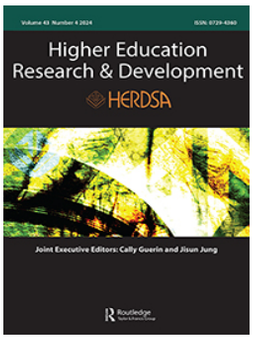

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Perspectives on disruptive change in higher education. A critical review of digital transformation during COVID-19

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ABSTRACT

Higher education institutions have always been changing concurrently with larger societal developments. This paper addresses digital transformation in higher education (DTHE) during a disruptive crisis, e.g., the COVID-19 pandemic. Understanding different perspectives on DTHE during the pandemic is important, as the meaning allocated to the unfolding events holds the potential to shape future decision making. We conducted a critical review of 22 academic papers published in the first year of the pandemic. A thematic analysis revealed divergent perspectives of how the pandemic was affecting DTHE, with the material pointing in the direction of the pandemic as an accelerator of ongoing changes in higher education. The papers unanimously understood DTHE as multi-dimensional and as an ongoing, long-time process entangled with digital transformations in other sectors already initiated before the pandemic. Although this review is limited to research carried out during the first year of the pandemic, further studies might address a longer time-period, by studying changes in higher education and research in consequence of a disruptive crisis.

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Higher education; digital transformation; disruptive change; critical review; COVID-19 pandemic

Introduction

The sudden shift to emergency remote teaching in the wake of the COVID-19 pandemic came as a shockwave for teachers, students, and administrators in higher education. It also triggered research and reflection on the potential of the pandemic for the digital transformation of higher education (DTHE). Researchers and practitioners alike rushed to communicate immediate experiences and reflected on how to make sense of an unprecedented situation as it was evolving. The resulting articles, published while the pandemic was on-going, provide a glance at interpretations and expected impacts of the pandemic on future developments of DTHE. They can be seen as constituting a baseline for the analysis of further developments. Moreover, they provide a snapshot

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in time of immediate reactions towards an unprecedented situation that hit DTHE-researchers, teachers, and administrators equally. As a result, the perspectives conveyed provide a unique combination of expert and novice views.

For the present article, we critically analyzed emergent perspectives on how the COVID-19 pandemic might affect DTH by reviewing academic writings published between Spring 2020 and Summer 2021. Taking what has been written about a DTHE as basis for analysis has been done before, as for example by Bearman et al. (2023), who analyzed key academic writings on the emergent role of artificial intelligence in higher education. However, while these authors took a discourse perspective, i.e., understanding writings as expression of already negotiated social meaning, our study was focused on academics' conveyance of immediate perspectives on an ongoing situation. Against the backdrop of sensemaking (Weick, 1995), we interpret taking a perspective as 'turning circumstances into a situation that is comprehended explicitly in words and that serves as a springboard into action' (Weick et al., 2005, p. 409). Perspectives thereby have a more individualized and local quality compared to discourses; like discourses, they hold the capacity to guide future decisions and practices, however on a small-group level and as the basis rather than the result for social negotiations (Graumann & Kallmeyer, 2002).

The COVID-19 pandemic has challenged our capacity to interpret what we were experiencing due to the sheer enormity of its scale (Christianson & Barton, 2021). To many, it presented as a crisis with great disruptive power. Such crisis situations can give way to sensemaking in extremes, by producing either highly constraining (negative) or highly empowering (positive) interpretations (Weick, 1988). In this light, the situation created by the pandemic may have evoked a variety of perspectives with the potential to influence further developments (Scholkmann, 2022; see also Green et al., 2020).

Some of these perspectives might well be mirrored in existing research and theory on digital transformation. One of the central concepts applied by those researching technological development and innovation, *disruptive change*, was made famous by the economist Schumpeter (2011), who proposed that novelty would give rise to new industries which would sweep away the old in a wave of disruption. However, others have claimed that closer studies of historical change reveal many small changes suggesting a much more gradual build-up over time rather than the more obvious sudden disruption (Bruland & Mowery, 2005). This kind of more gradual change is known as *incremental change* or *incremental innovation*.

In the same vein, the definition that digital transformation '(…) is about adopting disruptive technologies to increase productivity, value creation and social welfare' (Ebert & Duarte, 2018, p. 16), might be applied to DTHE as well. However, a systematic review found that only 8% of 206 publications on technological change referred to education (Reis et al., 2018). A low number of publications on digital transformation in (higher) education supports the perspective of a more gradual uptake of new technologies within education, or the lack of research in this area.

Since other areas of society appear to have come further in their digital transformations, we may expect education to follow a similar pattern. However, we must be aware that although some of the technologies are shared across several sectors in society, many are only relevant to one sector, highlighting the perspective of *generalizable vs. specific technologies for DTHE*. Also, many of the technologies and applications for use in higher education, specifically, have been around for a while (Tømte & Olsen, 2013),

and have developed quite slowly. This might have changed during the pandemic, where users were clamoring for fast fixes. This idea of an *acceleration of DTHE due to COVID-19* has not been well researched yet.

Finally, whether those writing about digital transformation are viewing it from an educational technology perspective or from the perspective of technological innovation, they seem to agree that a transformation is about much more than technology (Cresswell et al., 2022). The idea of technology as an *igniting force for new practices* keeps being vented in the DTHE literature, often hyperbolically highlighting its positive or condemning its negative effects. However, it has also been shown that educational technology can be appropriated as *an enactment of social and pedagogical purposes* that should not hastily be classified as 'good' or 'bad', but understood as creating complex socio-technical assemblages (e.g., Selwyn, 2016).

Materials and methods

Critical literature review

The aim of this article is to document and contrast perspectives on the COVID-19 pandemic in its first year, expressed in academic writings. We will do so by answering the following research question: *What are perspectives on disruptive change and digital transformation in higher education during the COVID-19 pandemic?* We applied a critical review method to show that one has 'extensively researched the literature and critically evaluated its quality' (Grant & Booth, 2009, p. 93). Going further than a simple description of identified research articles, a critical review comprises a degree of analysis and conceptual innovation. Ideally, it presents, analyses, and synthesizes data from a variety of sources. Its result might be reflected in a hypothesis or a model, rather than in a direct answer to a question. This might comprise a synthesis of existing models or schools of thought; alternatively, it might be a novel interpretation of the existing data (Grant & Booth, 2009).

As one type of literature studies, a critical review strives to identify the most significant items in the field by attempting to evaluate the included research articles according to their contribution, while not requiring formal quality assessment. It typically applies a narrative synthesis that might be conceptual or chronological. Further, the analysis seeks to identify conceptual contributions to strengthen existing theory or developing new theory. As the main advantage, this approach gives an opportunity for an appraisal of a topic and of what is of value from the existing body of research. Further it helps to re-entangle competing schools of ideas. One of its disadvantages is that it might lack structure and transparency, as there are no formal standards for methods reporting. Instead, a critical review usually puts an emphasis on the conceptual contribution of each item of the included studies. Thus, the interpretative elements are rather subjective, and findings might be the starting point for further evaluations (Grant & Booth, 2009).

Search and selection strategy

For the present paper, we followed a purposive sampling approach (Ames et al., 2019). We drew upon a selection of 22 academic articles published between May 2020 and

February 2021. These articles were part of a much larger corpus of material ($n = 451$) that we previously included in a scoping review on digital transformation in higher education. All 22 papers had been identified to convey knowledge *about DTHE* during the pandemic, i.e., texts that dove into a broader understanding of the systemic changes that higher education would undergo when transforming and being transformed towards and by the digital (for further details see Wollscheid et al., 2021).

Due to the close temporal proximity of our study to the publication dates of the articles examined, we did not use citation numbers to identify corresponding key publications within our sample. Instead, publications were selected based on a representation of key thematic categories that could reflect emerging perspectives on DTHE broadly under a global perspective. These were: *broad representation of disciplinary angles*; *broad representation of geography*; *variation in publication dates*; *variation in the degree of theoretical and empirical underpinnings*; *variation in terms of the claimed generalizability of the perspectives conveyed*. The classification of each paper in these categories was deliberately not understood as an assessment of its quality, as the sample contained various types of academic writings (e.g., conceptual vs. empirical), which not all could be expected to rate high in all categories. Also, based on our previous scoping review, the sample contained both papers written in direct response to the pandemic and papers that integrated the situation caused by COVID-19 into argumentations originally developed pre-pandemic.

Selection was based on assessment by two members of the research team, who first chose 40 papers based on agreement on their suitability for the analysis according to a variation of the above criteria. These 40 papers were independently co-assessed by an external higher education colleague in terms of their suitability for the study based on clarity of writing and comprehensiveness of information provided, resulting in highlighting 22 highly suited papers. The research team and the external colleague discussed and selected 12 papers out of the sample, which were considered anchor writings for the following analysis due to a combination of the selection criteria. An overview over the sample regarding the selection characteristics can be found in Table 1, while a full overview over the sample can be found in the appendix.

Both Table 1 and the appendix show a tendency in the sample towards a middle ground in terms of theoretical underpinning, empirical underpinning, and generalizable claims, with highest numbers in 'partly' for all three categories; however, the anchoring

Table 1. Overviews over papers included in the analysis ($n = 22$).

	Generalizability	Theoretical underpinning	Empirical underpinning	Disciplines	Geography	Publication period
High (n)	7	6	5	Education; Business and Economics; Computer Science; Social Work; Geography; Educational Technology; Health Sciences; Library Sciences	United Arab Emirates; Australia; Austria; Bangladesh; Canada; China; Egypt; England; Italy; Japan; Norway; Philippines; South Africa; Spain; United Kingdom; United States	May 2020–February 2021
Partly (n)	12	10	10			
Low (n)	3	6	7			

papers provided a somewhat more balanced selection here. From the appendix, we can additionally see that the highest number of papers could be allocated to Education sciences in a broad understanding, followed by Business and Economics and Computer Science, with again a somewhat more balanced selection for the anchoring papers. Geographical distribution, which was deliberately held broad, spanned all continents excluding South America, albeit with uneven distribution due to uneven representation in the initial sample. Publication dates for first publication of the papers (including online first publication) showed a tendency towards the last months of 2020 (November–December), again with a more balanced distribution for the anchors.

Thematic analysis: extraction of polarities

Our analytical approach was based on thematic analysis (TA; e.g., Clarke & Braun, 2014). Although not being pre-set on taking a critical perspective, we considered TA as a suitable approach as it allows for an in-depth analysis by striving for a retention of rich detail and variation in complex data (Herzog et al., 2019). The method is executed stepwise, with first 'identifying codes, then themes and eventually patterns (…)' (Herzog et al., 2019). Themes as the core concepts must be more than a repetition of wordings from the material, as they contain 'interpretative choices' (Herzog et al., 2019) and therefore also require a reflective stance on the side of the researcher.

During the analysis, first, the 12 anchor papers were read in-depth after being distributed to the research team, highlighting any passage that pertained to COVID-19 or digital transformation. Paraphrasing descriptions of the content of each passage were interpersonally validated and transferred into codes that were successively applied to the entire body of material using NVivo R, version 1.6. We collaboratively extracted overarching themes by referring the codings back to theory and research. For the final analysis, we applied the concept of polarities (e.g., McNaught, 2003), defining them as opposite yet mutually completing tendencies that can only be managed but never be solved (see also Johnson, 1992).

Findings

In the analysis five topics emerged, which were *Definitions of DTHE; The role of the pandemic for DTHE; The role of technology for DTHE; Valuation of DTHE under the pandemic; Objects of transformation*. These topics contained both polarities and common ground understandings. Both topics, common grounds and polarities, are displayed in an overview in Table 2. They will be elaborated on and illustrated by quotations in the following. It must be noted that each of the papers could lean towards more than one extreme of a polarity or span from one extreme into the middle ground. Therefore, the different themes, polarities as well as common grounds and middle grounds, will be described by referring to papers in multiple ways.

Definitions of DTHE

Only four of the 22 papers gave definitions of DTHE. One paper each gave a definition one or two times; two papers gave definitions four times, and one paper gave definitions

Table 2. Themes and polarities.

Theme	Polarities: extremes and common/middle grounds		
Definitions of DTHE	Common ground: An ongoing/long time process contingent on digital transformation in other sectors		
The role of the pandemic for DTHE	Common ground: A disruptive event, requiring rapid adjustments, exposing weaknesses in DTHE pre-pandemic, instigating change in a change-resistant environment		
	Accelerating transformations already set in motion before	Diverting transformations in new directions	Igniting transformations
The role of technology for DTHE	Supporting (non-technological) transformation happening in other areas	Interdependency between technology and transformation as mutually affecting	Driving transformation due to technological progress
Assessment of DTHE under the pandemic	An opportunity for transformation of the higher education sector		A threat to equality and inclusion
Objects of transformation	Broad and varied		Narrow and focused

five times. All definitions were entangled with the various polarities (specifically, the role of the pandemic in bringing about DTHE and the role of technology for DTHE).

Common ground: an ongoing and long-time process

As summarized in Table 2, the definitions unanimously interpreted DTHE as an ongoing, long-time process contingent on digital transformation in other sectors set in motion before the pandemic. Some nuance could be seen in how, for example, DTHE was defined as a fundamentally transformative process 'which is technological only in part' (Agasisti et al., 2020, p. 3), or how Laterza et al. (2020) proposed to define DTHE in plural, as they 'found the concept of 'digital transformations' more useful to capture the dynamics and complexities associated with these processes' (Laterza et al. 2020, p. 230). Other papers viewed DTHE under a management and strategic leadership perspective (Marks et al., 2021; Marks & AL-Ali, 2020). Due to the overall few definitions given these nuances were not broken down into a polarity.

The role of the COVID-19 pandemic for DTHE

Common ground: the pandemic as a disruptive event

The papers were highly unanimous in the understanding of the pandemic as a disruptive event that brought a halt to all businesses and resulted in inevitable short-termed adjustments such as emergency remote teaching, as shown in Table 2. This was described in terms such as 'the exogenous shock caused by the COVID-19 pandemic generated an unprecedented discontinuity and exacerbated previous trends, forcing a full switch to digital' (Agasisti et al., 2020, p. 3), 'the abrupt and imminent nature of the pandemic announcement' (Archer-Kuhn et al., 2020, p. 1011) or 'Covid-19's disruptive impact led to a rapid transformation of educational activity' (García-Morales et al., 2021, p. 3; see also Ashour, 2024; Ebner et al., 2020; Grimmer et al., 2020; Marks et al., 2021; Marks & AL-Ali, 2020; Martzoukou, 2021; Pittman et al., 2021).

Variation in perspectives could be seen throughout the papers in, e.g., emphasizing the need for rapid adjustments (Agasisti et al., 2020; Archer-Kuhn et al., 2020; García-

Morales et al., 2021; Guàrdia et al., 2021), pointing out the pandemic's capacity for exposing weaknesses in DTHE pre-Corona (Kabir et al., 2020; Marks et al., 2021; Marks & AL-Ali, 2020; Martzoukou, 2021), or elaborating on how the situation instigated change in the change-resistant environment of higher education institutions (Colpitts et al., 2021; Grimmer et al., 2020). As these were not clearly opposing or contradicting each other, they were not included as a polarity into the analysis.

Extreme 1: the pandemic as accelerating transformations already set in motion before

As displayed in Table 2, a theme emerged in terms of how the pandemic was seen in affecting DTHE. Here at the one extreme the pandemic was understood as accelerating transformations already set in motion before:

> Although the process of digital transformation in higher education began years ago, the pandemic has accelerated it, leading to fundamental changes in a question of weeks. (García-Morales et al., 2021, p. 2; see also Ahmed et al., 2020; Komljenovic, 2022)

Some papers also elaborated on causes for a slow and hesitant DTHE pre-pandemic, pointing out the change-resistance of the higher education sector (Anderson, 2020; Colpitts et al., 2021), which at least partly could be attributed to a lack in political and regulatory initiative (Ashour, 2024) or to bureaucratic hurdles (Martzoukou, 2021).

Extreme 2: the pandemic as igniting transformations

As an opposite extreme, some of the papers interpreted the disruption caused by the pandemic as an impetus to ignite DTHE, altogether, as shown in Table 2. As this understanding implies an almost total lack of digitalization in higher education pre-pandemic, it was not astonishing that some of the more explicit statements leaning towards this notion came from developing countries:

> (…) COVID 19 has offered additional opportunities for the world, particularly for the technologically disadvantaged nations, to alter teaching and learning methods and turn its concentration to innovations. Thus, the universities must utilize these opportunities to improve their higher education approaches based on reality [57], and the educators and learners are required to be prepared both mentally and technologically. (Kabir et al., 2020, p. 90; see also Marks & AL-Ali, 2020)

Some authors stressed that higher education as part of the public sector should 'learn from the previous experiences of other sectors' (Marks et al., 2021, p. 56). Moreover, also internal learning necessities were expressed in at least one of the papers, as teachers and administrators were seen as 'lacking experience of the most efficient online infrastructure, the pedagogical expertise and the training that is required for staff to deliver this type of learning to their students' (Martzoukou, 2021, p. 268).

Middle ground: diverting transformations in new directions

A middle ground emerged within this theme, where the role of the pandemic was seen as diverting transformations in new directions, as shown in Table 2 as well. This perspective entailed an understanding of DTHE as having been set in motion pre-pandemic; however, the experiences gained under COVID-19 were assumed to impact this

transformation, thus giving impetus and new direction to ongoing processes (Agasisti et al., 2020; Mariani et al., 2020; Martzoukou, 2021; Pittman et al., 2021; Yang & Huang, 2021).

This middle-ground was tied more specifically to what was being transformed, i.e. the objects of transformation (see below) compared to the perspectives at the extremes, which addressed DTHE rather generically. For example, some authors pointed out new directions and understandings of teaching and learning skills and pedagogy (e.g., Archer-Kuhn et al., 2020; García-Morales et al., 2021; Kabir et al., 2020). Others highlighted the opportunity to transform higher education by digitalization to meet the needs of a modern knowledge society (Ashour, 2024) and as a push for international mobility (Laterza et al., 2020). Also, several papers stressed that new directions in DTHE would be tied to economic interests and business model development in the higher education sector (Komljenovic, 2022; Marks et al., 2021; Marks & AL-Ali, 2020). Moreover, some papers pointed out that the pandemic would provide an opportunity to create a more technically inclusive higher education landscape (Pittman et al., 2021). Finally, some explicitly elaborated on how DTHE influenced by the pandemic would affect a broad (and not totally foreseeable) shift in nature and organization of higher education (Agasisti et al., 2020; Guàrdia et al., 2021). This was tied to the contingent outcomes of technology implementation in other sectors (Laterza et al., 2020) and understood as forcing higher education institutions to become 'adaptive learning organizations' (Colpitts et al., 2021, p. 162).

The role of technology in DTHE

Extreme 1: technology as supporting (non-digital) transformation

As Table 2 displays, the first extreme under this theme was based on notions of *technology as supporting transformation*. Here technology was seen as a vehicle to accelerate transformations happening in other, non-technological areas (e.g., pedagogy, organization or the nature of teaching and learning; c.f. the pedagogical the organizational or the adjustment to the unprecedented situation, Archer-Kuhn et al., 2020; Dlamini & Ndzinisa, 2020; García-Morales et al., 2021; Grimmer et al., 2020). Some papers, moreover, pointed out that without access to and competence in handling (educational) technology, a specific transformation, although clearly envisioned, would not be feasible (e.g., Cuaton, 2020; Dlamini & Ndzinisa, 2020; Kabir et al., 2020; Marks & AL-Ali, 2020; Pittman et al., 2021). Again, those papers could mostly be allocated to countries with poor technological infrastructure or stark economic divide.

Extreme 2: technology as driving transformation

The second extreme tied to this theme visible in Table 2 comprised perspectives of technology as driving transformation due to technological developments. Papers leaning towards this extreme described technology as the specific cause for a development, in the sense that without this (new) technology a specific aspect of transformation would not have been envisioned and enacted (Agasisti et al., 2020; Dlamini & Ndzinisa, 2020; Guàrdia et al., 2021; Marks & AL-Ali, 2020). Although all the papers communicating this perspective also contained citations leaning towards the other extreme or the

middle ground, understandings of a technology-driven transformation were prevalent and have therefore been included in this analysis.

Middle ground: interplay between technology and transformation

As a middle ground between the two extremes, some of the papers clearly saw technology and transformation as being interdependent, with both mutually affecting and being intertwined with another (see Table 2). These contain acknowledgements of digitalization as 'an enabler, not the final aim' (Agasisti et al., 2020, p. 10), of human and more-than-human agency in technology implementation (Anderson, 2020; Burns, 2020; Laterza et al., 2020), of tensions or mutual influence between pedagogy and technology (Dlamini & Ndzinisa, 2020; Kabir et al., 2020), and of adoption of digital transformation due to economic survival needs (Marks et al., 2021).

Assessments of DTHE under the pandemic

Extreme 1: an opportunity for transformation of the higher education sector

As can be seen in Table 2, some papers extended their more analytical perspectives on DTHE by ascribing value and quality to the developments during the pandemic. At the one extreme, an optimistic assessment could be found here, which stressed the opportunity for transformation of the notoriously change-resistant higher education sector (e.g., Colpitts et al., 2021). This was tied to the development 'towards a knowledge society' (Ashour, 2024, p. 1) and to the exploration of new pedagogical models for a 'transformation of higher education on a global level' (García-Morales et al., 2021, p. 6). One specific paper also highlighted the chance to better position the crucial digital transformation work done by academic libraries (Martzoukou, 2021).

Extreme 2: a threat to equality and inclusion

As the other extreme, a pessimistic or at least weary assessment was communicated based on notions of DTHE under the pandemic as posing a threat to equality and inclusion. Above all this was based on worries of lack of adequate technology, access to technology and poor connectivity that could easily exclude less-than-privileged students (Burns, 2020; García-Morales et al., 2021). Moreover, unresolved questions of data security and privacy were raised (Burns, 2020; García-Morales et al., 2021). In addition, though, was also the question whether DTHE would incentivize the perpetuation of outdated, mainly lecture-based and therefore not highly inclusive teaching scenarios (Dlamini & Ndzinisa, 2020).

Objects of transformation

As a last theme that can be seen in Table 2, also objects of transformation emerged from the material, being what is it that is being transformed. Generally, the papers provided a wide array of such objects, with some being mentioned frequently, whilst others only coded a couple of times, or one time, in extreme cases. Table 3 provides an overview and number of codings related to the emergent objects of transformation.

Table 3. Objects of transformation.

Category	Codings total (n)
Modes of delivery of teaching and learning	65
The role of higher education	25
Collaborations	21
Professional roles	17
Standards/rules/regulations	16
Organization/organizational culture	11
Student support	3
Society as a whole	2
Sustainability in HE	2
Digital skills	1
Digitalization policies	1
HE's economy and stream of revenue	1
Learners	1
Students' lives	1

Extreme 1: broad and varied

Under a broad and varied perspective, papers were addressing between four and eight different objects of transformation, spanning over mostly the entirety of the objects listed in Table 3. Here, modes of delivery of teaching and learning was a transgressing category, as was the role of higher education. Other widely coded objects of transformation were collaborations, professional roles, standards, rules and regulations, and organization and organizational culture of HE (Burns, 2020; Guàrdia et al., 2021), supplemented with student support (Yang & Huang, 2021), learners (Colpitts et al., 2021) sustainability in HE and HE's economy and stream of revenue (Agasisti et al., 2020) and society as a whole (Marks et al., 2021). Overall, at this extreme, the picture evolved that what was perceived as being transformed due to the pandemic were almost all key aspects of HE, as they were seen as contingent and intertwined.

Extreme 2: narrow and focused

Some papers took a more narrow and focused perspective on objects of transformation, roughly corresponding to the upper rows of Table 3. These papers addressed only one, sometimes two or maximum of three objects of transformations. Also here, almost all papers focused on modes of delivery of teaching and learning as the predominant object (e.g., Dlamini & Ndzinisa, 2020), supplementing this with the role of higher education (Komljenovic, 2022; Laterza et al., 2020), collaborations, professional roles (Ahmed et al., 2020), student support (Cuaton, 2020) standards, rules and regulations (Ebner et al., 2020), digital policies (García-Morales et al., 2021) or a combination of these (Anderson, 2020; Archer-Kuhn et al., 2020; Grimmer et al., 2020; Kabir et al., 2020; Martzoukou, 2021; Pittman et al., 2021). Out of three papers explicitly *not* addressing modes of delivery of teaching and learning, two focused on the role of higher education in combination with either standards, rules and regulations (Marks & AL-Ali, 2020), or digital skills and students' lives (Ashour, 2024). The last paper identified collaborations and professional roles as objects of transformation (Mariani et al., 2020). Overall, at this extreme the picture evolved that what was perceived as being transformed were first and foremost the core educational activities in combination with adjacent topics in different directions.

Discussion and conclusion

Our study analyzed academic writings published during the first year of the COVID-19 pandemic and viewed them as examples of sensemaking of an unprecedented situation. It built on the notion that perspectives emerging during the pandemic could be seen as a basis for how actors might enact DTHE in the future. As our study explicitly assumed further effects of the immediate interpretations published between May 2020 and June 2021 on DTHE, we will discuss our findings under this perspective.

First, all 22 papers showed high agreement that the pandemic was a disruptive event for higher education. However, perspectives on this disruption differed, with some authors interpreting the unprecedented situation as a driver for technological developments that had been set in motion before, while others saw it as an igniting force for unprecedented technological change. Also, perspectives on the role of technology itself varied, with some interpreting technology as a driver for disruption, while others saw technological transformation as a carrier of transformative agendas in other areas. Additionally, there was also a solid middle ground suggesting that disruption through technology and technology as carrier for social change were mutually intertwined, and this in our notion seems to be the most advanced perspective. Not only have entanglements between the technological and the social been discussed in critical educational technology research for quite some time (e.g., Bayne et al., 2014; Williamson & Piattoeva, 2019). Also, empirical studies show that the emergent digital reality post-pandemic presents as an assemblage of increased digital and specific on-site pedagogical arrangements (Broadbent et al., 2023).

Second, regarding the emergent objects of transformation some of the perspectives taken in our study must be understood as expressions of immediate concern during the sudden shift towards emergency remote teaching, as for example the change in pedagogy and didactics, professional roles, and collaborations. Also, the absence of certain objects such as e.g., digital assessment (Akbar, 2016) from the analysis can be explained through this. In the same vein we need to acknowledge that the perspectives expressed in our material were mostly focused on processes and procedures, and oftentimes with a bias towards teachers' and administrators' needs and experiences. Only very few objects of transformation addressed support of students, although this group had to undergo huge transformative changes by learning how to learn on their own in the digital sphere during the pandemic, and ever since (Raaper & Brown, 2020).

Third, a sharp polarity emerged in terms of seeing DTHE during the pandemic as either an opportunity for transformation of a notoriously change-resistant field, or as a threat to equality and inclusion, and these perspectives appeared to be linked to geographical and economical positioning of institutions or authors. Here we want to acknowledge that both perspectives are valid. Disruption as an opportunity for change has been well-elaborated in the literature on organizational learning in higher education (Scholkmann, 2021), as has the misunderstanding that DTHE will be a guarantee for fair and equal access through technological flexibility and adaptability (Selwyn, 2012). Attributing this distinction solely to a digital maturity perspective, as some authors have done (e.g., Marks et al., 2021), falls short in our view. Instead, a growing corpus of writings produced since 2021 alerts us to the exclusionary and destructive effects of DTHE as

an idea of progress based on technological advancement can have on those not in command of the same resources as the ones propagating these developments (e.g., Peruzzo & Allan, 2022).

To summarize, we can say that our findings point in the direction of a perspective of the COVID-19 pandemic as an accelerator of ongoing changes in higher education. Research by others seems to strengthen the more nuanced views emergent from our material; however, the next iteration of educational technological hyperbole seems to be in full swing already, with the advent of generative artificial intelligence.

Limitations and implications for further research

For limitations, first our study did not consider academic papers published after 2021. Second, our sample of 22 studies was purposefully retrieved from a larger sample, mostly published in English, collected in one single, international indexed database (Web of Science, WoS). Thus, data collection and sampling might be biased due to the under-representation of social sciences and humanities and of papers in other languages than English in WoS (Aksnes & Sivertsen, 2019), also resulting in the absence of representation of South America. Finally, the scope of our review was DTHE during a disruptive crisis, with a focus on teaching. Further studies might compare reactions of the research system during a disruptive crisis and digital transformations, looking at different aspects of the research process.

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References

Agasisti, T., Frattini, F., & Soncin, M. (2020). Digital innovation in times of emergency: Reactions from a school of management in Italy. *Sustainability*, *12*(24), 10312. https://doi.org/10.3390/su122410312

Ahmed, S. A., Hegazy, N. N., Abdel Malak, H. W., Cliff Kayser, W., Elrafie, N. M., Hassanien, M., Al-Hayani, A. A., El Saadany, S. A., AI-Youbi, A. O., & Shehata, M. H. (2020). Model for

utilizing distance learning post COVID-19 using (PACT)^{TM} a cross sectional qualitative study. *BMC Medical Education*, *20*(1), 400. https://doi.org/10.1186/s12909-020-02311-1

Akbar, M. (2016). Digital technology shaping teaching practices in higher education. *Frontiers in ICT*, *3*(1), 1–5. https://doi.org/10.3389/fict.2016.00001

Aksnes, D. W., & Sivertsen, G. (2019). A criteria-based assessment of the coverage of scopus and web of science. *Journal of Data and Information Science*, *4*(1), 1–21. https://doi.org/10.2478/jdis-2019-0001

Ames, H., Glenton, C., & Lewin, S. (2019). Purposive sampling in a qualitative evidence synthesis: A worked example from a synthesis on parental perceptions of vaccination communication. *BMC Medical Research Methodology*, *19*(1), 26. https://doi.org/10.1186/s12874-019-0665-4

Anderson, V. (2020). A digital pedagogy pivot: Re-thinking higher education practice from an HRD perspective. *Human Resource Development International*, *23*(4), 452–467. https://doi.org/10.1080/13678868.2020.1778999

Archer-Kuhn, B., Ayala, J., Hewson, J., & Letkemann, L. (2020). Canadian reflections on the COVID-19 pandemic in social work education: From tsunami to innovation. *Social Work Education*, *39*(8), 1010–1018. https://doi.org/10.1080/02615479.2020.1826922

Ashour, S. (2024). How COVID-19 is reshaping the role and modes of higher education whilst moving towards a knowledge society: The case of the UAE. *Open Learning: The Journal of Open, Distance and e-Learning*, *39*(1), 52–67. https://doi.org/10.1080/02680513.2021.1930526

Bayne, S., Gallagher, M. S., & Lamb, J. (2014). Being 'at' university: The social topologies of distance students. *Higher Education*, *67*(5), 569–583. https://doi.org/10.1007/s10734-013-9662-4

Bearman, M., Ryan, J., & Ajjawi, R. (2023). Discourses of artificial intelligence in higher education: A critical literature review. *Higher Education*, *86*, 369–385. https://doi.org/10.1007/s10734-022-00937-2

Broadbent, J., Ajjawi, R., Bearman, M., Boud, D., & Dawson, P. (2023). Beyond emergency remote teaching: Did the pandemic lead to lasting change in university courses? *International Journal of Educational Technology in Higher Education*, *20*(1), 58. https://doi.org/10.1186/s41239-023-00428-z

Bruland, K., & Mowery, D. C. (2005). Innovation through time. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 349–379). Oxford University Press.

Burns, R. (2020). A COVID-19 panacea in digital technologies? Challenges for democracy and higher education. *Dialogues in Human Geography*, *10*(2), 246–249. https://doi.org/10.1177/2043820620930832

Christianson, M. K., & Barton, M. A. (2021). Sensemaking in the time of COVID-19. *Journal of Management Studies*, *58*(2), 572–576. https://doi.org/10.1111/joms.12658

Clarke, V., & Braun, V. (2014). Thematic analysis. In T. Teo (Ed.), *Encyclopedia of critical psychology* (pp. 1947–1952). Springer New York. https://doi.org/10.1007/978-1-4614-5583-7_311

Colpitts, B. D. F., Smith, M. D., & McCurrach, D. P. (2021). Enhancing the digital capacity of EFL programs in the age of COVID-19: The ecological perspective in Japanese higher education. *Interactive Technology and Smart Education*, *8*(2), 158–174. https://doi.org/10.1108/ITSE-08-2020-0123

Cresswell, K., Sheikh, A., Franklin, B. D., Hinder, S., Nguyen, H. T., Krasuska, M., Lane, W., Mozaffar, H., Mason, K., Eason, S., Potts, H. W. W., & Williams, R. (2022). Benefits realization management in the context of a national digital transformation initiative in English provider organizations. *Journal of the American Medical Informatics Association*, *29*(3), 536–545. https://doi.org/10.1093/jamia/ocab283

Cuaton, G. P. (2020). Philippine higher education institutions in the time of COVID-19 pandemic. *Revista Românească Pentru Educație Multidimensională*, *12*(1), 61–70. https://doi.org/10.18662/rrem/12.1sup2/247

Dlamini, R., & Ndzinisa, N. (2020). Universities trailing behind: Unquestioned epistemological foundations constraining the transition to online instructional delivery and learning. *South African Journal of Higher Education*, *34*(6), 6. https://doi.org/10.20853/34-6-4073

Ebert, C., & Duarte, C. H. C. (2018). Digital transformation. *IEEE Software*, *35*(4), 16–21. https://doi.org/10.1109/MS.2018.2801537

Ebner, M., Schön, S., Braun, C., Ebner, M., Grigoriadis, Y., Haas, M., Leitner, P., & Taraghi, B. (2020). COVID-19 epidemic as E-learning boost? Chronological development and effects at an Austrian University against the background of the concept of 'E-learning readiness'. *Future Internet*, *12*(6), 94. https://doi.org/10.3390/fi12060094

García-Morales, V. J., Garrido-Moreno, A., & Martín-Rojas, R. (2021). The transformation of higher education after the COVID disruption: Emerging challenges in an online learning scenario. *Frontiers in Psychology*, *12*, 616059. https://doi.org/10.3389/fpsyg.2021.616059

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26(2), 91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Graumann, C. F., & Kallmeyer, W. (2002). Perspective and perspectivation in discourse. An introduction. In C. F. Graumann & W. Kallmeyer (Eds.), *Perspective and perspectivation in discourse* (Vol. 9, pp. 1–11). J. Benjamins Pub. Co.

Green, W., Anderson, V., Tait, K., & Tran, L. T. (2020). Precarity, fear and hope: Reflecting and imagining in higher education during a global pandemic. *Higher Education Research & Development*, *39*(7), 1309–1312. https://doi.org/10.1080/07294360.2020.1826029

Grimmer, R., Pollard, A., & Rolls, N. (2020). COVID-19 induced change in higher education: Reflections on rapidly transitioning a first-year undergraduate academic literacies unit from face-to-face to online. *Journal of Academic Language & Learning*, *14*(2), 95–105.

Guàrdia, L., Clougher, D., Anderson, T., & Maina, M. (2021). IDEAS for transforming higher education: An overview of ongoing trends and challenges. *The International Review of Research in Open and Distributed Learning*, *22*(2), 166–184. https://doi.org/10.19173/irrodl.v22i2.5206

Herzog, C., Handke, C., & Hitters, E. (2019). Analyzing talk and text II: Thematic analysis. In H. van den Bulck, M. Puppis, K. Donders, & L. van Audenhove (Eds.), *The Palgrave handbook of methods for media policy research* (pp. 385–401). Palgrave Macmillan.

Johnson, B. (1992). *Polarity management: Identifying and managing unsolvable problems*. HRD Press.

Kabir, M. R., Islam, M., & Deena, S. A. (2020). Explaining the adoption of technology-based design of higher education during and after COVID 19 period from a developing country perspective. *Interaction Design and Architecture(s)*, *46*(46), 88–119. https://doi.org/10.55612/s-5002-046-005

Komljenovic, J. (2022). The future of value in digitalised higher education: Why data privacy should not be our biggest concern. *Higher Education*, *83*, 119–135. https://doi.org/10.1007/s10734-020-00639-7

Laterza, V., Tømte, C. E., & Pinheiro, R. M. (2020). Guest editorial: Digital transformations with 'Nordic characteristics'? Latest trends in the digitalisation of teaching and learning in Nordic higher education. *Nordic Journal of Digital Literacy*, *15*(04), 225–233. https://doi.org/10.18261/issn.1891-943x-2020-04-01

Mariani, B., Havens, D. S., & Metz, S. (2020). A college of nursing's upward spiral during a global pandemic. *Journal of Nursing Education*, *59*(12), 675–682. https://doi.org/10.3928/01484834-20201118-04

Marks, A., & AL-Ali, M. (2020). Digital transformation in higher education: A framework for maturity assessment. *International Journal of Advanced Computer Science and Applications*, *11*(12). https://doi.org/10.14569/IJACSA.2020.0111261

Marks, A., AL-Ali, M., Atassi, R., Elkishk, A. A., & Rezgui, Y. (2021). Digital transformation in higher education: Maturity and challenges post COVID-19. In Á Rocha, C. Ferrás, P. C. López-López, & T. Guarda (Eds.), *Information technology and systems: ICITS 2021, Volume 1* (Vol. 1330, pp. 53–70). Springer International Publishing. https://doi.org/10.1007/978-3-030-68285-9

Martzoukou, K. (2021). Academic libraries in COVID-19: A renewed mission for digital literacy. *Library Management*, *42*(4/5), 266–276. https://doi.org/10.1108/LM-09-2020-0131

McNaught, C. (2003). Innovation and change in higher education: Managing multiple polarities. *Perspectives: Policy and Practice in Higher Education*, *7*(3), 76–82. https://doi.org/10.1080/13603100307746

Peruzzo, F., & Allan, J. (2022). Rethinking inclusive (digital) education: Lessons from the pandemic to reconceptualise inclusion through convivial technologies. *Learning, Media and Technology*, 1–15. https://doi.org/10.1080/17439884.2022.2131817

Pittman, J., Severino, L., DeCarlo-Tecce, M. J., & Kiosoglous, C. (2021). An action research case study: Digital equity and educational inclusion during an emergent COVID-19 divide. *Journal for Multicultural Education*, *15*(1), 68–84. https://doi.org/10.1108/JME-09-2020-0099

Raaper, R., & Brown, C. (2020). The COVID-19 pandemic and the dissolution of the university campus: Implications for student support practice. *Journal of Professional Capital and Community*, *5*(3/4), 343–349. https://doi.org/10.1108/JPCC-06-2020-0032

Reis, J., Amorim, M., Melão, N., & Matos, P. (2018). Digital transformation: A literature review and guidelines for future research. In Á Rocha, H. Adeli, L. P. Reis, & S. Costanzo (Eds.), *Trends and advances in information systems and technologies* (Vol. 745, pp. 411–421). Springer International Publishing. https://doi.org/10.1007/978-3-319-77703-0_41

Scholkmann, A. (2021). Resistance to (digital) change. Individual, systemic and learning-related perspectives. In D. Ifenthaler, S. Hofhues, M. Egloffstein, & C. Helbig (Eds.), *Digital transformation of learning organizations* (pp. 219–236). Springer. https://doi.org/10.1007/978-3-030-55878-9_13

Scholkmann, A. (2022). Innovation needs reflection. How experience from emergency remote teaching can become sustainable learnings through collective critical inspection. In H. Angenent, J. Petri, & T. Zimekova (Eds.), *Hochschulen in der Pandemie. Impulse für eine nachhaltige Entwicklung von Studium und Lehre* (pp. 104–115). Transcript.

Schumpeter, J. A. (2011). *Capitalism, socialism, and democracy* (2nd ed.). Martino.

Selwyn, N. (2012). Education and technology. Developing a global perspective. In N. Selwyn (Ed.), *Education in a digital world* (pp. 13–34). Routledge. https://doi.org/10.4324/9780203108178-5

Selwyn, N. (2016). Minding our language: Why education and technology is full of bullshit … and what might be done about it. *Learning, Media and Technology*, *41*(3), 437–443. https://doi.org/10.1080/17439884.2015.1012523

Tømte, C., & Olsen, D. S. (2013). *IKT og læring i høyere utdanning: Kvalitativ undersøkelse om hvordan IKT påvirker læring i høyere utdanning (Vol. 32/2013)*. NIFU.

Weick, K. E. (1988). Enacted sensemaking in crisis situations. *Journal of Management Studies*, *25*(4), 305–317. https://doi.org/10.1111/j.1467-6486.1988.tb00039.x

Weick, K. E. (1995). *Sensemaking in organizations*. Sage Publications.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science*, *16*(4), 409–421. https://doi.org/10.1287/orsc.1050.0133

Williamson, B., & Piattoeva, N. (2019). Objectivity as standardization in data-scientific education policy, technology and governance. *Learning, Media and Technology*, *44*(1), 64–76. https://doi.org/10.1080/17439884.2018.1556215

Wollscheid, S., Scholkmann, A., Capasso, M., & Olsen, D. S. (2021). Digital transformations in higher education in result of the Covid-19 pandemic, understood as a disruptive innovation – a scoping review protocol. *OFS Home*.

Yang, B., & Huang, C. (2021). Turn crisis into opportunity in response to COVID-19: Experience from a Chinese University and future prospects. *Studies in Higher Education*, *46*(1), 121–132. https://doi.org/10.1080/03075079.2020.1859687