AI robot colleagues" (Bayne *et al.*, 2020). The bombshell of ChatGPT and GenAI have asked new questions about unfettered machine learning technologies and their potentially destructive effects on traditional educational forms. We must ask if we should allow our human capacity for mental proliferation to be scaled relentlessly by machines (Costello, 2023).

"In times of AIs like ChatGPT, we urgently need to ask ourselves about the fundamentals of knowledge production and whether we were ever truly able to ascribe knowledge products to one person only. Is it not that we always build on the shoulders of others? AI has outpaced us for now in speed, not necessarily in sophistication but it is quickly getting there." (Kathrin)

"We also need to consider the possibility that AIs promising and delivering knowledge instantly might amplify the instrumentalization of knowledge seen in recent time. Why would anyone then bother to learn? Because knowledge help us to understand and navigate the world we live in. Our knowledge is part of our personal engagement to the world and each other. What we should be asking is, how can AI help us to learn and not how it can relieve us from learning." (Niels)

AIs are not just composed of algorithms but are enacted on physical devices, in classrooms or online learning spaces. AIs are trained on data from real humans. In other words, living beings, machines, and software are all objects that pop up in AI companion learning. Our orientation to all of these living and non-living objects is critical. Hacker pedagogies call us to proceed with care and a commitment to trying to uncover what care in ordinary educational acts, tools and practices might mean. As de La Bellacasa (2017) puts it, "care stands for a signifier of necessary yet mostly dismissed labours of everyday maintenance of life, an ethico-political commitment to neglected things, and the affective remaking of relationships with our objects. All these dimensions of caring can integrate the everyday doings of knowledge construction in and about technoscience."

Lastly, our companions are not just derived from humans as AI would ostensibly seem to be. Rather animals and plants are critical companions and friends. Even if the planet was saved for humans, it would be a bleak place without plants and animals and hence their companionship should be somehow acknowledged and factored into learning scenarios and intentions (Haraway, 2003). Indigenous philosophies and practices may prove important to this end for "rethinking the integration of the dualism between humanity and ecology" (Irwin, 2021).

Ultimately, we must rewild our thinking to let our world breathe. We must be ready to unplug, leave things alone and engage in forms of slow scholarship and peaceful practice (MyCroft & Sidebottom, 2017).
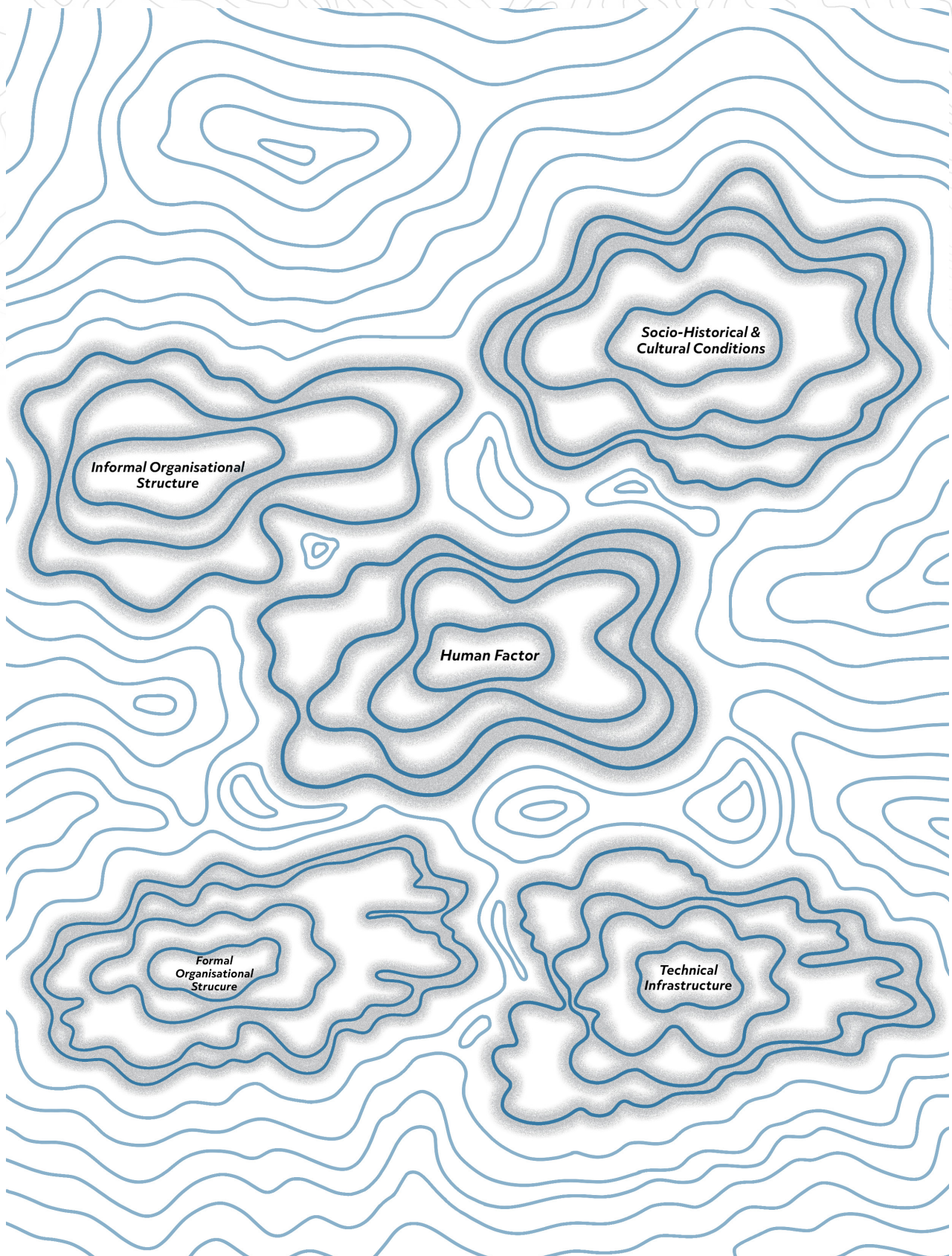
SEEING DIGITAL ECOSYSTEMS LIKE AN ATLAS

The next part of this synthesis report is presented as an annotated atlas, a map of voices telling us about research, teaching, management and policy making decisions regarding the digitalisation efforts at higher education institutions. The map presents ideas and items that research has reported to be aware of when existing digitalisation systems are evaluated and plans for further development are made. Deciding to share the report as an atlas is not unproblematic, since it provides readers with a collection of disparate parts, a kind of aerial view that invites looking for specific information about a specific topic. But this arrangement also invites the reader to wander and be attracted to adjoining details of the map perhaps out of curiosity. It should be used as a guide to aid self-evaluation efforts and scaffold discussions across various stakeholders, including teachers, students, management, IT specialists and the public. The atlas does not claim universality but the authors are aware of the partial account.

The atlas includes a map and a commentary page to provide an overview. The commentary provides an overview of the map topic, the content of the map and the major strands and elaborates on aspects that may be of special interest to the reader.

Each map focuses on a core topic and displays key aspects that are relevant and connected to the core topic. The topic and its connects were developed based on a literature synthesis.

The map starts from a central node, Human Factor and Digital Education Ecosystems. This central node divides into four main maps: socio-historical and cultural conditions, technical infrastructure, the formal and informational structure. The decision to present a synthesis report as an atlas was also based on the relevance of using the metaphor of a digital ecosystem, where we are using the imagery of a topographic map that has contour lines that allow to point out the natural and artificial features of a landscape.

A digital education ecosystem map

Socio-Historical &
Cultural Conditions

Informal Organisational
Structure

Human Factor

Formal
Organisational
Strucure

Technical
Infrastructure

Voices Atlas, Map 1, the central node

Map labels: Teachers, Students, Stakeholders; Non-Human Actors; Hyper-connected Environments; Vulnerabilities, Responsibilites, Need to Care; Individual Competence; End Users; Human Factor; Existing Knowledge and Experiences; Human Relations; Human Actors; Physical Contact; Virtual & Physical Space
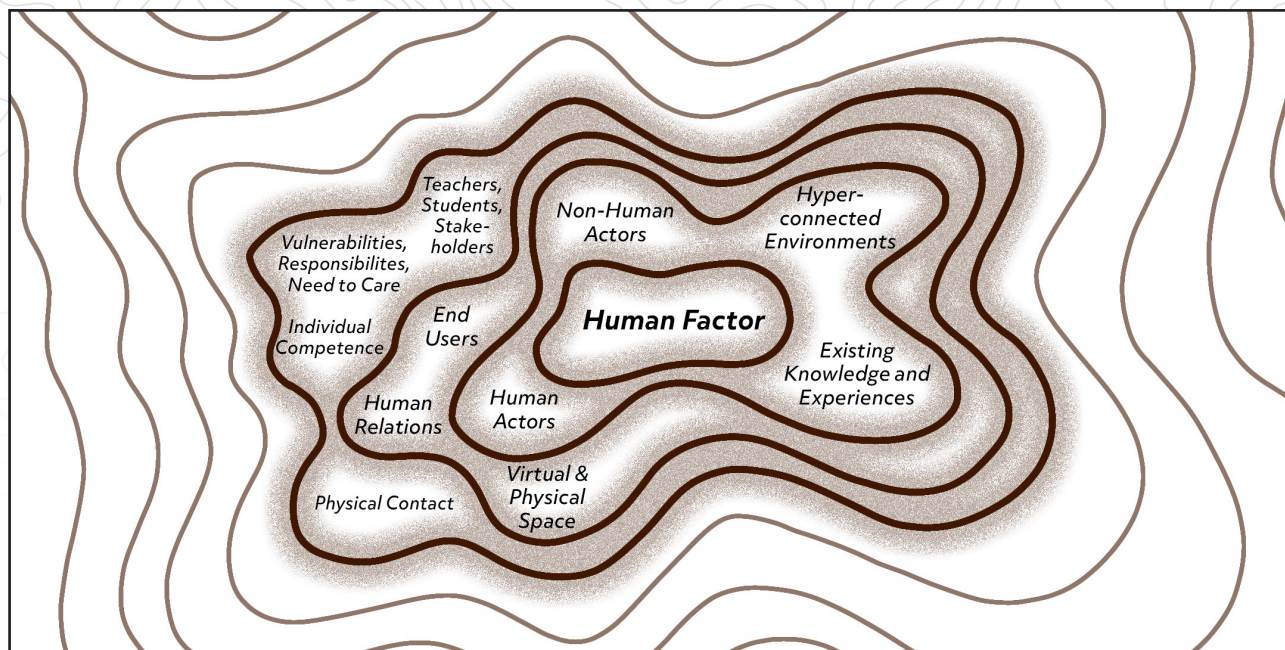
THE HUMAN FACTOR AND DIGITAL EDUCATION ECOSYSTEMS

COMMENTARY MAP 1

People are entangled with the hyperconnected and digitalised environments that shape modern education ecosystems and the more entanglement there is the more it seems important to identify the **human factor**. When we are thinking about digital rewilding, we need to start by placing the human factor into the centre so we can consider and reflect on issues attributed to knowledge and power in order to think how we can maintain control and address questions of responsibilities between **human** and **non-human** actors. To place the human factor central should also allow us to follow up on new forms of **vulnerabilities** and the need to **care** when there is increasing reliance on informational infrastructures with undesirable consequences (Floridi, 2015, p.9).

To think about digital transformations and the human factor we need to start by exploring our **existing knowledge and experiences** before challenging the fundamental and most relevant characteristics of any educational ecosystem (i.e., the **institutional culture, strategies of management, the mix of technology and operational organisation**) and place end users at the top of all strategic decisions, initiatives and actions (Savić, 2019). The massive changes that are caused by digital transformation also generate cultural tensions as the digital ambitions and initiatives of digital ecosystems confront long-standing operational goals and create competing priorities that are difficult to balance (Marović *et al.*, 2019).

The **human factor** in digital transformation needs to stay in focus, so **end-users (e.g., teachers, students, pupils, parents, experts, instructors...)** remain human (Marović *et al.*, 2019). Approaching digital transformation with the lens of human factors is crucial for modern institutions or organisations that must connect end-users to an overriding framework that encourages the further development of data management, real-time communication and analytics (Smith, 2019).

Individual competences of teachers and students play a significant role in the process of implementation of technologies. Teachers' competences and traits (adaptability, flexibility, openness) contribute to improving the communication, teaching and learning practices and outcomes. However, teachers' readiness to embrace technology is dependent on the institution readiness (see map 2), as technology should be incorporated at different levels at institutions (curriculum development, standardised assessment, etc.) (Gupta, Seetharaman, & Maddulety, 2020).

Human relations play out in the preferences to share both common virtual and physical space (i.e., internet cafe) and it is here where social practices can be observed. Places where **physical contact** between embodied human actors takes place, can create favourable atmospheres (in case of an internet cafe it's an atmosphere without the pressure peers or work), where people with the similar interests may meet, share their interests and keep in touch while doing the activities, collaborating and socialising. A mixture of virtual and physical contact can turn the virtual experience into then a hybrid one (Nardi, 2010, p.180-181).

Voices Atlas, Map 2
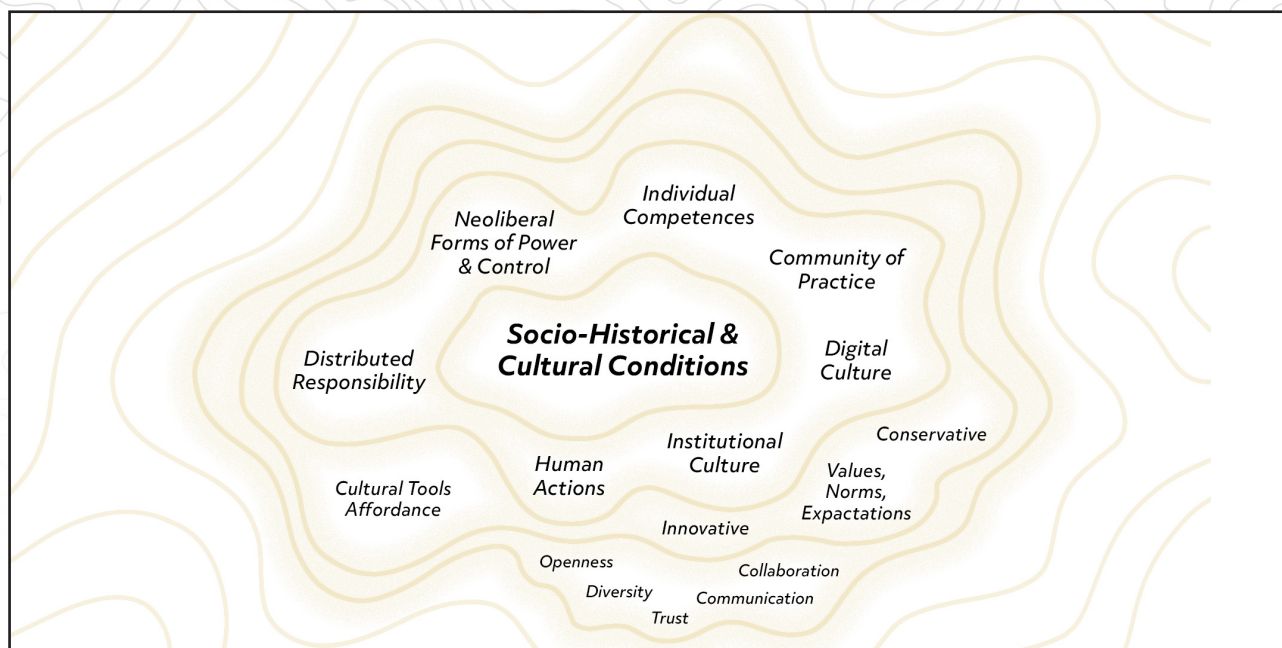
SOCIO-HISTORICAL AND CULTURAL CONDITIONS OF DIGITAL EDUCATIONAL ECOSYSTEMS

COMMENTARY MAP 2

As a late-modern so-called digital society we have access to an abundance of informational resources and the capacity to attend to sharing and orchestrating information, however, we find ourselves still very much bound by our social and cultural history and traditions. With digital environments and technologies becoming "smarter", their persuasive powers grow. They challenge and make us rethink **socio-historical and cultural conditions.**

"Rationality and disembodied reason were the specifically modern attributes of humans… And responsibility for the effects brought about by technological artefacts was attributed to their designer, producer, retailer or user. ICTs challenge these assumptions by calling for notions of distributed responsibility." (Floridi, 2015, p.8)

Digital education ecosystems have been based on existing and sometimes nested socio-historical and cultural conditions. To understand how the cultural dimension of organisations shape digital learning ecosystems, we have to identify **institutional culture** first. Institutions have been eager, to identify and incorporate changes in response to so-

cial demands stemming from an information society, since they are said to be less likely to fall behind and promote future learning ecosystem (Walcutt & Schatz, 2019, p. 340-341).

When we talk about **socio-historical and cultural conditions** we mean the situations that **reveal human actions** and **cultural, institutional, and historical context** in which this action takes place. All **actions correspond to normative values** and organisational structure. However, analysing human actions within a cultural context can't be separated from the mediational tools, the **"cultural tools"** of concepts and artefacts, that are nested in the history and culture. In socio-cultural theory, the term **"affordance"** is used to specify a (digital) tool's possibilities to mediate human actions (Somekh, 2007).

Socio-cultural conditions shape the process of interaction and communication with different groups of stakeholders, also defined by the concept of "community of practices" – "informal, situated learning of apprentices (students) with acknowledged practitioners". The socio-cultural nature of **community of practice** is expressed by the meaning of the separate words, where practice is understood as a **social practice** that is developed through the mediated actions of agents, whereas "community" correlates to **rules and values**, divisions of **labour, shared objects** of the group as a whole (Somekh, 2007).

Institutional culture is a socially constructed phenomenon in which individuals learn, perceive, reproduce or examine and alter the values, norms and expectations of a certain group of people (Kezar & Eckel, 2002). **Conservative culture** is proved to be one of the constraints to implementing digital innovations (Vicente Lucas, Carlos, & Bem-Haja, 2020). The restraining factors in institutional culture include lack of shared vision of the strategy, segmentation and hierarchical structures, management

control, work overloads, risk aversion, no reward and recognition strategy. **Innovative culture** is agile, nimble, constantly evolving, open to experiments and diversity of the viewpoints. There are a number of factors that shape the innovative nature of culture: leadership, commitments, strategy, structure, mechanisms of support, trust, communication, distributed network, attitude, etc. Encouraging collaboration internally and externally with the special focus on trustful relationships is essential for building culture of innovation (Zhu & Engels, 2014).
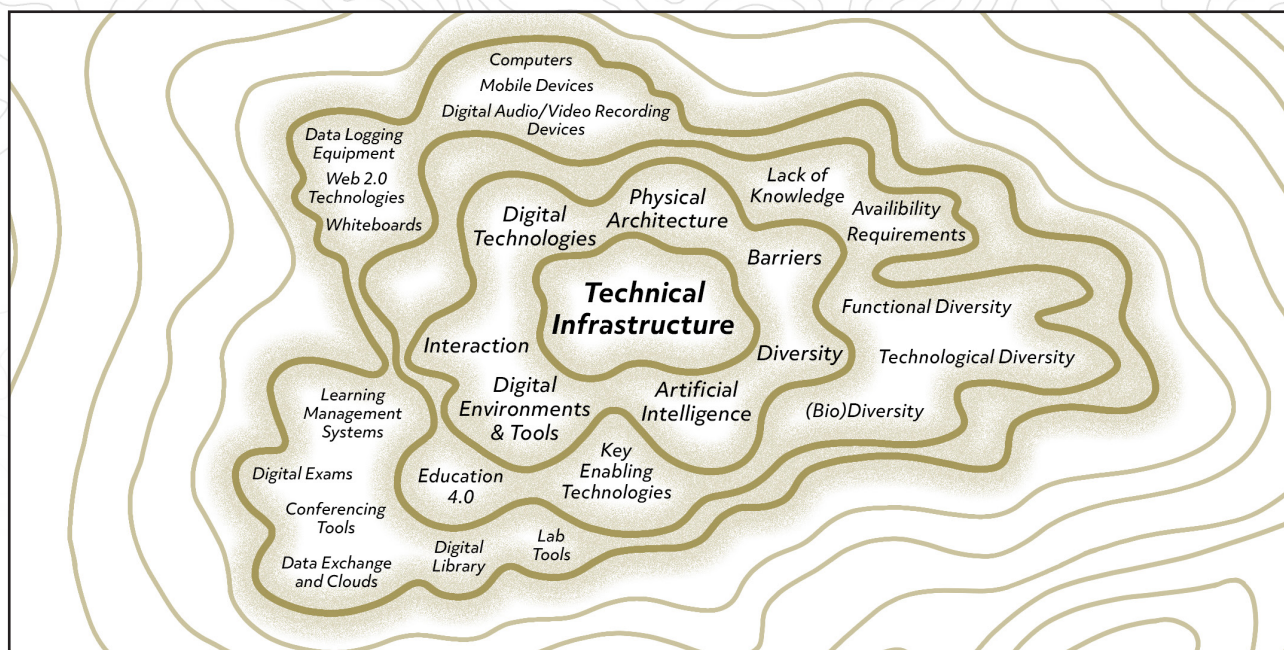
The institutional culture evolves due to the implementation of innovations, its main shifts concern re-imaging partnerships across an institution. Thus, when **a new type of digital culture** – for instance a collaborative one – emerges, it can contribute to having **trust in technology** and increase **decision making** (Grajek & Reinitz, 2019). However, this level of trust can also become betrayed and begs the question of what it means to design environments that allow individuals to act responsibly. With a focus on the rational individual Western-oriented, **neoliberal** institutions have shifted their emphases on investing into systems that provide them with more authoritarian forms of power and control, gouvernmentalite' as Foucault puts it.

Strategic investment into **infrastructure** has been utilised by institutions to create hubs for co-working and interaction (co-creational infrastructure) but at the same time has infrastructure supported control, monitoring and the channelling of attention. This means that infrastructure is not neutral. Institutions have done this frequently through their work processes, tools and rules. Digital environments are a continuation of existing institutional practices.

When we talk about the **digital culture within an organisation,** we mean the set of values and attitudes that a certain community is based on.

Rewilding digital culture allows for the instilling of values and attitudes of individuals who are part of a social group, to support positive and open characteristics and perhaps reduce the constraints to the use and non-use of digital technologies (Brunetti *et al.*, 2020). The path for (re)building a digital ecosystem at educational institutions can span from individual development to collaborative innovation (Reichert, 2019). At the **individual level** it is essential to develop digital skills through training (lifelong programmes for staff) that focus on diagnostic and further enhancement of digital skills, talents and support continued spreading of digital culture (Brunetti *et al.*, 2020).

Voices Atlas, Map 3

Technical Infrastructure

Physical Architecture · Digital Technologies · Data Logging Equipment · Web 2.0 Technologies · Whiteboards · Computers · Mobile Devices · Digital Audio/Video Recording Devices · Lack of Knowledge · Availibility Requirements · Barriers · Functional Diversity · Technological Diversity · Diversity · (Bio)Diversity · Artificial Intelligence · Interaction · Digital Environments & Tools · Learning Management Systems · Digital Exams · Conferencing Tools · Data Exchange and Clouds · Digital Library · Education 4.0 · Key Enabling Technologies · Lab Tools

TECHNICAL INFRASTRUCTURE

COMMENTARY MAP 3

In order to rewild digital education systems we need to consider the significance and power of infrastructure.

> *"My conclusion was that we need to construct an infrastructure that allows for a plurality of publics, a choice of exposure and places to hide. Such an infrastructure cannot be taken for granted, it will not appear of itself, nor will it grow organically or 'naturally' from the computational layers we are currently putting in place." (Hildebrandt, 2015, p. 187)*

Digital technologies that furnish the technical infrastructure in higher education include "the subset of electronic technologies encompassing hardware and software used by individuals for educational, social and/or entertainment purposes in the formal and informal contexts of their everyday lives" (Ng, 2015, p. 4). This may include computers, mobile devices, digital audio- and video-recording devices, data logging equipment, whiteboards, various Web 2.0 technologies including online resources and tools and educational software (Ng, 2015). Reasons for providing digital technologies to students and teacher include support of learning and teaching to reach set learning goals, to develop digital competences and/or to become a digital citizen as life-long learner (Ng, 2015).

In education, the term **"Education 4.0"** is a relatively new concept and closely connected to the term "Industry 4.0" (Goldin *et al.*, 2022). Different studies that deal with the topic of Education 4.0 have defined some core elements encompassing: new learning formats, location and time-independent learning, individual and

personalised learning, globalisation and international exposure, gamification to motivate students and teachers, ability to search and locate information and knowledge, lifelong learning, exams for evaluation, self-organisation, interdisciplinary content, individual assessment, collaborative and active learning, new media for learning (Goldin et al, 2022). **Digital tools** that are said to enable Education 4.0 and can be found in almost all higher education environments include Learning Management Systems (LMS), video conferencing tools, digital exam assessment tools, data exchange and cloud systems, document collaboration tools, game-based learning tools, digital library and database tools, virtual and remote lab tools, digital white- and chalkboard tools or digital gradebooks (Goldin et al, 2022).

One of those key tools are **Learning Management Systems (LMS).** They are typically e-learning platform as web-based software application that is used to help and improve students' experiences of learning as well as to house a teacher's depositories of knowledge about specific topics. Those platforms include an in-built hierarchy between teacher and students, and they are designed to manage content, interactions, assessment, and evaluation of activities. Learning Management Systems can also provide environments for students to interact increasingly in mobile formats (Mohd Kasim & Khalid, 2016). Typically, LMS are classified into three types: tools for learning skills, tools for communication and tools for productivity (Srichanyachon, 2014).

Infrastructure tools can also act as **barriers** for moving towards an education 4.0: in the simplest form if they stay hidden because of a lack of knowledge among teachers or students about the availability of digital tools, or the requirement for teachers and students to take

individual responsibility when they use different tools (Goldin *et al*, 2022).

Organisations focus on budgeting to ensure access to infrastructures and technologies. So-called **'key enabling technologies' (KETs),** are characterised by their pervasive character, and may enable processes and services. Because of this, organisations focus often on investments in such technologies however, often they have not been tested or tested for educational purposes to support such claims (Evangelistal *et al.*, 2018).

Diversity plays an important role in shaping how infrastructure may be utilized since diversity facilitates development. Diversity in digital learning environment can be described according to different criteria:

- According to the theory of connectivism (Siemens, 2005), the term **"functional diversity"** is used to disclose individuals' use of digital technologies; this kind of diversity focuses on the differences in searching for, navigating, understanding the connections and evaluating the information, distributed across the networks;

- **Technological diversity** increases the inclusiveness of the ecosystem as it avoids monocultural technology (for example, when the ecosystem is built only on one operating system or products of one company) (Lane & Goode, 2021);

- **(Bio)Diversity** includes the intersection of gender diversity and technology, since technology is often associated to be an image of masculinity and power. Studying the issues of digital ecosystem building and functioning, it is essential to identify women as both designers and users of technology. However, is also important not to apply a naturalized understanding of "women" and to

understand gender in intersection with other categories like class, race or disability (e.g., Crenshaw, 1989). An intersectional techno-feminist perspective on the design and use of technology and technical infrastructure may disclose needs that have not been met so far and transformative practices that move beyond the dichotomy of feeling and thinking (caring ethics and rationality) (Faulkner, 2011).

The **interaction** with the technical infrastructure in an ecosystem supports its function and allows the sharing of information and resources. The interactions between humans and non-humans (computers, technologies, information system) has also accelerated the development and deployment of **artificial intelligence** (Brunetti *et al.*, 2020) highlighting also questions on how to safeguard human rights and freedom (Laouris, 2015).

Voices Atlas, Map 4
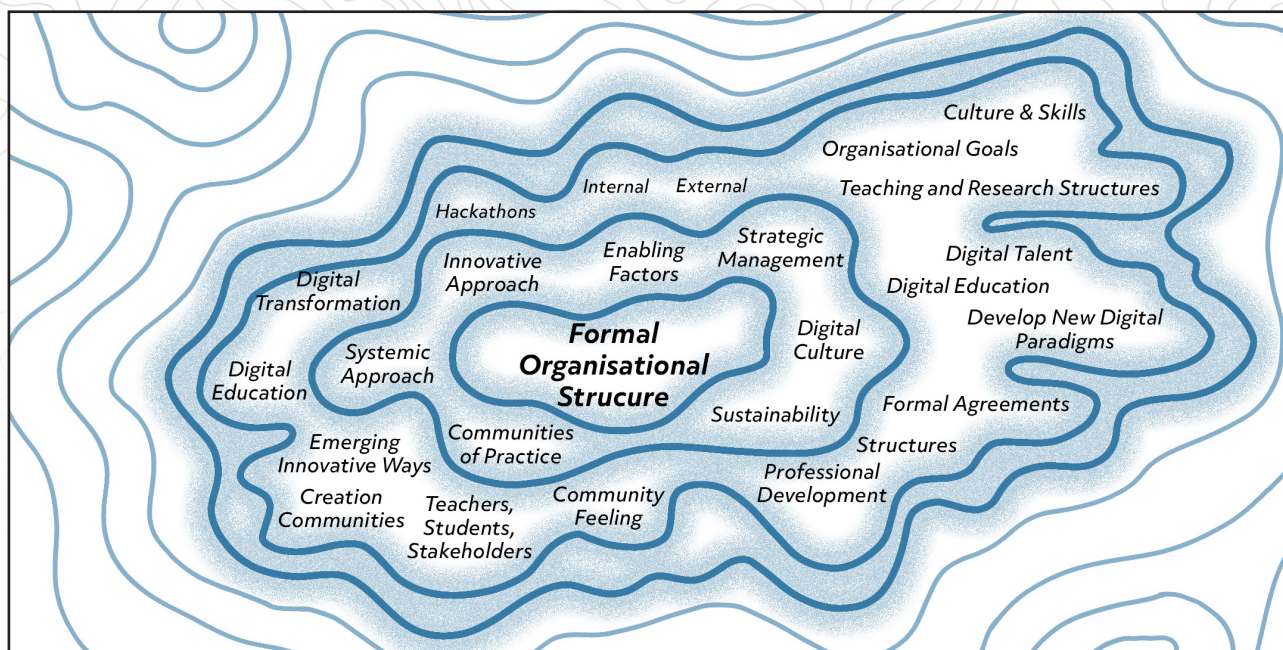
FORMAL ORGANISATIONAL STRUCTURE

COMMENTARY MAP 4

Late modern universities are facing the liquidity of modern societies. With liquidity we mean that individuals have learned (also from and through the use of technology) to rely on themselves, and that relations with others may be uncertain (Arena & Hussenot, 2021; Bauman, 2000). For the formal management structures at universities, it means that, digital transformations in education require specific **systemic approaches.**

To enable transformative teaching through digital approaches, an organisation needs to make formal strategic **management** decisions. A priority area is to define the **organisation's goals** (mindsets or plausible accounts) how the organisational phenomena are being produced (Arena & Hussenot, 2021) and begin with the identification of existing "culture and skills". This includes teaching and research structures that

need to be in place to define, set and support the directions for professional development.

This in turn allows an organisation to support their existing **digital education,** identify **digital talents** and nurture a **digital culture.** Development of digital culture and skills is contextually situated and needs to take place before investing in digital infrastructure and technology. Keeping this in mind will support **sustainable digital transformation** at a local level over time (European Commission 2017, 2018). Transformations require that organisations **develop new digital paradigms** in and for their institutions (e.g. Evangelistal *et al.*, 2018). These paradigms can also influence an institution's policy plan.

"This identification of existing skills and cultures is critical, so organisations or groups do not all try to become the same or try to be better at everything." (Eamon)

Organisational phenomena can only emerge through the things people do (the actions they take). "Enabling factors" (so-called **enablers**) can support digital transformation at the formal organisational level. One group of enablers are internal re-organisations to develop new bundles of skills (Butschan *et al.*, 2019), implement cultural change (Heavin & Power, 2018), and activate human resource management practices (Carlsson, 2018) and change management capabilities (Grover & Kohli, 2013). A second group of enablers is external and deals with collaborative partnerships to go beyond organisational boundaries and relationships (Sommer *et al.*, 2017; Farrington & Alizadeh, 2017), and in support of open innovation dynamics (Frishammar *et al.*, 2018).

Communities of practice that may be supported through formal organisational structures can give rise to **new emerging innovative ways** of collaborations through the formal set up of *creation communities* (Dandoy, 2021). Communities are here defined as a self-described group (e.g., teachers, students, and other community stakeholders), who develop a community feeling. This feeling emerges through feelings of nearness in space, time, or relationship (**proximity**) and from the attractiveness of a place or space (**amenities**).

One such example of formal structures that can be supported around new and innovative approaches include academic **hackathons.** Organising time, space and resources to run these often fast-paced (e.g., 36-72 hour) events has gained in popularity and hackathons and game jams are now frequently included as part of conferences or special events. Hackathons

and jams provide opportunities for participation activities where participants can gain skills in prototyping and social collaboration (Decker *et al.*, 2015).

Sustainability of any formal agreements and structures is typically supported through professional development (online asynchronous or face to face) offered on a voluntary basis or made part of qualification schemes offered by universities.

Voices Atlas, Map 5
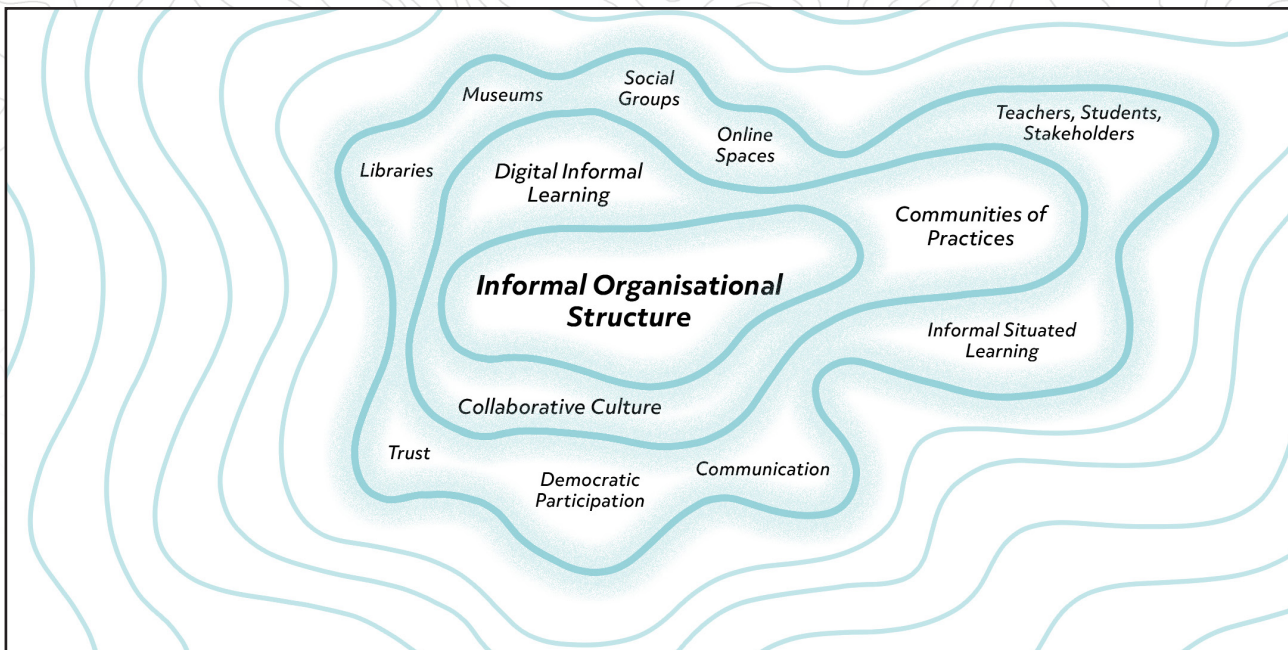
INFORMAL ORGANISATIONAL STRUCTURE

COMMENTARY MAP 5

Informal organisational structures can heighten trust and increase the involvement of human actors. The level of participation in **informal interventions** (forums, dialogues, voluntary event) improves if they are underpinned by a collaborative culture with the special focus on democratic participation since participants want to be heard. This means that communication is a core strategy in informal structures (Kezar & Eckel, 2002). Community of practices at the informal level can contribute to interactions between apprentices and practitioners whether they are students or teachers (Somekh, 2007).

Informal organisational structures support that communities can speak more freely about concepts of learning including beyond classroom walls and with special attention on informal spaces. These contexts are sometimes referred to as 'real-world' spaces or authentic contexts. **Digital informal learning** implies learning in informal spaces of the wider eco-system and may include libraries, museums, social groups, online affinity spaces, etc.). These spaces are not strictly limited by their physical location, they can include the pedagogical practices their participants are used to that demarcate formal education from other informal places, for instance, where people engage with digital technologies and literacy. The distinction between formal and informal spaces is not to put a value on one over the other, rather, to recognize those spaces, both physical and virtual, that are often less privileged in the scholarly discourse (Meyers, Erickson, & Small, 2013).

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