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Building resilient and creative universities: exploring the new normal for eight universities across Europe

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Abstract
The rapid digital turn tested universities' resilience like never before. New modes of survival and creative actions were required to cope with the COVID-19 crisis and the extreme upheaval of established ways of teaching. While prior research has explored organizational resilience and creativity separately, their interconnection remains underexamined. This study addresses this gap by analyzing 68 interviews with university staff members working at eight European universities (located in Germany, the UK, Austria, and Estonia), investigating the interlink between organizational resilience and creativity during the pandemic and the abrupt uptake of educational technology (EdTech). We identify three organizational practices which illustrate the resilience-creativity nexus: Accumulating, Engaging, and Reassembling. *Accumulating* refers to universities cultivating resources and support structures, which may fall outside of normal routines, including investing in technical training and didactic support for teachers. Whereas, *Engaging* includes practices universities undertake to foster institutional exchange to find creative solutions for carrying out emergency remote teaching. Lastly, *Reassembling* refers to processes in which universities reinvent existing routines and invent new ones, including rethinking time-honoured teaching practices in light of new technological discoveries. By illustrating how these practices shaped universities' responses to disruption, this study advances our understanding of how resilience and creativity are intertwined in organizational adaptation. This suggests that resilient universities must not only cultivate robust resource structures but also embrace collaborative innovation and flexible reinvention to incorporate creativity and navigate ongoing digital transformation.

Keywords Organizational resilience · Organizational creativity · Educational technology · Higher education · Organizational change

1 Introduction

There has been much interest in exploring how higher education institutions evolve in the post-COVID world [1–10]. Central to this discussion are questions about how to best build *resilient universities*—institutions equipped to cope with future crises and change and thrive under uncertainty [11–15]. Past events have shown evidence that a university's resilience is closely coupled with their creativity. That is, universities' abilities to respond to and grow from the crisis was implicitly intertwined with an organization's ability to generate "novel, useful ideas or problem solutions" ([16], p. 368) in

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the face of profound obstacles [7, 12, 17–23]. For example, universities had to use 'out-of-the-box-thinking' to navigate major challenges related to lacking technical resources and digital infrastructure [17], re-imagine group work and student interaction in online settings [22], and address uneven digital literacy among university staff and students [21]. These studies suggest that a university's creativity is intertwined with their resilience.

Despite the connection between these concepts being observed in practice, this linkage has yet to be fully articulated in the literature. For instance, in a recent definition from Duchek [24] organizational resilience is described as "[an] organization's ability to anticipate potential threats, to cope effectively with adverse events, and to adapt to changing conditions" ([24], p. 220). Reading between the lines, we may surmise that organizational creativity is embedded in the resilience process: organizations need to have the capacity for imagination to envision potential threats, engage in creative 'out-of-the-box-thinking'—to navigate the uncharted waters and develop novel solutions as well as the creative capacity to interweave new and old knowledge to meet future needs.

Existing research on university resilience has largely focused on structural and leadership factors that support crisis adaptation [12, 25], whereas studies on creativity have examined how institutions foster innovative practices [26–28]. However, little attention has been paid to how creativity operates within resilience processes, how universities not only withstand disruption but also use creative capacities to anticipate challenges, develop novel responses, and embed adaptive strategies. Given the increased emphasis and interest among policy makers and practitioners in building universities equipped to thrive under uncertain conditions [12, 15, 29], this paper aims to further our understanding of the connection between resilience and creativity, a research gap that merits further investigation. Thus, the research question guiding this study is: In what ways are a university's resilience and creativity processes related?

Through the analysis of eight case studies in four European countries (Germany, the UK, Austria, and Estonia)—study programs using EdTech during the COVID-19 pandemic and subsequent rapid digital turn—we explore how universities' resilience and creativity were tested and maintained in the face of a global crisis. In the following, we first review existing literature on resilience and creativity in higher education, emphasizing their intersection. We then introduce the theoretical background, outlining key concepts from organizational resilience and creativity research that inform our study. Next, we present our research methodology, which consists of a multiple case study design, semi-structured interviews, and thematic analysis. The findings section introduces the three organizational practices—Accumulating, Engaging, and Reassembling—that illustrate the resilience-creativity nexus. Finally, we discuss the broader implications of these findings for theory and practice, before concluding with a reflection on the study's contributions, limitations, and future research directions.

2 Literature review

In order to provide a comprehensive response to the research question, it is first necessary to understand how the concepts of resilience and creativity have been examined in the context of higher education. The following section will therefore review existing literature on resilience and creativity at the university.

2.1 Resilience at universities

Resilience at universities has become much discussed in light of the COVID-19 pandemic [12, 13, 25, 30] but also prior to the pandemic university resilience was investigated in relation to acute situations of conflict, war or natural disasters [31] and system-level changes like economization [32]. University resilience is commonly understood as the ability for institutions to maintain their core activities of teaching and learning under challenging circumstances [12, 33]. However, despite this common understanding of resilience, scholars diverge in their focus and conceptual framing of resilience.

Some link university resilience to the resilience of its members, the individual ways in which students and academics cope with crises [34–38]. This view on resilience focuses on the individual responses of university instructors [25, 37, 38] or university students [34–36, 39]. Disruptions causing the need to be resilient in this strand of literature are related to the COVID-19 pandemic [25, 36, 37], a learning and working environment under constant pressure [35, 38], or concrete challenges such as personal health problems [39]. In this light, university resilience depends on the exchange of individuals and their coping strategies [25]. For example, various authors illustrated how communication among university staff members was key for institutions successfully navigating the COVID-19 crisis, as it provided means to discuss and assess new ways of teaching and learning, share emotional responses to the crisis, such as fear, stress, and anxiety as well as exchange 'success stories' [25, 39].

Another main strand of literature focuses on a university's capabilities, viewing resilience as organizational and connecting it with a processual understanding [12, 30, 33]. Duchek [24] argues that resilience of organizations can be most productively understood as a process consisting of three interrelated stages: anticipation before crisis, coping during crisis, and adaptation after crisis. Bartusevičienė et al. [12] expand upon Duchek's work and translate it to the university context by focusing on different organizational capabilities: highlighting the importance of resource availability in the anticipation stage, experimentation in the coping stage, and participation in the adaptation stage. For example they point to the importance of having organizational routines in place prior to the crisis, i.e. "a metaphorical toolkit to draw on in the face of disruptive events that threaten academic continuity" ([12], p.168). Scholars also underline that the resilience process at universities need strong elements of faculty engagement. For instance, Shaya et al. [30] suggest two kinds of leadership to practice during crisis management: delegative leadership, which gives autonomy and decision-making capacities to specifically designated staff members as well as participatory leadership which means including faculty in decision-making processes. Similarly, Dohaney et al. [33] investigated the organizational conditions needed to continue teaching during a natural disaster. The authors suggest a "blended approach" to university leadership, in which managerial decisions are not only made top-down, but also bottom-up, drawing on the expertise of university staff. This emphasizes the importance of faculty engagement, but also of leadership and communication for university resilience.

2.2 Creativity at universities

There is an emerging perspective in the literature on how to organize creativity across the university, or in other words, how to develop a creative university [26, 27, 40]. Common to this perspective, there is an understanding that creativity mechanisms may span across the whole institution as well as be differentiated and located in different levels. For example, Rae [27] investigates how higher education institutions can become more creative. According to Rae, the university structure consists of elements that are key for creativity to flourish [27]. Embedded within social networks, which are tied to wider social and economic contexts, the university can become a hub where creative ideas, conversations and information can flow between an array of actors. Creative ideas thrive best, Rae explains, when staff members are well-integrated into the organizational culture and identity, which enables them to form a common vision as well as keeps them abreast of activities within their institutions.

Thus, the more integrated staff members feel in their university culture, the higher is the chance of them obtaining relevant information (e.g. how to use required resources and expertise) necessary to engage in creative work. In addition, Kim [28] argues that a shared vision, which enhances knowledge sharing between university staff, and elements of a trustful culture foster an innovative university. This notion of a creative culture is also linked to peer learning, informal support, and knowledge sharing [41–43]. In a related study, Barnett [26] uses a socio-theoretical lens to develop five types of creativity at the university—intellectual, pedagogical, learning, environmental, and reflexive,—and stimulates that creativity is located within different domains of the university. While intellectual creativity is relevant for academic work and pedagogical creativity for teaching practices, learning creativity manifests in student engagement. Environmental creativity concerns the engagement with society and lastly reflexive creativity refers to the university's adaptability [26]. In conclusion, the creativity of a university is evident in research, university teaching, and study programmes, in digital learning environments and physical campus spaces as well as in its engagement with the wider society and industry.

Although both the resilience and creativity literature emphasize the importance of staff engagement, leadership, and a supportive organizational culture, there is limited conceptual bridging between these domains. Both sets of literature lack empirical understanding on how organizational capabilities are translated into action and how in turn individual resilience and creativity contributes to the university as an organization. Conceptually, for both key concepts, it is thus necessary to attend to processes which are links between the organizational and the individual level.

3 Conceptual framework

Bridging the conceptual literature on resilience and creativity, we argue that these two concepts are intertwined in processes. With this understanding, we draw a link to the process ontology that describes organizational phenomena as being constantly 'in flux' [44, 45]. Thus, the emphasis is placed on studying interaction as it ebbs and flows over time to construct social reality[44]. We thus follow Duchek [24] in her proposition that resilience can be most productively understood as a process consisting of the three interrelated stages mentioned before: anticipation, coping and adaptation. In the anticipation stage, organizations must be able to detect future threats, such as by creating recovery plans,

establishing connections to key external actors, and having slack resources to allocate in times of crisis. In the coping stage, two capabilities are necessary: the first involves organizations accepting the problem and the second developing and coordinating solutions. Lastly, the adaptation stage consists of embedding creative solutions and new knowledge into existing organizational practices. This requires both reflection (e.g. making sense of the change) and implementing organizational change (e.g. practices and structures are changed in accordance to newly obtained knowledge) [24].

Similar to Duchek's resilience framework and in contrast to other creativity definitions, Fortwengel and colleagues conceptualize organizational creativity as a social process. Tracing it to the structuration theory from Giddens [46] they highlight the interplay between agency (e.g. the individual creator) and the organizational structure [45]. Thus, the relationship between an individual's actions and organizational structures (e.g. contextual features, hierarchical constructs, and resources) become the focal point of investigation when studying organizational creativity. We identify another conceptual overlap of the stages of resilience with creativity concepts in the university context in Barnett's environmental and reflexive creativity [26]: the former focuses on how universities need to creatively engage with the larger society and the latter on how universities need to be agile and open to new possibilities for their survival. Both these actions speak to the capabilities organizations need to be able to identify future threats, a key element of their resilience.

For our theoretical understanding, we conclude, that organizational processes and practices—which may embed resilience and creativity—can emerge in response to internal dynamics (e.g. organizational resources, structures, social interaction) as well as external dynamics (e.g. the COVID-19 crisis) [24, 25]. Thus, in our empirical material, we look for the intersection of resilience and creativity in different processes, how they interlink to both key concepts and what tensions may arise. For our purposes, this conceptual orientation is the most appropriate to examine our object of study—universities navigating an ongoing crisis and employing different organizational practices to cope with the ensuing rapid digital transformation.

4 Research method

Our methodological approach was inspired by the *Interactive Research Model* [47], which involves including research participants in various stages of the research process. This approach aligns with our aim to explore institutional resilience and creativity in higher education, as it allows for insights that are co-constructed with those directly involved in EdTech implementation. Drawing on this model, we set up an *Open Call for Case Studies* inviting university staff working in European study programs to apply. This recruitment method enabled us to identify key organizational challenges related to EdTech implementation as well as reach case studies outside of our networks. However, it also presented some potential shortcomings as it targeted individuals who were highly motivated. To counteract this, we sought to secure interviews from individuals with contrasting opinions on EdTech during our fieldwork.

We adopted a case study research design, selecting our cases based on the heterogeneity principle [48]. Case studies are particularly suited for analyzing complex organizational processes in diverse institutional contexts, making them ideal for studying how universities navigate digital transformation. Additionally, the heterogeneity principle allowed us to account for the impact of internal and external dynamics in our cases as well as the diverse nature of universities (see Table 1). While other approaches, such as large-scale surveys, could provide broader generalizability, they would lack the depth necessary to capture nuances. Ethnographic methods, while offering rich insights, were not possible due to covid restrictions.

In total, we conducted 68 semi-structured interviews across eight cases with staff members working in connection to the study programs that serve as case studies: technical, support, and administrative staff in addition to institutional leadership / management. Semi-structured interviews were chosen because they provide a structured framework for comparability while allowing interviewees the flexibility to raise concerns and insights that we might not have anticipated, ensuring that the research process remains open to the participants' lived experiences rather than imposing predefined assumptions about their work. The interviews took place in an online environment and were conducted in English and German.[1] In the interviews, we explored the organizational conditions that hinder or foster the implementation of EdTech. The questions were structured along three main parts: structure and strategy, experience with change processes and educational technologies, and leadership and support. This included questions such as "In your opinion, what hinders or supports digital teaching at your university?" or some that were directed directly to the process-understanding of

[1] Interview excerpts from the German interviews have been translated by the research team.

Table 1 Case study overview

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
Study Program								
	Visual Technology	Social Work	Social Work	Business Administration	Political Science	Sociology	Medical Technology	Law
Degree of Digitalization								
	High	Medium	Low	High	High	Low	High	High
Types of Institution								
	University of Appl. Sci	University of Appl. Sci	University of Appl. Sci	University of Appl. Sci	University	University	University	University
Type of Funding								
	Private	Private	State	State	State	State	State	State
Country								
	UK	Germany	Germany	Austria	Estonia	Germany	Germany	UK
Student Population								
	1.000–5.000	up to 1.000	1.000–5.000	1.000–5.000	1.000–5.000	5.000–20.000	> 20.000	> 20.000
University Level of the Interviewees								
Study Program	3	5	2	4	6	4	3	4
Faculty	4	1	2	3	3	1	0	3
Central Leadership	2	4	2	1	1	5	2	3
Total	9	10	6	8	10	10	5	10

change such as "What was the attitude towards digital teaching at your faculty before COVID-19? How has it changed since COVID-19?". To give a broad overview, questions included topics such as crisis management, leadership, strategy, infrastructure, organizational culture, communication, and institutional identity. The interviews lasted on average 1 h, were recorded and transcribed and personal information anonymized. The data was analysed collaboratively using thematic analysis [49]. To ensure consistency across researchers, we developed a shared codebook that incorporated both theory-driven and data-driven codes. Aligned with our conceptual framework, our coding scheme was developed to reflect key resilience and creativity concepts, allowing us to identify patterns in how universities leveraged creative adaptation as a resilience mechanism. To enhance reliability, we followed an intercoder agreement process, where the research team jointly defined coding categories and resolved discrepancies through discussion [50]. We used MaxQDA software to systematically organize and analyze the interview transcripts.

Table 1 outlines the characteristics of each case, highlighting the heterogeneity of the eight cases on which our findings on the interplay between resilience and creativity at university are based.

5 Linking resilience and creativity at the university

Through focusing on what universities were doing to continue their mission of teaching amidst governmental lockdowns and campus closures, we identified three actions showcasing the resilience-creativity nexus: Accumulating, Engaging, and Reassembling. Accumulating involves universities gathering resources and support structures, which can be used for a swift adaptation to change. This not only aids in crisis management but also fosters creative problem-solving by organizing resources for novel situations. Engaging denotes fostering a culture of exchange within universities, including diverse voices in processes of decision-making. This necessitates both flexibility and creativity in achieving group consensus. Reassembling involves exploring new practices and reinventing old ones within universities, merging existing expertise with new ideas. This intertwining of old and new fosters a culture of creativity, leading to novel approaches and interactions. However, these three practices encountered tensions—factors within the university environment that prevented them from being fully realized. Moreover, these practices were difficult to track along a time dimension, as they often occurred simultaneously.

5.1 Accumulating

Accumulating, the cultivating of resources and support structures at the university, was identified as vital to face the upheaval of established teaching practices and needed to be creatively applied. From the literature, we know that resilient universities require a range of resources at their disposal in order to anticipate and cope with rapid change or a disruptive event [12, 24]. We determined that universities invested in *resource allocation,* which included investing in personnel resources—fostering digital skills of instructors and other staff, technological resources—hardware and software, as well as support structures, such as technical and didactic support.

Many of the respondents reported that prior to the pandemic they had limited experience with EdTech and lacked the essential technical skills to operate these technologies. In this light, accumulating resources translated to *fostering individual skills and knowledge*, which heightened the capacity for staff members to cope with changes to their work processes and teaching formats. We found that individual skills and knowledge fell into two categories, one regarding technical and the other didactic aspects. The first, allocating resources for IT support, became vitally important when the pandemic prevented in-person teaching. The following quote from a university teacher working at an Estonian university illustrates this:

> "We put in more money to encourage teachers to invest more time and just to ensure, I mean that the IT department could [provide] resources, to ensure that all the systems are working … it was just clear that we have to do more [and the] .. base was very good at the beginning of the crisis."

At first glance, accumulating resources may appear to be a standardized procedure however, when further explored it also exhibits implicitly creative traits: accumulated resources and support structures need to be organized in a manner that enables them to be creatively applied to potentially unknown situations that fall outside of known routines (e.g. linked to "reflective creativity" from Barnett [26] and the "anticipation stage" from Duchek [24]). Therefore, we also identified that diverse and flexible didactic skills were necessary for teachers to respond quickly to changing teaching formats.

Developing and using such didactic skills required teachers to exercise creativity in the classroom, that is, thinking of new ways to deliver learning content to students. A instructor reflected on this creative process:

> "It was very nice when it flowed [student engagement online]. ... When the Padlets [online collaboration platform] and the whole thing fill[ed] up. Those are the beautiful moments. I first had to learn: How do I use the Padlet? Are there different ways? How do I use it so that it is also inspiring or that it connects with what students can recall?"

For these creative processes to flourish, our data indicated that teachers needed freedom to experiment or improvise with technology in the classroom. Accumulating also means *setting up organizational resources & support structures* at the university, because the individual skills described above thrive in an environment that supports them. Repeatedly, we found that training was a key issue for the skill development of teaching staff, ideally these trainings allowed teachers to gain both technical skills and didactic knowledge:

> "University management scheduled or wanted training ... to which everyone was invited ... in the end, this was also a very fruitful exchange, because new ideas were always generated ... I perhaps had more of an eye on the technical side, [other] colleagues more on the didactic side, and that's where some new things emerged."

Didactic training looked differently across institutions: the study programs in our sample faced the crisis with different toolkits at their disposal. The set of skills may be dependent on the size of the university, disciplinary and research focus, the portfolio of study programs, and the way the university engages with other stakeholders. For example, in an Estonian university, there was a special unit dedicated to assisting teachers with didactic issues that accompany EdTech implementation and offering group training and individual tailored coaching. Another example, a research university in the United Kingdom was more prepared than most:

> "I think we were prepared, as prepared as one can ever be. Let's say that we did have lifeboats. We had pretty much the right number of lifeboats. And no one had really used them in a long time. But it was relatively obvious how they worked. …When COVID hit, we had already [invested in] the physical technology. Everybody had a laptop … [and] we understood what the software was on those computers."

Therefore, we infer that in order to be resilient universities require a multiplicity of skills and resources ready and an environment in which these can be creatively expanded. Accumulating resources thus increases the range of adjustments that can be made when crises occur and university routines are disrupted.

Reflecting on the accumulating practices described above, it is important to note that things did not always proceed as planned. Specifically, we observed two main tensions during accumulating resources one being *resource restriction*. Sometimes teachers wanted to experiment with certain EdTech tools and faced organizational hurdles when these tools were not centrally supported and the usage therefore got restricted. Additionally, in some instances universities attempted to standardize technologies which resulted in more restrictions for teachers, as one teacher explained:

> "...there were lots of tools that I would have liked to use. But they are not part of the centrally provided suite. And therefore, they're either strongly discouraged or simply impossible to use, because they're not interacting with the official platforms."

Another major concern for teachers was the constant *lack of time*. Interviewees reported that they did not have enough time to partake in the much needed training and development opportunities in light of the immense workload that the switch to digital teaching entailed. Time was also lacking for other important activities, such as for reflection on new developments and crafting digital teaching strategies for the whole university. One teacher remarked how opportunities were simply lost because there was no time allocated to developing a strategic process for digitalization and getting everyone involved.

5.2 Engaging

Involving diverse voices was also found to be a key component of a university's resilience and intertwined with its creativity. Joint decision making processes are known to be especially important when dealing with a disruptive event [12, 33] and different perspectives not only require a flexible mindset but also a creative approach to building group consensus [36]. As universities were experiencing a rapid uptake of EdTech amidst the COVID-19 pandemic, *facilitating mutual exchange across the university* was essential for finding collective and creative solutions to carry out teaching. In the face of the crisis, many respondents reported a high level of camaraderie, in which staff members "pulled together" to get things

done which directly contributed to the resilience of their institutions. In the quote below, a teacher working at a private university in United Kingdom encapsulates this feeling:

> "A lot of people stepped up … there was quite a good feeling of solidarity, at a certain point. …And it was like all hands on deck. … And I think it was quite democratic in that sense and the ideas won. And it didn't really matter who's had the idea. If it's going to work, let's do it."

As illustrated in the quote, we found that the pandemic often had the effect of diminishing hierarchical structures. This way of thinking reflects a flexible mindset, which was key in troubleshooting acute challenges that arose during the rapid shift to online teaching. In the following quote, a dean at the same institution explained the purpose of routinizing staff exchange during the pandemic:

> "… you need to make sure inexperienced teachers have mentors, you need to try and make sure there's regular contact between the groups of people teaching different programs to make sure things are coordinated … we set up more regular meetings … to check-up on how things were going both in terms of technology if they hit any problems with that "

Another institutional leader detailed how these meetings became sites for staff across the institution to share their successes of "experimenting with different ways of managing the classroom" and explained that the pandemic had sparked people to "innovat[e] in their own way all over the place … because all of us needed to try and put the fire out and everyone was trying to help." In other words, the resilience of staff members—to cope with abrupt changes to teaching—became a joint effort for their institution's survival. It is important to note, that this mentality of mutual exchange, was found across our cases, but most common among study programs that described their institutional environments as "non-hierarchical."

Even amongst more technically savvy staff, exchange was crucial for generating creative solutions for emerging challenges. In an Austrian applied university, staff working in a Business Administration program described how a shared approach to taking responsibility for EdTech was encouraged by the management, who "trusted us [teachers] a lot," as one instructor reported. Another teacher commented on this method and its impact on creativity:

> …the team functions very well … It's not about building up silo thinking, but about bringing out the best possible product, so to speak, at the end as a team. And that requires a few cornerstones. It requires leadership and not a manager who manages from above. It's also about giving more responsibility to the individual team members and not having the responsibility centralized in one person."

Encouraging shared responsibility for EdTech appeared to have a strong connection to a university's resilience and its ability to react to challenges that emerged during the COVID-19 crisis. As central administrations were not always able to react quickly enough to all pressing challenges, sharing responsibility with teachers was a way to speed up the transition to online teaching. This shared responsibility looked different across the study programs, in some cases teachers were given more responsibility, including choosing their own digital tools and course design, while others were guided more by their central administration.

Staff members played pivotal roles in the *Engaging* component through their active participation in mutual exchange and sharing responsibility for EdTech. Through their participation they helped build a resilient community, a group of individuals who trusted and relied on each other for support and found jointly novel solutions for overcoming challenges [30, 33]. Engaging was again connected to the creativity of individuals and their institutions, as it required staff to think outside of the box to find solutions for delivering teaching online as well as institutions to be flexible and creative in setting up exchanges and recognizing expertise across their staff members.

However, efforts to foster engagement within the institutions did not always proceed smoothly—we observed that tensions arose especially within the context of shared responsibilities and increased autonomy of university staff described above. Tensions notably developed for some teachers when the sharing of responsibilities was not a choice of their own, but was rather a *forced involvement* to take on tasks and responsibilities because leadership was absent. Furthermore, the involvement of staff in leadership decisions seemed to need the right balance, not only too much but also too little responsibility caused tensions. Teachers who were left to their own devices, reported feeling overwhelmed and discouraged with EdTech, whereas central administrations that sought to strictly control online teaching stifled their teachers' creativity and motivation.

Another tension, *lack of recognition*, affected (1) the way universities often missed to recognize additional work and (2) the way student interaction changed due to not being in a classroom with them. For example, teachers reported a lack of acknowledgement and rewards from university leadership for their heightened engagement, such as taking on additional tasks and responsibilities, leading to dissatisfaction. Regarding the recognition from students in the classroom, the forced move to exclusively online communication was accompanied by the so-called "black tile problem," describing the situation of only looking at black tiles as no one in the online classroom would turn their camera on, leading to a situation that was sometimes described as "alienating."

5.3 Reassembling

Exploration and reinvention were found to be a third set of crucial organizational practices in fostering a university's resilience that is mirrored in the literature [24, 28, 41]. The interweaving of new and old ideas directly sparks creative processes such as improvisation, fostering innovative thinking, behavior, and interaction. For example, teachers had to reassemble proven engagement strategies for in-person classes to suit digital environments. In the following quote, a professor at a German university of applied sciences expressed enthusiasm for integrating digital technologies into teaching:

> "I have also used many exciting new tools. I have worked a lot with Miroboard, for example. I introduced it directly in the first [corona] semester … a tool that I will definitely continue to use in a post-corona period. Because the collaboration processes via Miro were a bit better than when you stand at a whiteboard."

The desire to keep lessons learned from the crisis was also expressed by staff members working in a sociology program at another German university. One teacher described her positive experiences with digital teaching:

> "Many of us have somehow come up with new ideas as a result of this compulsion to digitize [our] teaching. I think everyone wants to return to face-to-face, but not necessarily to the status quo that they had before, but also want to draw inspiration from it and perhaps do a few things differently."

The teacher further highlighted the effectiveness of online tools for social sciences, stating, "we don't need a lab or anything […] hybrid things will work quite well for me." Another instructor of the same program planned to incorporate multimedia elements into their curriculum, noting, "images and sound could go into curriculum content." A colleague from the respected university technology center predicted that "normal face-to-face teaching with digital assistance will likely become the standard in the near future." These examples reflect the potential of technology to enhance learning experiences and the study program's efforts to cultivate their unique "creativity footprint" without compromising their identity [26].

Besides the creation of new ways of teaching and course planning, reassembling also took place in changing whole study programs. For example, a German applied university that prior to the pandemic had a low degree of digitization, decided to add a new English language program with a strong online component.

Our findings also revealed that university staff must be creative when reassembling teaching practices by devising innovative solutions to pedagogical obstacles, drawing on personal experiences or those of their peers. A professor at a German university shared how this creativity sparked friendly competition among colleagues:

> " … colleagues who discovered something new treat it quite demonstratively and get everyone a bit excited about it. And think: Okay, what was that? What was it called? (laughs). I'm not going to say that there's some kind of playful competition to present something great. So what, just a little incentive."

Individual acts of creativity reassembling teaching practices depend on a *culture of innovation* that welcomes and supports new ideas rather than stifling them. Research shows that an organizational culture fostering creativity and innovation is crucial for university resilience [30]. For instance, a German research university established a dedicated institute for teaching innovation, which provided essential support for the university's pandemic response, as one instructor noted:

> "There were training offers and more, [...] so to speak, a huge information and training landscape. It was very well received, there were live events, there were synchronous and asynchronous training courses, there were consulting services."

This institute, as one staff member explained, needs to be agile and creative in order to navigate and address the diversity of the university.

"We have to develop solutions for all these diverse groups. That means that we have the opportunity to address the different levels of expertise, but also the different needs in terms of support, in regards to flexibility in time or space, in collaboration."

Reassembling manifested in new ways of teaching or course planning and sometimes even in changing whole study programs. These changes lead to "eager" discussions across the institutions about what changes to keep from the pandemic with the result that most study programs planned to incorporate some digital changes into their curricula post-COVID. Additionally, reassembling crucially depends on creativity as well as fosters it and creativity can thrive with organizational structures that enable new problem-solving strategies and processes.

However, it also needs to be addressed that the picture of an innovative culture, marked by experimentation and new solutions, is not complete without looking at the tensions and contradictions within it. Our findings also reveal *resistance towards digital change* and technology-driven teaching, rooted in fear of technology or job loss. Some teachers were cautious about digital tools' and did not want to overestimate possible positive impacts on their classrooms, as illustrated by a faculty member's quote: "many of [my colleagues] think that sometimes we invest too much into the technical sphere into the equipment and all this type of different tools, always expanding and that creates over elevated expectations." Additionally, many respondents were *holding on to familiar practices* and awaiting a return to face-to-face teaching post-pandemic. Some were against sustainable implementation of EdTech, wanting short-term solutions to revert to previous methods. This resistance was often tied to the university's identity as a physical campus institution and a teaching and learning culture which is tied to tradition and thus sometimes counteracts reassembling practices.

In Table 2, we summarize the definitions of the three organizational practices, their connections to resilience and creativity as well as the tensions related to their implementation.

Resilience and creativity are interconnected through three key processes—Accumulating, Engaging, and Reassembling. These practices emphasize the importance of both structured preparation and adaptive reinvention while navigating institutional constraints and change.

6 Discussion and conclusion

Following the COVID-19 crisis, there is a growing interest in developing resilient universities capable of thriving in future crises and during rapid change [12, 31]. The crisis highlighted the close connection between a university's resilience and creativity, showcasing their capacity to innovate in challenging circumstances [17, 22]. While this link is suggested in previous literature [30] it remains conceptually unexplored. This study examines how organizational resilience and creativity intersect through the rapid adoption of EdTech in eight European study programs during the COVID-19 pandemic.

In our findings, we unpack three organizational practices at universities during the crisis—Accumulating, Engaging, and Reassembling—, which interlink resilience and creativity. The practices provide empirical examples of how universities respond to crises and make use of different kinds of creativity but also shed light on the internal tensions and challenges faced by institutions. In the following, we want to further discuss our findings in light of previous literature and our theoretical framework.

Table 2 Linking resilience and creativity

	Accumulating	Engaging	Reassembling
Definition	Resource allocation	Involving diverse voices	Exploration and reinvention
Activities	Fostering individual skills & knowledge Setting up organizational resources & support structures	Facilitating mutual exchange across the university Encouraging shared responsibility	Improvising, experimenting & reinventing practices Creating a culture of innovation
Resilience Connection	Preparatory work and structures needed to cope with change / crisis	Preparatory work and structures needed to cope with change / crisis	Learning from change / crisis
Creativity Connection	Building adaptable skill sets and structures	Flexible mindset and creative consensus building	Weaving together new and old ideas and practices
Tensions	Resource restriction Lack of time	Forced involvement Lack of recognition	Resistance towards digital change Holding on to familiar practices

The first, *Accumulating*, involves universities building up a broad range of resources and support structures to respond swiftly to change. This is in line with previous literature that emphasizes the role of strategic resource allocation for a continuity of teaching and learning. Bartusevičienė et al. [12] for example, emphasize that strategic resource allocation was a defining factor in whether universities successfully maintained academic continuity during the COVID-19 crisis. Our findings on resource allocation are also in line with Duchek [24], as she emphasizes that resilient organizations require preparatory mechanisms to mitigate disruption. They also show how the resilience stages [24] may overlap at the university: resource accumulation is not only about preparedness but also about fostering an environment where creativity can emerge in response to sudden challenges. The rapid mobilization of resources demanded creativity, particularly as teaching staff had to transition online within weeks. The tension shown in Accumulation between standardization and creativity reflects a common issue in organizational resilience literature, where the need for structure sometimes impedes flexibility and creative responses.

The second organizational practice in building resilient and creative universities, *Engaging*, involves promoting mutual exchange and shared responsibility. We know from the literature that institutions that shared responsibility for EdTech with teaching staff were more effective in crisis management [30, 33] and that creative ideas work best when staff feel integrated in the organizational culture and identity [27]. Our findings on engagement reinforce this suggestion of the literature saying that universities that encouraged communication and shared decision-making were better able to navigate the challenges of crisis management. Engagement practices contribute to creating a culture of creativity, where staff feel valued and integrated into the institution's culture. Pointing out the risks of overwhelming staff or compromising their sense of ownership, our results corroborate the need for universities to strike a balance between fostering engagement and avoiding burnout or resistance to new practices.

Thirdly, in *Reassembling*, staff members played a crucial role in reimagining work processes through their experiences with digital teaching. They drove creative changes in classroom dynamics and the use of digital tools, engaging in "bricolage"—creating something new from existing parts [12, 24, 51]. This flexible mindset, embracing new ways of thinking and interacting, aligns with concepts of "reflective creativity" from Barnett [26] and Duchek's [24] adaptation stage as well as universities being able to draw from a variety of organizational features [32], emphasizing the importance of organizations being receptive to innovative directions. While the organizational capacity to adapt is critical for resilience, the emotional and psychological resistance to change can impede the process. Our findings acknowledge the individual resistance that often accompanies the organizational capacity to adapt. Resilient universities need to navigate how to encourage innovation while managing internal contradictions and fears of change.

Across the findings, we see the important role individuals play in resilience and creativity processes. However, we do see the effect of the organizational changes when setting up support structures and resources (e.g. *Accumulating*), organizing formats for mutual exchange (e.g. *Engaging*), and lastly in ensuring that lessons learned from the crisis remain (e.g. *Reassembling*). The tensions are often located between the organizational structures that are provided and an individual sense of resistance or overburdening. Our findings stress the need to find ways in which the organizational structure of the university can support and encourage individuals, so that they become more creative and retain their individual resilience mechanisms which in turn contributes to the resilience of the institution.

The study furthers our understanding of the relationship between organizational resilience and creativity, but has some limitations. Although some details are given regarding the contextual features of each study program an in-depth analysis was not possible within the scope of this paper. Future research would benefit from a more detailed analysis of the internal and external dynamics that shape resilience and creativity processes at the university. In the study, the data presented captures universities navigating an ongoing crisis, it would also be valuable to determine how an institution's resilience and creativity may change in the long-term. The study also identified several gaps in the literature such as creativity at the university being an underexplored topic, with only few studies examining creativity from an organizational perspective [26, 27]. Future research may further this perspective by exploring the key characteristics of a creative university.

In conclusion, we hope our research contributes to a clearer image of what constitutes a resilient and creative university, in light of current and future crises, such as climate change, pandemics, war and conflict. With these challenges becoming increasingly important we point at the organizational practices that are employed to prepare universities for uncertain futures.

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Author contributions ML made substantial contributions to conceptualising the paper, analysing the data, and writing and revising the paper. LOS contributed to collecting and analyzing the data, conceptualizing, writing and revising the paper. FK contributed to conceptualizing the paper, analyzing the data and writing and revising the paper. BD contributed to data collection and analysis and writing and revising the paper. All authors have read and approved the final manuscript.

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Data availability The data is not publicly available due to privacy restrictions. However, the data that support this study are available upon reasonable request from the corresponding author.

Declarations

Ethics approval and consent to participate The research was ethically approved by the Ethics Committee of the Alexander von Humboldt Institute for Internet and Society. The study was conducted in agreement with the guidelines governing research involving human participants, as outlined by the Ethics Committee of the Alexander von Humboldt Institute for Internet and Society. Prior to participation, all participants were duly informed of their rights and responsibilities and provided explicit written consent.

Competing interests The authors declare no competing interests.

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