



CHAPTER 1

Digital Transformations in Nordic Higher Education: A Step Towards Unpacking a Multifaceted and Emergent Phenomenon

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SETTING THE STAGE

Digitalisation-related challenges and opportunities in higher education (HE) are not new, but awareness of their transformative potential has increased, with global trends including massive open online courses (MOOCs) and other forms of technology-enhanced open education

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(Fevolden & Tømte, 2015). The COVID-19 pandemic has emphasised the importance of flexible forms of teaching and learning (T&L), and, as a result, has intensified the adoption of technological platforms and solutions across the board (Nurhas et al., 2021). A 2020-study by the International Association of Universities revealed that substantial challenges remain, not least across world geographies. For example, 85% of HE institutions in Europe and 72% in the Americas were able to quickly move online following the pandemic, compared to 29% across the African continent (IAU, 2020; Marinoni et al., 2020). Such developments have increased the urgency of policymakers and managers within HE institutions (HEIs) to devise plans for digital transformation (DT) against the backdrop of rapid technological change impacting the whole of the public sector (Collington, 2021).

In this book, we address HE in the Nordic countries, which are a relevant object of analysis for a variety of reasons. First, the Nordics have among the better-developed state-funded (with ample resources) HE systems worldwide, with a broad commitment to tuition-free education and other equity-related considerations. Second, the Nordic countries are top-ranked in terms of digital adoption, with central governments playing a critical role in pushing the DT agenda throughout the whole of the public sector. Third, despite their similarities—geography, language, and

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political and social welfare models, etc.—there are significant differences among the Nordic countries that are of relevance for investigating how the phenomenon of DT manifests itself differently across specific national and organisational contexts.

As a starting point, it is imperative to provide some clarity on the three concepts that are often used interchangeably in the extant literature. *Digitisation* refers to the process of converting analogue information (e.g., someone’s written notes) and encoding it into zeroes and ones so that it can be stored, processed, and transmitted through the use of ICT tools like computers (Bloomberg, 2018). It is important to highlight that the focus here is on digitising particular (analogue) outputs into digital information rather than referring to the process(es) by which this takes place. The latter process refers to the second key concept—namely, *digitalisation*—which includes how social relations and organisational arrangements affect the ways in which individuals and organisations interact and/or operate as a result of the adoption of digital tools and platforms (e.g., moving from ‘snail mail’ to email). In such a context, salient and ubiquitous phenomena like automation are inherent in digitalisation trends, ‘whether it be shifting work roles or transforming business processes generally’ (Bloomberg, 2018, p. 4). Finally, *digital transformation* (DT) refers to a much broader process of change that implies substantial (cross-cutting) organisational adaptation, in addition to the effective implementation of digital platforms and solutions. Vial (2019), based on a review of the existing literature and semantic analysis, has proposed a working definition of DT as a process ‘where *digital technologies* create *disruptions* triggering *strategic responses* from organizations that seek to alter their *value creation paths* while managing the *structural changes* and *organizational barriers* that affect the *positive* and *negative* outcomes of this process’ (p. 118; original emphasis).

The existing academic literature on DT in HE focuses primarily on T&L issues in the virtual classroom in the context of distance, online, and blended learning approaches. There is a burgeoning literature spanning several decades, both in the Nordic countries (Cerratto-Pargman et al., 2012) and in other parts of the world (Castro, 2019; Kirkwood & Price, 2014). Recent literature on massive open online courses (MOOCs), however, shows limited attention has been paid to developments across the Nordic countries compared to North America, the rest of Europe, and China (Veletsianos & Shepherdson, 2016; for an exception, see Tømte et al., 2020). Despite increasing attention on blended learning, relatively

little is known about how face-to-face T&L is affected by digitalisation. Studies have indicated that teachers use digital tools to complement rather than transform in-person T&L (Blaine, 2019; Kirkwood & Price, 2014). This was also observed during the initial phases of the COVID-19 pandemic—i.e., teaching with the support of digital technology, coined as ‘emergency remote teaching’ in HE (Hodges et al., 2020). This meant that the majority of faculty staff simply transferred their regular classroom-/campus-based teaching to the online sphere rather than substantially altering their pedagogical approaches and support content. In most cases, this included livestreamed lectures, the sharing of presentation files, and/or pre-recorded video and/or audio lectures to students (Farnell et al., 2021).

Studies on digital T&L in HE have tended to investigate classroom dynamics and interactions between teachers and learners (Shen & Ho, 2020), and more recently, between frontline IT staff and administrators (Haase & Buus, 2020; Khouja et al., 2018; Tømte et al., 2019). Analyses of the links between T&L and other relevant processes are often absent (for an exception, see Castañeda & Selwyn, 2018). For example, we know little about *how* (a) HEIs’ and academics’ strategic goals and future aspirations are taken into consideration when adopting digital policies and strategies; (b) HE policymakers and HEIs’ management shape the bottom-up processes of digital T&L, and vice versa; (c) software developers use pedagogical knowledge to develop T&L digital tools; and (d) for-profit, educational technology providers help shape the technological, organisational, and economic dimensions underpinning HEIs’ T&L.

A major ambition of this edited volume is, thus, to address these empirical and theoretical gaps in the literature. In so doing, our aim is, first, to move away from current debates on digitalisation towards embracing the broader framework of DT. The latter phenomenon can be understood, as highlighted earlier, as more than simply the digitisation of HE activities and materials; it also pertains to digital technologies’ potential to disrupt organisational structures, practices, and goals (Vial, 2019, p. 118). According to Sursock (2015), DT is a dominant feature of the twenty-first-century HE, globally. Yet, little is still known about how the process manifests itself across distinct policy, organisational, disciplinary, and T&L contexts. This quest has become even more urgent with the developments set in motion by the COVID-19 pandemic, increasing the urgency and saliency of adopting digital tools in T&L (cf. Crawford et al., 2020). A major contribution of this volume is expanding the relatively narrow (in most cases) scholarly and policy debates surrounding DT

within a broader systemic framework that conceives of the phenomenon as pertaining to multiple manifestations at various scales and involving an increasing number of internal and external stakeholders. In other words, following the initial suggestion by Laterza et al. (2020), our chief aim in this volume is to embrace DT in its plurality (interactions of multiple, co-evolving elements) rather than embracing a simplistic (narrow) analysis of individual components in isolation. In other words, we refer to Digital Transformations (DTs) from now on.

Given this backdrop, this edited volume brings together leading and upcoming social science scholars from different disciplinary traditions—history, pedagogy, public administration, information systems, sociology, anthropology, and political science, among others—to unpack the complex and dynamic processes of DTs in Nordic HE. Nevertheless, it is worth noting that developments across the region need to be assessed against the backdrop of other (macro-level) aspects associated with European and global institutional frameworks and the respective technical (resources and competition) and institutional (rules and regulations) environments. Hence, the view adopted in this volume is that of unpacking Nordic dynamics in light of global processes, developments, and macro-level trends, including key insights associated with the political economy and cultural dimensions underpinning HE systems and HEIs. This means that the empirical findings and conceptual insights generated throughout the volume are, we hope, of relevance to a much broader global audience and a multitude of stakeholder groups, not simply to those operating within the geographic scope of the Nordics. In so doing, we make use of a systemic or holistic approach by investigating developments across multiple levels of analysis—from macro to meso to micro—as well as the extent to which these are nested within (mediate or reinforce) one another (Pekkola et al., 2021). Moreover, the empirical case contributions that comprise the bulk of the volume contextualise ongoing dynamics by considering the effects (short- and mid-term) associated with the COVID-19 pandemic, among other areas, by providing critical reflections on possible future developments in the context of a post-pandemic (HE) outlook and the changing nature of the public sector at large.

UNPACKING DIGITAL TRANSFORMATIONS: A CONCEPTUAL FRAMEWORK

Digital transformation is a complex and multifaceted phenomenon that unfolds differently across specific contexts and temporal dimensions. As a

result of this, as is the case with other social science phenomena like *globalisation* (de Sousa-Santos, 2006), Laterza et al. (2020) have suggested that we move away from single conceptions towards more pluralistic (from DT to DTs) and systemic approaches that consider the complexity associated with the myriad of interrelated process(es) under investigation. As a starting point, the authors suggest three analytical elements worth noting in terms of attempts to unpack the manifold empirical manifestations of DTs in the HE realm.

The first element pertains to the importance associated with the *contextual* dimensions underpinning DTs. As alluded to earlier, within the framework of DTs in HE, there is a need to expand the analysis beyond the immediate context of the classroom to encompass *system-wide* (actors and institutions) and *organisational-specific* (internal change or adaptation) elements that play key roles in the ways in which ideas, actors, preferences, values, resources, and processes interact (in non-linear and complex ways), resulting in both intended or planned and unintended or emerging effects at the macro (system), meso (organisational), or micro (sub-unit, individuals, programme, etc.) levels. At the macro or system level, this implies paying close attention to aspects associated with the political economy underpinning HE systems and HEIs, including shifts in governance regimes. As is the case with many other arms of the public sector, HE systems across the world, including the Nordic countries, have, in the past three decades or so, been the target of New Public Management (NPM)–inspired reforms focusing on efficiency, quality, and accountability (Hazelkorn et al., 2018; Pinheiro et al., 2019). The effects of these reforms have played out rather differently across various countries, but there has been a general move towards the importance attributed to ex-post mechanisms of oversight and control centred on the combination of policy instruments, such as the following:

- Enhanced institutional autonomy, mostly on the procedural side ('the how');
- Centralisation of decision-making within HEIs, resulting from managerialism;
- Performance management, both within teaching and research;
- Concentration of resources (people and funding) for national and global competitiveness, e.g., via forced or voluntary mergers (cf. Pinheiro et al., 2016).

These initiatives are inherent in top-down (government and HEI management) attempts to transform HEIs into more rationalised or complete organisations that are capable of more efficiently responding to external demands and shifting circumstances (Ramirez, 2010; Whitley, 2008). Studies have revealed that some of the many unintended consequences emanating from these reform processes relate to a general decline in the collegial decision-making structures and lowered autonomy for teachers (Barman et al., 2014) within HEIs on the one hand (Amaral et al., 2013), and an erosion of trust between managers and academic staff on the other (Hansen et al., 2019). The role of external stakeholders has also become increasingly salient insofar as the governance of HEIs' internal affairs is concerned, including the setting of strategic priorities (Stensaker et al., 2016) alongside the importance attributed to societal impact (Sørensen et al., 2019). The rise (since the late 1990s) of contractual arrangements has changed the nature of the traditional pact, brokered via the state, between HEIs and society, from one based on trust towards an increasingly transactional arrangement based on performance metrics and 'deliverables' (Geschwind et al., 2019; Gornitzka et al., 2004). Finally, the co-existence of old (cherished) academic norms and values—like autonomy and collegiality—with a new managerialism outlook or logic stressing performance, accountability, entrepreneurialism, and competition has led to new tensions, not least regarding ideas of 'winners' and 'losers' (Santiago & Carvalho, 2008). Faced with multiple (often contradictory) external and internal pressures, many universities experience 'mission overload' (Enders & Boer, 2009), challenging the established norms, values, and shared identities (Geschwind et al., 2022).

One important dimension related to context pertains to what political scientists have termed 'path dependencies,' as well as the importance attributed to *critical junctures* and *temporality* (Bucheli & Wadhvani, 2013; Pierson & Skocpol, 2002). The transition (since the late 1990s) from an analogue into a digital sphere has created both new challenges and opportunities for HEIs. The rise of MOOCs—massive online open courses—represents the first step in a gradual process of adapting traditional teaching and learning activities (for a recent review, see Tømte et al., 2020). Thus far, the results have been mixed. The so-called 'promised revolution' (cf. Billsberry, 2013) has not materialised, but MOOCs have led to the adoption of technological/digital platforms across the board as part of the new *modus operandi*. It has also been

observed that MOOCs have somehow gained ground in terms of life-long learning offerings, including the development of new accreditation systems such as ‘micro credentials’ (Brown et al., 2021; Pickard et al., 2018).

The COVID-19 pandemic represents yet another disruptive step in the use of digital platforms and technologies within the realm of T&L and research. Yet, contrary to some predictions, the pandemic revealed the shortcomings resulting from current digital policies and institutional arrangements (Farnell et al., 2021), in addition to the classic importance attributed to the relational aspect of T&L (Bond et al., 2021; Iglesias-Pradas et al., 2021; Karalis & Raikou, 2020). Studies have suggested that significant progress must be made to take full advantage of digital literacies and pedagogies, despite the rise of more supportive policy and institutional environments in a handful of countries, including the Nordics (Farnell et al., 2021).

Organisational scholars have shed light on the importance attributed to *resource dependencies* while adapting to new circumstances, such as technological shifts and regulatory requirements (Marshall et al., 2007; Oliver, 1997). Overall, most HEIs around the world, including those based in the Nordic countries, are largely dependent on public budgets and other financial mechanisms to support the bulk of their teaching and research activities. Emerging crises, like COVID-19, create unprecedented challenges to governments in the re-allocation of public funding across the public sector at large (Ansell et al., 2020). In several European countries, the pandemic has resulted in the rise of a new financially stringent regime, posing new strategic and operational challenges to HEIs and academic communities alike (Estermann et al., 2020; Pinheiro et al., 2023). The absence of sustainable financial investments in technological platforms and digital competences may, in the mid- to long-term, result in the loss of HEIs’ abilities to cope with, and adapt to, future crises and other unexpected disruptive events. Put another way, financial stringency and the capacity for resiliency are negatively correlated (Pinheiro et al., 2022). Faced with regulative and technical environments that put a premium on short-term performance and responsiveness to societal demands, HEIs the world over face the challenge of managing their budgets and delivering on the ‘metrics’ while, at the same time, adapting their formal and informal structures and core activities to the new post-pandemic realities, including rapidly shifting and turbulent societal and policy environments (Trondal et al., 2022).

The second critical feature noted by Laterza et al. (2020) relates to the importance associated with several elements that play a *mediating* role at the system level. As identified by the authors, technologies—or more specifically, the nature, scope, and purposes of the technological platforms being adopted—are such mediators that must be considered while unpacking DTs in HE. The infusion of artificial intelligence (AI), big data, and learning analytics in HE has led to the phenomenon known as ‘platformisation’ (Perrota, 2021). A key element in this refers to the implementation of learning management systems (LMSs):

LMSs are now ubiquitous in higher education, where they have evolved from static repositories of learning materials to fully-fledged data collection environments. The data collected by LMSs include traditional grades and other assessment metrics, but also log-in data, resource usage data, online learning activities completion data, participation in forums, clicks, and other forms of ‘behavioural surplus’ (Zuboff, 2019) in digitally enhanced educational settings. (Perrota, 2021, p. 54)

Platformisation has enabled private, for-profit firms to gain unprecedented access to the considerable amounts of data being generated within the context of LMSs, raising several critical ethical and pragmatic considerations, not least regarding data protection (Angiolini et al., 2021; Botnevik et al., 2020). While LMSs offer new ways of visualising and measuring teaching and learner behaviours, the actual uses of relevant analytics derived from these platforms remain limited in the Nordic countries. Moreover, the adoption of national (Nordic)- and European-level strategies for learning analytics are absent. For example, most European countries have not yet established national policies for learners’ data or guidelines that govern the ethical usage of data in research and education, despite the emerging body of research presented by European scientists on these matters (Nouri et al., 2019).

Nevertheless, faculty staffs’ limited use of learning analytics as a means of improving T&L is perhaps not surprising. We may consider this way of monitoring or assessing teaching methods and learners’ behaviours as quite advanced in terms of digital competence. What constitutes ‘digital competence’ is also much debated in HE. An often-cited definition originates from Ferraris’s work, with digital competence understood as

[t]he set of knowledge, skills, attitudes, abilities, strategies, and awareness that are required when using ICT and digital media to perform tasks;

solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming and empowerment. (Ferraris, 2012, p. 30)

While Ferraris's definition is rather broad and originates from a policy context, other studies have also strived towards the development of instruments that can measure levels of digital competence (Sillat et al., 2021). Recent studies have shown that most students and teachers in the Nordic countries and beyond hold only a basic level of digital competence (Zhao et al., 2021). Yet, prior to the COVID-19 pandemic, governmental initiatives in Denmark, Norway, and Sweden promoted the development of digital competencies among HE students and faculty staff, who were encouraged to employ appropriate learning strategies and used relevant digital technologies to improve the quality of education (Haase & Buus, 2020; SOU, 2015; Tømte et al., 2020; Zhao et al., 2021).

Academic norms and values are considered important mediating elements in HE (Balbachevsky & Kohtamäki, 2020; Benner & Sandström, 2000). As alluded to earlier, in several countries, traditional collegial structures have been under attack, resulting in a gradual decline in academics' participation in the internal governance of HEIs (Hansen et al., 2019; Santiago & Carvalho, 2008). The infusion of market-based elements centred on performance and excellence has contributed to a shift in many HE systems, including the Nordics, from an egalitarian towards a more meritocratic and competitive ethos (Geschwind & Pinheiro, 2017). This, in turn, has resulted in a growing divide between 'haves' and 'have nots,' contributing to cultural fragmentation within and across academic sub-units (Langfeldt et al., 2013). Third space professionals, mediating between administrative and academic tasks, norms, and strategic priorities, have become increasingly prevalent in certain European HE systems, like that of the UK (Whitchurch, 2012). Not only has the group referred to as 'technical-administrative' staff changed dramatically, with fewer assisting, secretarial roles to more expert positions (Ryttberg & Geschwind, 2019; Stage & Aagaard, 2019), but the traditional boundaries between academic and administrative staff have been blurred and hybridised (Pekkola et al., 2022). Finally, DTs in HE entail major implications for the complex and evolving relationships among ICT staff, educational developers, and academics.

Other types of stakeholders, internal and external to HEIs (cf. Pinheiro, 2015), also play an important mediating role, not least in terms of helping to translate external demands and expectations into internal activities and priorities. State agencies tasked with funding and accrediting HEIs play a crucial role in diffusing mechanisms and standards for key areas like quality assurance, bibliometrics, and societal impact. Student audiences are not only the co-creators of digital educational endeavours but they also play an increasingly important role in terms of quality assurance and certification, given the importance attributed to regular programmatic evaluations (Karlsson et al., 2014). External partners from the public and private sectors have also increased their footprint in the primary activities of HEIs in the last decade, partly as a function of the importance given to work-placement, employability, and lifelong learning (Small et al., 2018), as well as in the context of joint funding and risk sharing in the realm of research applications and the establishment of centres of applied science and innovation dedicated to grand challenges such as sustainability (cf. Yarime et al., 2012).

Finally, following seminal work on the institutional (cultural-laden) features of HEIs, careful attention should be paid to the dynamic and complex interplay between the adoption and diffusion of digital platforms and the solutions and local norms, values, identities, and traditions, both at level of the university (Clark, 1956, 1972) as well as the sub-units and/or sub-disciplinary academic groups in question (Becher & Trowler, 2001; Trowler et al., 2012).

The third aspect referred to by Laterza et al. (2020) includes the *types of effects* accrued to the adoption (and subsequent adaptation) of digital technologies and platforms in HE. One critical aspect of this sheds important light on the dynamics and complexities associated with the interplay between continuity and change. There is a long tradition in studies of HE systems and institutions suggesting that change tends to occur in a rather incremental manner (Seeber et al., 2015; Stensaker et al., 2012; Vukasovic et al., 2012). As is the case in other arms of the public sector, HE systems require a considerable degree of stability and continuity, and hence there are ‘natural’ (institutional) barriers to implementing disruptive innovations in HE (Pinheiro & Young, 2017; Young & Pinheiro, 2022). This, obviously, does not imply that change does not occur within systems and institutions, but its nature, scope, and pace differ substantially in accordance with contextual circumstances.

For example, new institutional arrangements may emerge from both internal and external digitalisation processes. By adopting learning-management platforms, HEIs may reach out to students independent of campus-based teaching offerings. Prior to the COVID-19 pandemic, such offerings were quite widespread in continuing education programmes offered by HEIs, both as MOOCs and as regular online courses in the Nordic countries (and beyond). During the pandemic, online offerings became the dominating course format offered to all students, yet as previously demonstrated, this type of offering, framed as ‘emergency remote teaching,’ was delivered by faculty without any prior experience in online teaching and to students who had signed up for campus-based programmes without any preference for studying online (Scherer et al., 2021; Solberg et al., 2021).

As European societies gradually learn how to live with COVID-19, both policymakers and HEIs alike are now debating how to proceed with online offerings as campus-based teaching becomes possible (and in many cases the default mode) once again. A newer concept is emerging—namely, ‘hybrid’ teaching (Nørgård, 2021; Schleicher, 2020). Although the concept is relatively new, framing a post-pandemic teaching mode, several understandings and approaches have begun to emerge (Nørgård, 2021). One such approach notes that university students may simultaneously attend classes both on campus and online (Barman, 2021). Yet, the quality of this type of offering has become much debated in countries like Norway (Krono, 2022a, 2022b). While the digital technologies/platforms that support this teaching mode seem to be in place, the pedagogical approaches remain unresolved for teachers, who are left asking how they can activate and reach out to students who are learning both on campus and online. In this way, digital technology either opens up new possibilities that are not yet consonant with existing pedagogies or the unintended results emanating from DTs lead to a new set of pedagogical dilemmas.

The escalating usage of digital technology also contributes to the establishment of new roles that affect academics’ responsibilities. For example, third-space professionals such as educational developers and Information and Communications Technology (ICT) staff may be more visible in the organisation, becoming increasingly significant for academics who require rapid support to design and deliver teaching in digital environments, as during the COVID-19 pandemic (O’Toole et al., 2022). Consequently,

this can lead to power shifts where technical skilled staff have a significant say in defining and assessing student learning (Facer & Selwyn, 2021), something that is elaborated on in some chapters of this book (cf. Scholkmann; Barman & Weurlander).

Finally, new digital technologies may also impact epistemic work within the academic disciplines themselves as the building blocks for HE systems and HEIs worldwide (Clark, 1983, 1984). Several of the book chapters demonstrate examples of how this plays out in practice (cf. Hermansen & Lund; Øvrelid et al., Tømte & Lazareva; Singh, etc.). In this regard, digital competences come to the fore as crucial in diverse ways. As suggested by Castelfranchi (2007), digital competence serves as the most important factor distinguishing the knowledge society from the information society. While the former aims to transform information into resources enabling society to take effective actions, the latter creates and disseminates raw data.

In short, by considering the complex interplay between the sets of factors and mechanisms outlined above, a more realistic assessment of the effects, both intended and unintended, of DTs at different levels, functions, and structures within HEIs can be realised. That said, the use of DT in HE is both a rather complex and evolving process, and this edited volume, with its methodological limitations, is a necessary first step in unpacking an important emerging phenomenon with the potential to substantially alter the profile and outlook of HE systems and institutions both in the Nordic countries and beyond.

VOLUME'S CONTRIBUTIONS

This edited volume addresses the suggested, systemic, and pluralistic framework encompassing different types of DT processes at multiple levels of analysis. Most contributions are empirically based on the Nordic context, with two of the contributing chapters looking at ongoing and emerging developments beyond Nordic HE. The volume is organised into four parts, including an introduction (prologue) and an epilogue by the editors.

The first part sets the stage by addressing aspects related to the political economy of HE, most notably by investigating how for-profit EdTech platform providers, as third parties, have increasingly gained influence within HEIs in the form of the provision of sophisticated digital infrastructures. In Chapter 2, de Andrade, Laterza, and Thomas provide a

research literature review, identifying various narratives around this development. Based on these findings, the authors further discuss what impact this development may have on HEIs, based on their status as either private or public institutions. In this part, the ambition is also to expand our understandings of how to unpack the DTs in HE. In Chapter 3, Øvrelid, Bygstad, Ludvigsen, and Dæhlen argue for looking at DTs as what they frame as ‘dual digitalisation.’ Using this approach, they elaborate on how education may converge with digital subjects, underscoring that this process is enabled by what they frame as boundary subjects and data. A key message from these authors is that digitalisation changes the relationship between students and teachers, and that digitalisation may also change the subjects themselves due to datafication. The authors thus elaborate on how this dual digitalisation can be managed.

The second part comprises four chapters that, in various ways, unpack new and emerging teaching and learning practices.

In Chapter 4, Tømte and Lazareva explore how new learning spaces may impact teaching and learning. By investigating a relatively new trend known as the future classroom lab, which originates from the policy field, the authors explore how this technology’s rich learning space may foster the development of teachers’ professional digital competence (PDC), which in itself may represent an epistemic change within teacher education. Key findings suggest that the room itself does not provide any learning for students as such—it has to be guided by the teachers. That said, teachers’ PDC may impact how they benefit from using the room with their students.

In Chapter 5, Hermansen and Lund perform a narrative inquiry to explore how institutional practices and activity settings at various levels within the faculty studied can be seen as coupled systems. It is suggested that these couplings may allow for sustainable and transformative change. The authors demonstrate that the interplay between structure and agency results in the transformation of situational contexts of action.

In Chapter 6, Singh and Haugsbakken study how the design of learning resources in an online course offering, here approached as an institutional MOOC in Norway, may foster sustained engagement and interaction with learning resources, which again may enhance the process of developing students’ scientific understanding. Even if findings suggest that the design seems to work well in the case being studied, the authors discuss the limitations of this type of learning. For example, in this MOOC-based online context, students have limited opportunities to

interact intellectually with fellow learners and instructors. Existing interactions tend to promote the seeking of solutions to specific problems rather than becoming reflective and discursive inquiry about issues, which could be a barrier to epistemic transformation. A key message from the authors is that key mechanisms like communication, interaction, and collaboration about developing and advancing a conceptual understanding of learning problems are necessary conditions for epistemic transformation to take place.

Chapter 7 addresses the timely issue of how digital technologies have impacted assessment practices in HE. Here, the authors Barman and Weurlander raise several issues that remain unsolved. By interviewing university teachers at two HEIs in Sweden, the authors investigate both roles and key decision-making processes as regards teachers' use of digital technologies. They discuss how the need for remote assessment that was accelerated during the COVID-19 pandemic resulted in epistemic changes in terms of what kind of knowledge and knowing are being assessed. A key finding is that the use of digital technology has seemingly led to the adaptation rather than innovation of assessment practices.

The third part of the volume highlights organisational manifestations of DTs and includes four chapters that address this perspective in various ways.

In Chapter 8, Scholkmann applies the theoretical lens of street-level bureaucracy and frontline work to discuss how different groups of actors in the university enact DTs as they execute their work. She illuminates how DTs may play out for faculty, students, educational developers, and administrative staff, as they represent essential practices that both enact and resist digital transformation. A key message here is that frontline workers should be focused on future research regarding DTs, including policy-making, the interplay between frontline practices and local variations, and a long-term perspective on their own work and DTs.

In Chapter 9, Degn discusses the extent to which local translations of digitalisation have been used strategically by universities in Denmark. The findings suggest that universities seem to be more reactive than proactive in their adaptation efforts. A key message here is that the strategic use of digitalisation as a policy idea thus far has not been high on the agenda for Danish universities.

In Chapter 10, Wollscheid and colleagues present the results from a scoping review of research on DTs in HE as a result of the COVID-19 pandemic. The findings point to a greater interest in knowledge for use

in, rather than knowledge *about*, academic writings during the first year of the pandemic, with a focus on the hard sciences. With that, potentially underdeveloped research areas include knowledge about DTs in HE and a focus on so-called soft disciplines. Another observation is that many of the digital technologies were already developed, and many were in use before the pandemic, which may indicate that the latter accelerated a wave of change that had already begun.

In Chapter 11, Laterza and colleagues present an empirical study within one HE in Norway to examine how DTs have been perceived by various actors before and during the COVID-19 pandemic. The findings showed that the historical tension between a top-down push towards DTs and the reluctance among several teaching staff to go ahead as fast as envisaged by central management has led to significant differences in conceiving of the desirable content and goals of DTs among different actors—especially between central management, administrators, and support services on the one hand and many of the teaching staff on the other.

In the **fourth part**, Chapter 12, the editors reflect on the volume’s empirical and conceptual contributions in the form of a short epilogue, proposing a way forward for future inquiries.

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