Digital Transformation of Higher Education - Global Learning Report 2022

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Digital Transformation of Higher Education

Global Learning Report 2022

GLOBAL LEARNING COUNCIL

DAAD Deutscher Akademischer Austauschdienst
German Academic Exchange Service

THE

Preface

When the COVID-19 pandemic plunged the world into a global state of emergency in early 2020, improvisation was initially required in many areas of society. Solutions had to be found to keep various areas of society functioning, at least provisionally, under the conditions of social distancing. These solutions were more successful in some areas than others.

We all hoped to find a third category alongside success or failure—that some areas that were previously seen as major challenges could also permit a phase of experimentation or partial success. We have all begun—somewhat hopefully—to talk about or even promote the "new normal".

This concept often referred to the benefits of digital transformation, which has been quite sluggish so far. Many areas of society, this crisis has shown us once again, can benefit from thoughtful and intelligent digital integration. One such area is education in general and higher education in particular. Educational research has been investigating how to improve teaching and learning with digital support for years, and educational institutions and many tech companies have considered this idea.

Now that more than two years have passed since the beginning of the COVID-19 pandemic, we want to take another look at how the digitization of higher education is developing around the world in this Global Learning Report 2022. While our focus last year was on immediate crisis management, this year we know more about what has worked and can lead to sustainable success, and at what point a careless approach can cause the educational experience to deteriorate, create barriers, and foster inequalities.

To avoid these harms, we strongly believe that global exchange is necessary in education and reflection on the same. We seek to create a foundation for educators to work together on a fair and accessible system of global education.

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The **Global Learning Council** (GLC) is a virtual organization that brings together thought leaders in the effective use of technology to provide access to education and improve learning outcomes worldwide. Founded in 2013, the GLC offers a platform to connect educators, organizers, and innovators from academia, industry, and the non-profit sector to foster cooperative processes and advance innovative strategies for digital learning.

The **German Academic Exchange Service** (Deutscher Akademischer Austauschdienst, DAAD) is the world's largest funding organization for international academic cooperation and the international exchange of students and researchers. Its members are German institutions of higher education and their student bodies. The DAAD's presence in more than 100 countries worldwide is the foundation of its international expertise.

Times Higher Education (THE) is a leading source of information about global higher education, that showcases perspectives from across academia, governments, and industry. With a deep understanding of the higher education sector, THE provides access to news and analysis, data, university rankings, and forums for debate. On the THE Campus platform, academics can also find and share advice on digital teaching and learning.

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Executive Summary

Sara Custer (THE)

The two-year anniversary of the COVID-19 pandemic whizzed past us in March 2022. And time continues to march further away from the moment when the world changed for so many, including higher education institutions (HEIs), which altered how they deliver their core missions of teaching and research.

In the second year since the COVID-19 crisis began, we have moved from wondering when we will go back to "normal" to figuring out how to live with and build upon what has changed—whether by creating a flexible working culture, rebuilding our economies, or living with the puppies we acquired during lockdown.

The contributing authors of the Global Learning Report 2022 deliver their messages with an urgency that was lacking in last year's paper. From chapter 1, entitled "Moving from Stated Values to Enacted Efforts: Strategic Leadership in Higher Education," to chapter 9, "An Accessible Future for all Students: Using Technology to Realize Higher Education's Greatest Promise," education technologists are clear: HEIs must act now if they are to maintain the momentum of digital innovation seen in the previous two years.

This process will require collaboration, risk-taking, new models of education delivery, and a firm commitment to tackling the inequalities that existed before the pandemic began and the new ones that have emerged since. This year's report is full of advice and recommendations for how to act now.

Carnegie Mellon's (CMU) Lauren Herckis and the Global Learning Council's (GLC) Anne Leiser begin by reminding us of the enormous demand for higher education around the world. In the last 50 years, the global higher education enrollment rate of eligible students has risen from 10% in 1972 to more than 40% in 2020. To address the resulting strain on resources, higher education providers have responded with MOOCs, the HyFlex course model, virtual or augmented reality, artificial intelligence applications, and micro-credentials. These tools, regardless of their efficacy, "create additional urgency for HEIs to adopt digital teaching and learning in order to remain competitive in the market," they write, while the pandemic has further fueled the pressure on institutions by forcing them to begin digitization processes.

However, Herckis and Leiser point out that there are deep disparities in higher education that must be addressed alongside the digitization of teaching and learning. "One of the biggest learnings of the pandemic was that inequalities in education run wider and deeper than many of us were previously aware," they say.

After interviewing higher education leaders from more than 20 institutions around the world, Herckis and Leiser have crafted four recommendations for how leaders should act to move beyond reflecting on accessibility and digitization goals and enact them. The first is that digitalization is most effective as an instrument with which to achieve a well-defined goal. The second is that educational strategy must be thought out well into the implementation phase. Third, all stakeholders at an HEI must be included in strategic processes. And finally, the sector must recognize that different institutions fulfill different purposes within the higher education ecosystem.

My colleague at Times Higher Education (THE), Rosa Ellis, also interviewed two higher education leaders for this report: Matthias Kleiner, president of the Leibniz Association (Leibniz), and Subra Suresh, president of Nanyang Technological University (NTU). In their interview, Kleiner and Suresh express excitement about the benefits new technology can bring to teaching and learning, especially in the fields of augmented and virtual reality. The strategies and technologies introduced during the pandemic that stand to benefit higher education long-term are many, according to Kleiner, including facilitating communication, reducing air travel, and supporting open science.

Many authors comment on the surge of collaboration that emerged during the pandemic—from informal faculty networks to interlinked student connections across the globe—saying that they would like to see this carried forward.

Melissa Laufer and Bronwen Deacon at the Alexander von Humboldt Institute for Internet and Society (HIIG) and Len Ole Schäfer at Digitalization, Diversity and Lifelong Learning – Consequences for Higher Education (D^2L^2), respectively, write about the informal university networks born out of crisis that drove innovation and encouraged more intimate collaboration among faculty. They encourage HEIs to cultivate these groups by creating flat hierarchies, agile administrative channels, and formalized exchange spaces that give teachers the freedom to experiment with digital tools and formats while empowering middle managers to allocate resources and recognize internal talent.

Like Herckis and Leiser, Trine Jensen at the International Association of Universities (IAU) acknowledges the inequities that were exacerbated during the pandemic and argues that this is a unique moment to mold a more equal future. Although digital poverty persists, every region of the world has seen serious infrastructure investments, she writes. "How this will impact higher education over time remains in question, especially in a world where, we hope, social activities are no longer a threat to public health and institutions will select digital tools by choice rather than by necessity," she says. "This important transformation pressures HEIs to reflect on how they wish to shape higher education in an increasingly digital world."

While the pandemic exacerbated existing inequities and revealed new ones, it also jolted higher education forward to a much brighter future—if HEIs act now, writes Andrew S. Rosen at Kaplan Inc. "When online education is implemented with attention to quality and outcomes, it offers many possibilities for solving some of the core issues that have plagued education for generations," he argues, citing improved learning at a greater scale with lower costs as the benefits of online education. "That enormous potential seems clearer than ever," he says. To realize this potential, "universities must double down on the nimbleness they discovered during COVID-19, and continue to be open to innovation and new business models," he urges.

Microsoft's Alexandros Papaspyridis and Jason LaGreca also see huge potential in this moment, writing that we have a "once-in-a-lifetime opportunity" to reimagine the very definition of higher education. According to Papaspyridis and LaGreca, the future will be hybrid and flexible—HyFlex. HyFlex campuses, they argue, encourage social connections through rich collaboration between students attending in-person and remotely; are flexible and adaptive, supporting hybrid learning from any device at any time; and replicate the future workplace, exposing learners to the tools and skills they will need upon graduation. To truly grasp this opportunity, institutions must invest in change management to create a culture that will encourage faculty and students to focus on HyFlex teaching and learning, they say.

The digitalization of the past two years has transformed international academic cooperation, mobility, and exchange, write Dagmar Willems and Alexander Knoth at the German Academic Exchange Service (DAAD). However, it has also highlighted barriers including students' lack of hardware and Internet connection, their difficulty navigating unfamiliar software and learning platforms and obtaining secure and internationally recognized credentials, and a focus on synchronous live learning and assessment, which limits learning across time zones. They explain a few of the ways DAAD is working to tackle those barriers and call for national and international collaboration on an initiative that would stitch together the current isolated digital systems that students encounter. This seamless digital learning pathway would cover every step of students' education journeys.

Yasmin Djabarian and Kevin Saukel at the German Forum for Higher Education in the Digital Age (HFD) nod to the possibility of returning to campus physically and urge that the discourse should not be dominated by debating analog vs. digital learning but rather by the question of how to ensure that universities are future-ready and can deliver an inclusive education for learners. Universities must consider student perspectives as they shape the future of higher education after the pandemic, they say. "Taking advantage of the growing experiences with a variety of learning scenarios—analogue, digital, hybrid—is a crucial opportunity to take bold steps toward further manifesting the shift from teaching to learning."

To fulfill the potential of digitalization at scale, they call for the re-envisioning of desirable futures of HEIs, new learning spaces, further professionalization and peer learning opportunities (including facilitating these processes), and real student participation on an institutional level.

Liv Gjestvang and Raechelle Clemmons at Amazon Web Services (AWS) have a similar vision for the future. They warn that "as the pressures of the pandemic wane, the tendency to fall back into the old ways of doing things will only grow." They suggest that for higher education to be equitable and accessible to everyone, HEIs need to lean into modes of flexible learning that draw on the best of in-person, hybrid, and online learning. That includes high-impact practices (HIPs) like internships, service learning, and undergraduate research, which increase retention and graduation rates for students, especially those who have been historically underserved in higher education.

They also call for a re-imagining of how student services are delivered and say that technology can give students support when, where, and how they need it. They challenge leaders to make a wholesale cultural change within their institutions to embrace innovation and iteration, test solutions quickly to learn what works, and incentivize risk-taking.

The final chapter synthesizes our authors' contributions into a unified vision for the future of higher education. This outlook encompasses five defining goals for higher education institutions in a new, post-pandemic world of greater digitalization and innovation: accessibility, inclusion, individuality, sustainability, and quality teaching.

Introduction

Christin Schemmann (GLC)

2021 was another challenging year in the higher education landscape. After the experience of 2020, the COVID-19 pandemic continued to define day-to-day teaching and learning in many higher education institutions (HEIs). While efforts to contain the pandemic continued, the international higher education community was faced with the need to adapt traditional teaching and learning formats. In many cases, this adaptation meant shifting to digital offerings. Higher education systems have shown unprecedented readiness and speed in reshaping long-established teaching methods. Despite the undesirability of the pandemic, the crisis catalyzed the modernization and digitization of the higher education landscape, as evidenced by its newly created cultures of innovation and openness to change.

Digital teaching and learning practices became the new normal in 2021, highlighting how offerings that started as temporary stop-gap solutions became routine. Universities used the second pandemic year to rethink, redesign, and improve digitized teaching and learning formats.[1]

Last year, when the Global Learning Report 2021 was released, many HEIs were still in immediate crisis response mode. The consequences of the COVID-19 pandemic were not yet fully known, and that remains true today. One year later, however, the systematic shift in higher education toward digitization gives us an early glimpse of the potential future of post-secondary education. Stakeholders have come to recognize and appreciate the benefits of online and hybrid teaching and learning, such as their flexibility, time efficiency, and rapid, direct communication channels.[2] The lessons learned over the past two years can help to further promote these benefits, which can improve learning experiences, and thus, learning outcomes and work readiness. Enhancing these is particularly important in a world characterized by inequalities. Teaching formats should be designed to enable learners to gain the skills that are relevant to their learning and subsequent career success. Although doing so requires HEIs to monitor developments in occupational fields, which is resource-intensive, it can help to address inequalities in higher education.

This is particularly urgent as it has become clearer than ever to most of us that inequalities in higher education run deeper than we thought. The pandemic has shaken our vision of an open, inclusive, and high-quality higher education landscape that improves the futures of learners worldwide. Although the existence of inequalities is unsurprising, their magnitude is profound. The development of the higher education landscape depends on overcoming these barriers if international networking, collaboration, and the creation of educational access, opportunity, and success are understood as part of the purpose of higher education.

In our Global Learning Report 2021, we, therefore, identified equitable access for learners and educators as one of the four key action areas critical to successful digital higher education. These findings were derived from empirical studies conducted by the editors of this report in 2020. Equal access addresses the need for infrastructure, broadband, and devices, as well as digital skills and institutional support structures. We concluded our last report with suggestions for how leadership, policy, and industry should proceed to advance the digitization of higher education while addressing inequalities. Equality in higher education must be addressed holistically, meaning that the starting points for overcoming inequalities must be as diverse as the problems.

To further reduce these disparities, this year's Global Learning Report 2022 focuses on inequalities in higher education and aims to shed light on them from different perspectives in the education sector. We seek to provide insight into how digitization can

1 — Mavengere, N. B., Pondiwa, S., Matiyenga, T. C., Manzira, F. & Mutanga, A. (2021). The 'new normal' in higher education: Innovative teaching and learning technologies and practices during a crisis. *Journal of Advances in Computing and Engineering* (ACE), 1(2), 37-46. Retrieved from http://dx.doi.org/10.21622/ACE.2021.01.2.037

2 — Elshami, W., Taha, M. H., Abuzaid, M., Saravanan, C., Al Kawas, S. & Abdalla, M. E. (2021). Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. *Medical Education Online*, 26(1). DOI: 10.1080/10872981.2021.1920090

advance higher education to realize its potential to provide better learning outcomes worldwide. During this transformation, it is important not to lose sight of HEIs' individual goals, identities, contextual factors, and strategies that influence their respective digitization paths. The sciences of learning and motivation can furthermore be included in the planning of digital teaching formats.[3] The key to successfully overcoming disparities is making thoughtful, needs-based, strategic, and data-driven decisions about the use of digital tools that meet the needs and goals of each HEI and its stakeholders. The challenge for the future is to make deliberate decisions that will break down barriers in and for higher education and foster greater international cross-organizational collaboration.

To do so, this report includes various players from the international higher education landscape to highlight possible digitization paths. The contributors' different geographical backgrounds, from Europe, North America, and Asia, allow them to present many perspectives. They also differ in their institutional embeddings—from universities (CMU and NTU) and research institutions (HIIG, D²L², and Leibniz) to think tanks (HFD), non-governmental organizations (IAU), technology providers (Microsoft and AWS), and teaching and learning companies (Kaplan Inc.) to national agencies and funding organizations (DAAD) and higher education magazines (THE), as well as a contribution with the participation of the GLC itself. We would like to accompany digital transformation actors as they develop a digitized teaching and learning environment and provide practical suggestions for its design. The presentation of different voices is intended to help HEIs find support and inspiration for their digital journeys depending on their situations, strategies, and goals.

To this end, the Global Learning Report 2022 consists of nine articles.

The first article is by Lauren Herckis and Anne Leiser, who share insight into their collaborative empirical study examining HEIs' journeys from stated values to enacted efforts and the role of digital learning in that process. They outline the extent to which influencing factors such as an institution's identity and goals shape its digital transformation strategy. Despite the individualization of HEIs' transformations, the authors offer four universal recommendations for the digital transformation process.

The second article deepens the leadership perspective of the first two authors, as Rosa Ellis interviews Matthias Kleiner and Subra Suresh on global leadership in international higher education. They answer questions about international collaboration, digitization's potential to improve teaching and learning, ways to advance diplomacy, achieve sustainable development goals (SDGs), and create greater equity in the workplace.

Third, Melissa Laufer, Bronwen Deacon, and Len Ole Schäfer provide an in-depth look at their empirical study of middle management in higher education. Middle management can foster the emergence of informal innovation centers among employees to share experiences and information and compensate for staff deficits by creating a culture of trust and supporting the necessary organizational structures.

In the fourth paper, Trine Jensen uses an empirical study to discuss inequalities in international higher education. The pandemic has revealed stark regional differences in the availability of resources for digital teaching and learning. However, the lessons learned from the crisis can help us address these inequalities and develop solutions tailored to individual HEIs.

In the fifth article, Andrew S. Rosen argues for the benefits of a digitized higher education landscape in terms of accessibility, affordability, and quality. He backs this up with an overview of the various international uses of digitized higher education practices. These can help improve learners' work readiness and thus harness higher education's potential for equal learning and life opportunities.

3 — Clark, R. C. & Mayer, R. E. (2021). E-learning and the science of instruction: *Proven guidelines for consumers and designers of multimedia learning* (4th ed.). John Wiley & Sons.

Sixth, Alexandros Papaspyridis and Jason LaGreca argue for the efficient and effective use of technology to advance the quality of learning in higher education. Doing so should be based on HEIs' contextual factors and consider learners' changing circumstances as they increasingly seek hybrid and flexible learning models.

Dagmar Willems and Alexander Knoth continue the focus on the student perspective in their article, using the journey of an international student in international higher education to highlight the points at which technology-enabled mechanisms can significantly improve learner outcomes and experiences.

Yasmin Djabarian and Kevin Saukel also define students as important stakeholders to be considered and actively involved in the digital transformation of higher education. They also provide four practical recommendations on how a blended university can live up to the ideal of equal learning opportunities.

Finally, in the ninth article, Liv Gjestvang and Raechelle Clemmons define affordability, mental health, accessibility, and work readiness as four barriers to student success. To overcome these, the authors suggest practical ways that teaching and learning can be effectively supported through digital mechanisms. At the end of the article, they identify key questions that HEIs must answer to meet their learners' needs and succeed in the ever-changing higher education landscape.

1. Moving from Stated Values to Enacted Efforts: Strategic Leadership in Higher Education

Lauren Herckis (CMU) and Anne Leiser (GLC)
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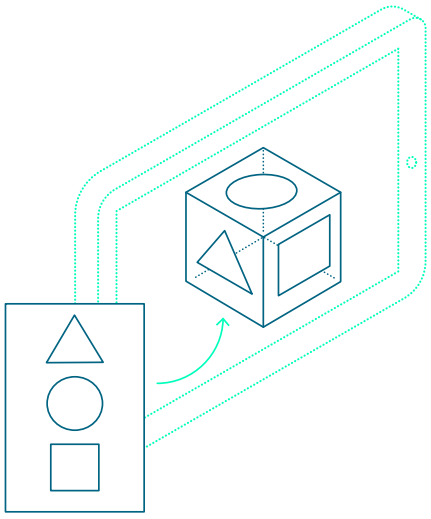
Carnegie Mellon University (CMU) is a global research university known for its world-class interdisciplinary programs. A birthplace of innovation since its founding, it remains committed to solving real-world problems and creating a transformative educational experience for students focused on deep disciplinary knowledge; problem-solving; leadership, communication, and interpersonal skills; and personal health and well-being.
https://www.cmu.edu/

The Global Learning Council (GLC) is a virtual organization that brings together thought leaders in the effective use of technology to provide access to education and improve learning outcomes worldwide. Founded in 2013, the GLC offers a platform to connect educators, organizers, and innovators from academia, industry, and the non-profit sector to foster cooperative processes and advance innovative strategies for digital learning.
https://www.globallearningcouncil.org/

In recent decades, the higher education market has seen enormous growth, with the number of students enrolled in higher education institutions (HEIs) increasing steadily from year to year. To illustrate this: In 1972, the global enrollment rate of eligible students stood at only 10%; in 2001, it had reached 20%; and by 2020, it had exceeded 40%.[4] Along with the growing demand for higher education, the strain on HEIs—particularly publicly-funded institutions—has also grown. Countries with limited resources have struggled to finance this demand, and many have undertaken efforts to restructure their higher education systems to enhance their reach and effectiveness.[5] Institutionally, many HEIs have responded to perceived pressures and trends with new models of teaching and learning, often using digital tools and technologies to aim for improved learning outcomes and learning experiences.



These innovative approaches to teaching appear and spread like wildfire, one after another. We have seen this in the rapid proliferation of MOOCs, the HyFlex course model, virtual or augmented reality, artificial intelligence applications, and micro-credentials. These tools, models, and methods appear to great fanfare and expansive claims of effectiveness, regardless of evidence that they improve learning outcomes and learning experiences persistently or in diverse contexts. These trends create additional urgency for HEIs to adopt digital teaching and learning to remain competitive.

4 — UNESCO Institute for Statistics. (2022). *School enrollment, tertiary*. UNESCO. Retrieved from http://uis.unesco.org

5 — World Bank. (2021, October 22). *Higher education*. Retrieved from https://www.worldbank.org/en/topic/tertiaryeducation#1

This is particularly true for private and highly-ranked HEIs that rely more on brand, reputation, and market position than their publicly-funded counterparts.

The pandemic added to the pressure on HEIs by forcing them to adopt institutional digitization processes. While instructors and staff went above and beyond to support students, the ad-hoc measures implemented in 2020 were inadequate to address the plethora of issues that students faced. One of the biggest lessons of the pandemic was that inequalities in education run wider and deeper than many of us previously knew.[6]

Disparities in higher education

Ultimately, huge disparities in the higher education sector remain between regions, institutions, and individuals. The efforts of HEIs actively working to close these gaps do not often translate to direct, positive impacts on students' learning outcomes.

We partly attribute this to overall systemic issues over which HEIs have limited control. Factors such as food, housing, home environment, and mental health have been increasingly understood as fundamental to learning and student success. Students in precarious positions are much more likely to experience interruptions of their educational experiences because their precarity leaves them vulnerable to disruption and makes regaining access to educational opportunities more challenging. Fundamentally, a student needs their basic needs met to be receptive to learning opportunities.[7] Consistent access to basic human needs is not equally distributed. As a result, many students are not in positions to benefit from the educational opportunities available to them. Digital learning requires additional access—devices, digital literacy, and Internet connectivity—and so even fewer learners are poised to benefit from digital learning. Inequitable access to basic resources exacerbates disparities in access to educational opportunities and allows even fewer learners to benefit from what we consider appropriate, effective educational strategies. To strive for increased equity, HEIs must at least recognize that some students may struggle to meet their basic needs, or may lack access to adequate preparation and that this affects their engagement with educational opportunities.

Another partial reason that HEI efforts to reduce disparities fall short is directly within their scope: Many institutions struggle to reach their goals, and partial implementation does not necessarily result in even partial success. An educational intervention that is effective under optimal conditions may not be beneficial under other conditions. Conditions vary widely across educational contexts, and the effectiveness of educational tools and strategies is shaped by the context and time in which they are implemented. The greatest challenge that learners face is accessing educational opportunities that deliver on their promises. Moving educational innovations from theory into practice is a wicked problem, and little research addresses how best to tackle it.

Visions for the future of HEIs

A recent collaboration between the GLC and CMU sought to explore how HEIs move from stated values to enacted efforts and the role of digital learning in this process. We interviewed HEI leaders from more than 20 institutions around the world to learn about their institutional strategies for digital teaching and learning, visions for the future of digital learning, and implementation recommendations.

6 — Laufer, M., Leiser, A., Deacon, B., Perrin de Brichambaut, P., Fecher, B., Kobsda, C., & Hesse, F. (2021). Digital higher education: a divider or bridge builder? Leadership perspectives on edtech in a COVID-19 reality. *International Journal of Educational Technology in Higher Education, 18*(1), 1–17. DOI: 10.1186/s41239-021-00287-6

7 — 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. DOI: 10.1080/07294360.2020.1826029

HEIs' visions are varied and often adapted to their contexts. Overall, most HEIs see their primary responsibility as bridging societal gaps, serving students, advancing knowledge, and supporting democracies. Many also indicate that digital learning serves to expand access, reach large audiences, provide continuous education opportunities, enrich learning, and enhance students' experiences. Some state that they strive to make use of the unique affordances of digital technology, which allows institutions to be more collaborative, support data-driven improvement, focus on new forms of internationalization, and decolonize teaching. We also find that some goals remain unstated or understated, desired without being actively transformed into enacted strategies.

In many cases, the values and statements of institutional identity are key to crafting strategy. For example, technical universities are more focused on preparing their students for the workforce, while comprehensive public universities often state that access is central to their missions. International universities emphasize their mission to promote open society and democracy through collaboration and international exchange. Institutional identity may thus dictate, constrain, or shape digitalization goals.

These goals, and the steps taken to realize them, are affected by varied influences: people, organizations, and trends that shape strategy and encourage or hinder the adoption of digital learning. Within an institution, the available infrastructure, expertise, and technology contribute to shaping digital learning, as do the institutional structure, student preferences, staff workload, and financial and branding considerations. Beyond the institution, government funding and quality assurance agencies play significant roles in deciding what is possible. Additionally, culture and mindset are relevant in determining the international recognition of digital learning qualifications and the perceived societal value of higher education. Commercial educational technologies influence strategy and goals through the technologies that are available and affordable, whether they fulfill the HEI's needs, whether new developments in technology can solve existing problems, and whether alternative solutions are available. Finally, disruptions such as the recent COVID-19 pandemic can significantly shape and reshape strategy, although some HEIs had experienced comparably disruptive events well before this pandemic.

Not only do the above-mentioned factors influence HEIs' goals and strategies, but they also affect how institutional decisions are made and how those decisions are translated into projects and policies. For example, we found differences in the mechanisms that are in place for long-term projects versus on-the-spot initiatives; how policies are developed within HEIs; which procedures projects undergo to be realized; which decisions are made collaboratively; which governing bodies are empowered to make decisions for which areas; which parties consider propositions and decide if they align with the overall institutional strategy; how resources are deployed; and who manages the day-to-day operation of various projects. In short, the governance and management of digital learning at HEIs are variable.

The significance of the COVID-19 pandemic

The pandemic came up repeatedly in our interviews, although we did not intend to focus on it. Emergency transformations were often viewed as a necessary pandemic response and these forced radical transformations of educational practice. In other cases, institutions shut down partially or completely, and then pursued or experienced recovery rather than transformation. Some institutional leaders considered the pandemic a

catalyst of positive change, forcing shifts in faculty expectations, human or institutional infrastructure, or educational technology that were sufficient to engender accelerated progress toward existing goals. Other institutional leaders suggested that new goals were born out of the extraordinary changes that arose from the crucible of the pandemic, enabling previously unforeseen potential. The COVID-19 pandemic, therefore, can be seen as a disruption with diverse impacts on institutions around the world. The decisions made and actions taken in the wake of epidemiological realities, social factors, and policy decisions external to HEIs have also shifted the perceived role of some institutions, while others' goals and strategies were not significantly impacted.

In summary, digital teaching and learning look so different from institution to institution because what digital learning is intended to accomplish depends, first, on the HEI's strategy and identity; second, on the influences that shape strategy and identity; and third, on the realities that affect the implementation of strategies into actionable, and then, enacted policies at the HEI.

Implementing strategic plans

Before addressing our recommendations, we must recognize that HEIs around the world will remain bound to the realities of their regions, systems, students, and contexts. After all, HEIs are unique institutions; many are legacy-bound organizations with different disciplinary traditions and instructors who are used to autonomy in teaching and principles of academic freedom. This means that digital learning and all it encompasses will continue to look very different globally. When we speak of the implementation of digital learning, we are thus speaking in abstract terms, with learning realities poised to be unique in their respective institutional contexts.

Moving from stated goals to enacted strategies in higher education requires attention to these contextual differences at the regional, local, institutional, departmental, and community levels. We must begin by recognizing that we can address challenges at each of these levels and strive to provide high-quality education for all learners. However, no two contexts or institutions are identical, so reaching these goals requires different approaches: Concrete and well-considered implementation plans that are aligned to the HEI's contextual needs are required. Implementation science offers a pathway to creating contextually appropriate strategic plans and empowering institutions to implement their goals.

Implementation challenges have been explored and addressed in diverse domains, including medicine and public health.[8] Humans pride ourselves on our rationality, but our understandings of the world around us are constrained by our distinct vantage points: Our positions in the world, our lifetimes of experience, and our expertise are limited compared to the incredible breadth and range of experiences enjoyed by the total of our fellow humans. One person cannot fully grasp the complexity of social systems such as communities and nations. When we identify, in principle, a policy approach or position and wish to see it implemented at scale, we must consider multiple levels of implementation.[9] If a nation, university, family, or student decides to focus on mental health, the opportunities and challenges associated with this effort will vary significantly. National campaigns, institutional policies, family priorities, and individual efforts each entail different considerations, succeed based on different metrics, and require different engagement with specific interventions known to promote mental health. Similarly, strategic goals of the types that most HEIs describe require different strategic and policy efforts at the international, national, institutional, community, and individual student levels, and success is evaluated on diverse metrics.

8 — Proctor, E., Silmere, H., Raghavan, R. et al. (2011). Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Administration and Policy in Mental Health and Mental Health Services, 38*, 65–76. Retrieved from https://doi.org/10.1007/s10488-010-0319-7

9 — Eisman, A. B. et al. (2021). Implementation science issues in understanding, collecting, and using cost estimates: a multi-stakeholder perspective. *Implementation Science, 16*(1), 1–12.

With this in mind, we believe that some recommendations apply to all contexts: (1) Digitalization is most effective as an instrument with which to achieve a well-defined goal, (2) educational strategy needs to be thought out well into the implementation phase, (3) all stakeholders at the HEI need to be included in strategic processes, and (4) different HEIs fulfill different purposes within the higher education ecosystem.

First, we believe that digitalization is most effective as an instrument with which to achieve a well-defined goal. Our research evinces that HEIs that successfully enact efforts aligned with their stated goals describe digitalization as a means by which to achieve those goals, not as a goal or metric in itself. Digitalization may extend educational opportunities to new cohorts of students, such as part-time professionals or far-flung rural students, in service of expanding access. Digitalization may also offer granular student performance data in service of enhanced learning outcomes. Regardless of the stated institutional goals, the varied factors influencing goals and strategy, and HEIs' approaches to enacting policy, digitalization is effective primarily as a well-defined component of a more complex set of policies and strategic practices.

Secondly, educational strategy needs to be thought through to the implementation phase. Learning, especially learning by technology, must be designed holistically, with technical support, disciplinary input, pedagogical implementation, student needs, and evidence-based evaluation incorporated into the implementation process. We find that HEIs with successful digital learning approaches also have more integrated educational strategies in place. These spell out specific goals with incentives to support their implementation in various places and evaluations that track changes over time to support recommendations for future action.

Thirdly, all stakeholders at the HEI need to be included in strategic processes. This does not necessarily mean that every stakeholder should have a seat at the table when devising the institutional strategy—though in many cases, we have seen that this sets a positive precedent for strategic ownership—but at the very least, all stakeholders must be included in enacting the institutional strategy. Empirically, we find this to be most successful when institutional leaders create and maintain buy-in at all levels. Often, this includes the potential for individual initiatives to be created bottom-up, with resources, evaluations, and accountability mechanisms to allow successful projects to be scaled and policies to be created around them.

Lastly, different HEIs fulfill different purposes within the higher education system. Lofty goals that cannot be effectively implemented serve no one; what is necessary and possible depends on the individual context and the specific needs of students, instructors, and staff. Thus, there is no right or wrong way to implement digital teaching and learning. HEIs must personalize these processes, choosing appropriate, attainable, and implementable goals. In practice, we see that HEIs that choose realistic goals that are directly aligned to the needs of students and staff face less resistance and receive more support from stakeholders, thus creating collaborative effort at multiple levels and enabling them to better advocate for further policy support.

Contextual factors and compliance with the institutional strategy as keys to success

In conclusion, digitalization may often be the right means by which to meet strategic goals, but it should not be a goal in itself. We believe the best way forward is for HEIs to define independent strategic goals with the HEI's unique contextual needs in mind. This often means acting against the pull of the edtech industry. While educational technology is extraordinarily useful in implementing specific goals, those goals should be defined with respect to an HEI's context and valued by stakeholders at all levels. Holistic implementation plans that consider diverse dimensions of policy and are evaluated over time may incorporate digitalization to support or enhance specific goals, which should be continuously revisited to ensure that they remain relevant, appropriate, and prioritized by stakeholders at all levels.

HEI leaders understand that learning technologies can significantly impact students, institutions, faculty, and larger communities. When an HEI's unique characteristics, contexts, and goals are actively considered in the implementation of educational strategy, it can realize the potential of these powerful tools and effectively channel them toward specific goals.

2. Global Leadership in Higher Education: Interview with Matthias Kleiner (Leibniz) and Subra Suresh (NTU)

Rosa Ellis (THE)
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The Leibniz Association (Leibniz) connects 97 independent research institutions in Germany that range in focus from natural, engineering, and environmental sciences to economics, spatial and social sciences, and the humanities. Leibniz Institutes address issues of social, economic, and ecological relevance. They conduct knowledge-driven and applied basic research, maintain scientific infrastructure, and provide research-based services.
https://www.leibniz-gemeinschaft.de/en/

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the Engineering, Business, Science, Medicine, Humanities, Arts, and Social Sciences, and Graduate colleges. NTU is home to world-renowned autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies, and Earth Observatory of Singapore – and various leading research centers such as the Nanyang Environment & Water Research Institute. www.ntu.edu.sg

Times Higher Education (THE) is a leading source of information about global higher education that showcases perspectives from academia, government, and industry. With a deep understanding of the higher education sector, THE shares news and analyses, data, university rankings, and forums for debate. On the THE Campus platform, academics can also find and share advice on digital teaching and learning.
https://www.timeshighereducation.com/

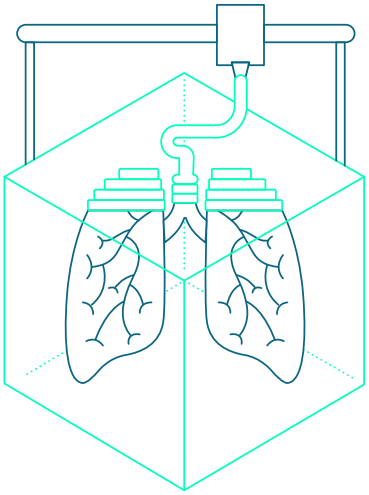
How should leaders of higher education and research institutes around the world collaborate, and can this sector help bridge political divides? These questions, among others, are high on the Global Learning Council (GLC) agenda.

To explore this and other issues, Times Higher Education reporter Rosa Ellis sat down with Subra Suresh, founder and former chair of the GLC, who is now president of Singapore's Nanyang Technological University, and Matthias Kleiner, current chair of the GLC and president of the Leibniz Association, a network of 97 research institutions in Germany.

How should leaders of higher education and research institutes collaborate with each other and with other sectors?

For Suresh, collaboration is more critical now than it ever has been in the past. The technology that the world was forced to adopt during the COVID-19 pandemic has enhanced collaboration, but "at the same time, geopolitical factors have led to anti-globalization, not least travel constraints, technology disputes across nations, and more recently, real physical wars."

Kleiner adds that the technologies developed to allow for communication during the pandemic can now be used to further digitize learning and enable the collaboration necessary to tackle the world's biggest problems. "The cooperation between institutions and the cooperation between science, policymakers, industry and other stakeholders in societies is so important. I think here you can really use the technologies we developed in the last 10 to 20 years," he says.



Suresh gives an example of how technology can enhance learning. NTU has recently developed a new medical school in partnership with Imperial College London, and technology has allowed them to adopt a "flipped classroom" model. "The students come to the class fully prepared, they've gone through the material, [and] the professor in the classroom uses that time to discuss what they have already read," he says.

Other technological advances are also enhancing education. Every medical degree involves dissecting a cadaver at some point. Suresh says, "That's how you learn anatomy. But you can also use things like 3D printing to print human flesh." He adds, "If you're studying cardiology, you rotate the human heart in 3D, and you can slice it in any plane. So, using technology, you can learn much better."

Suresh is also excited about the opportunities afforded by augmented and virtual reality, such as the Metaverse.

For Kleiner, museums, especially research museums like those of the Leibniz Association, will also benefit from new technologies. Collections can be digitized, not only through 2D imagery but also through 3D scanning to reveal further information. "You could get more insight into the pieces; for example, [a scan could reveal] the bones of a bird," he says.

"Take the Mona Lisa by Da Vinci," Suresh adds. "If you have a 3D scan, you can actually see how Da Vinci painted it layer by layer."

Inequality as a societal phenomenon became more evident during the pandemic. How are you tackling that issue and the SDGs more broadly?

In terms of inequality, Suresh says, Singapore has gone from a developing nation to a wealthy country in just 50 years. However, when the pandemic hit, he saw some disparity in the finances of NTU students. "We had several hundred students who were in urgent need of financial help. They had maxed out on their scholarships, and many of them could not go home," he says.

NTU established a philanthropic fund with no conditions attached to allow the institution to help any student who was in urgent need of financial help. When the

university had to close some of the student residence halls during the pandemic, the financial needs and family constraints of some of the students became evident. "In the case of some students, with families of four or five were living in a two-bedroom apartment; there was no space to do a Zoom call privately. Some of the students asked to come back to the residence halls", he explains. For other students, NTU had to provide laptops and pay for Wi-Fi connections.

In other areas of the world, the U.S., for example, inequality in the working world increased, Suresh continues. More women lost their jobs than men, and proportionally more minority women lost their jobs. "So the financial inequality led to learning inequality, education inequality, job inequality, and also digital inequality," he says.

Kleiner adds that Germany also experienced the digital divide—many families could not afford tablet computers or laptops for their children, or at least, not one per child, and so learners' education suffered. If that is addressed, "I think digital learning and all issues around this can really unfold their possibilities," he says.

In terms of the SDGs, NTU has linked its strategic plan to achieving six or seven development goals. "We linked what we call challenges, which are challenges for Singapore and challenges globally," Suresh says. The university's four grand challenges are humans and their impact on the environment; the science, art, and technology of learning; the fourth industrial revolution; and healthy aging.

Regarding the environment, the plan is to reduce NTU's absolute carbon footprint by 50% by 2035 compared to the 2019 baseline. The institution will be audited every year by PricewaterhouseCoopers to ensure that it is on track. NTU also gets 10% of its energy from solar energy.

Kleiner says that these NTU initiatives are the kinds of things networks such as the GLC can promote.

Which strategies introduced during the pandemic are sustainable and might last beyond the crisis?

Combining elements of online communication with the real world will be key, Kleiner says. Reducing air travel is something universities should be doing. The other area that has seen a radical shift during the pandemic is open science.

"New technologies also give a push in terms of open science, how to share publications, to share knowledge, to share data in a fair and reliable way to increase quality, quality of data, quality of knowledge," he says.

How can leaders position higher education within a wider network and connect with policymakers and broader society?

"It's obvious that we have to increase our collaborations for the benefit of humankind, and the state of our planet," Kleiner says. New technologies will offer new possibilities for collaboration.

"This also should include the competition; I think there's no collaboration without competition in the science field… this is really a driving force of society and of humankind to combine competition and collaboration, if it's in a fair and appropriate way," he says.

Suresh adds that science can be used to drive diplomacy. During the Cold War, "when the West was not talking to the Soviet Union, the research institutions and the universities in the West were open to Russian scientists and Soviet scientists at that time." Now, China and the U.S. are in similar positions: Despite the countries' political differences, there is collaboration between their scientists.

In terms of what individual universities and research institutes can do, "COVID-19 is a good example," Suresh continues. "History has shown over and over again, that at times of crisis for humanity, universities and research entities have stepped up to the plate to offer solutions. And during COVID-19, the fact that we have developed vaccines at record pace, universities have played a very important role."

3. The Power of Informal Networks: How Middle Management, Central Leadership and Trust can Impact Innovation at the University

Melissa Laufer (HIIG), Bronwen Deacon (HIIG),
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The Alexander von Humboldt Institute for Internet and Society (HIIG) researches the development of the Internet from a societal perspective to better understand the digitalization of all areas of life. As the first research institute in Germany with a focus on the Internet and society, the HIIG has developed an understanding that emphasizes the embedding of digital innovations in social processes. Based on this transdisciplinary expertise, the HIIG aims to develop a European response to digital structural change. https://www.hiig.de/en/

Digitalization, Diversity and Lifelong Learning – Consequences for Higher Education (D²L²) is a central research institute of the FernUniversität in Hagen. Over 50 researchers work here, using evidence-based knowledge in order to support and advance the transformation in education towards increased digitalization, personalized learning, adaptive systems, and artificial intelligence. https://e.feu.de/english-d2l2

In uncertain times, the extraordinary becomes visible. The rapid shift to digital teaching during the COVID-19 crisis marked a turning point for the higher education landscape. It shed light on unequal access to digital tools, institutional infrastructures, and digital competencies, as well as fueled a spirit of innovation and collaboration among teaching staff. In the research project, Organizational Adaptivity in the German Higher Education Context, a cooperative project between D²L² and HIIG, we investigated the accelerated transition to digital teaching and the organizational factors that hinder and facilitate sustainable digital teaching practices at universities.[10]

In this article, we reflect upon the empirical data—interviews, focus groups, and surveys with university teaching staff and leaders—collected during this research project and explore how the pandemic led to small informal networks emerging at the university, which became hubs for innovation and knowledge-sharing. These informal networks arose in response to uneven digital literacy among teaching staff as our empirical findings indicated that many teachers lacked formal training in the use of digital tools and formats. In addition, we discuss how university leadership and middle managers can support informal knowledge-sharing at their institutions, as well as how this can be harnessed as a means to bridge unequal digital competencies among teaching staff and spark innovation.

10 — Elsholz, U., Fecher, B., Deacon, B., Schäfer L.O., & Laufer. M. (2021). Implikationen der Covid-19-Pandemie für digitale Lehre: Organisierte Freiheit als Veränderungsparadigma. *MedienPädagogik: Zeitschrift für Theorie und Praxis der Medienbildung, 40*, 472–486.;

Laufer, M., Leiser, A., Deacon, B., Perrin de Brichambaut, P., Fecher, B., Kobsda, C. & Hesse, F. (2021). Digital higher education: a divider or bridge builder? Leadership perspectives on edtech in a COVID-19 reality. *International Journal of Educational Technology in Higher Education, 18*(1), 51. DOI: 10.1186/s41239-021-00287-6;

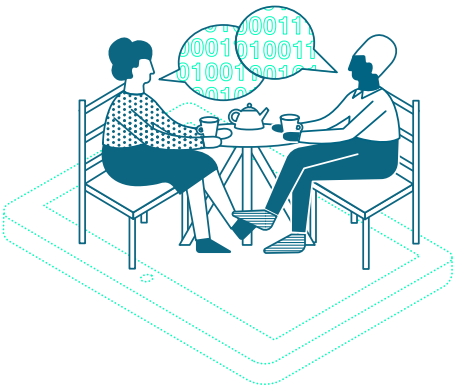
Laufer, M., Deacon, B. & Schäfer. L. O. (2022). *Leadership in digital change: An exploration of organizational trust and innovation in universities* (Working paper).;

Deacon, B., Laufer, M. & Schäfer, L. O. (2022). *Implementing and sustaining educational technology. A systematic literature review from an organizational perspective* (Working paper).;

Schäfer, L. O., Laufer, M. & Deacon, B. (2022). *The rapid digital turn: An exploration into the tight and loose coupling of university structures* (Working paper).;

Timm, M., Deacon, B., Tschache, T., Schäfer, L. O. & Laufer, M. (2022). *Atomisierung, Innovation und Organisation: Qualität der Lehre im ersten Digitalsemester* (Working paper).

Informal networks create innovation



The pandemic opened a window of opportunity for the creation of new knowledge and redefined the dynamics of knowledge exchange within universities. In our empirical studies, we identified how informal networks among teaching staff, in particular, emerged during the crisis and drove innovation. These informal networks became sites for ideas and knowledge-sharing, stimulating the flow of information between colleagues as well as strengthening the teaching staff's resilience in a rapidly changing digital environment. These networks also often emerged in response to absent or limited systematic support for digital teaching from university management.

Through our research, we explored the various benefits of these informal networks. Not only did they create short distances and a high density of information flow, which was used to generate new and rapid digital teaching solutions, but they also served as supportive environments for teachers, providing encouragement and a forum for the exchange of ideas, as well as recognition of and appreciation for informal leaders and experts. Moreover, an added value of these informal networks was that they were built on intrinsic motivation, that is, individuals who were highly motivated to lend their expertise or work collectively on problems acted as bridge-builders across the institution.

A sense of belonging at the university: the importance of small communities

There is both theoretical and empirical evidence that academics have a strong sense of belonging to a particular unit at the university, rather than to their higher education institution as a whole. From Weick's [11] theory of loosely coupled systems, we understand that the university does not operate as a single unit but rather consists of many independent units with unique processes and practices. We confirmed this in our studies: teachers identified more closely with their respective faculties or study programs and informal networks emerged among colleagues who worked closely together, often in the same discipline. This closeness of subunits within the university underlines their independence and importance. However, this structure has both benefits and disadvantages: although informal networks can enable innovative and adaptive behavior, they can also create knowledge silos that keep knowledge within these smaller units. This can create challenges when university leadership and management must guide their organizations through such crises as the COVID-19 pandemic, as university management may not be able to oversee all of the processes within these subunits.

Middle management as bridge-builders

As the pandemic unfolded, we observed empirically that university leadership sought to regain control and organize systematic support for digital instruction. While some of the teachers we spoke to found the emerging centralized support helpful, others felt that it constrained their newfound innovation and creative freedom—which had initially been created and shared through informal networks. Within this group of more critical teachers, there was a strong consensus that the concentration of power at the central level of the university, with its accompanying rules and restrictions, inhibited innovation. However, not all university leaders obstructed creativity and digital teaching development. While we identified some formal management structures that limited ideas from

11 — Weick, K. (1976). Educational organizations as loosely coupled systems. *Administrative Science Quarterly, 21*(1), 1—19. DOI: 10.2307/2391875

flourishing due to mechanisms of mistrust and control (which we further examine below), we also observed middle managers (e.g., deans) encouraging informal networks and intrinsic motivation among teachers. Middle managers accomplished this by being accessible for knowledge exchange, formalizing informal networks, and even championing funds for these networks.

From the literature, we know that middle management is critical for organizational success,[12] especially as university performance and competition are increasingly influenced by activities and output at the middle levels (e.g., faculties and departments) rather than at the top level.[13] Not only can middle managers strongly affect teachers, inspiring and enabling them to be innovative and adaptable but also they can play major roles in supporting informal networks and their goals by negotiating the formal rules and structures set out by the university's top-level leadership. For example, if a university wanted to centralize the digital tools teachers use in the classroom, it would benefit by including the expertise and informal networks that emerged in the crisis. Including these informal leaders in the decision-making process may decrease resistance to centralized decisions and lead to the selection of more suitable tools for the classroom. Therefore, it is reasonable to assume that a wide diffusion of innovations within a university, as the digitalization of teaching requires, must also consider the needs of smaller units at the university and is connected to flat hierarchies and the support of middle management.

12 — De Boer, H., Goedegebuure, L. & Meek, V. L. (2010). The changing nature of academic middle management: A framework for analysis. In V. L. Meek, L. Geodegebuure, R. Santiago & T. Carvalho (Eds.), *The changing dynamics of higher education middle management* (pp. 229–241). Springer.;

Floyd, S. W. & Wooldridge B. (1994). Dinosaurs or dynamos? Recognizing middle management's strategic role. *Academy of Management Executive, 8*(4), 47–57.;

Floyd, S. W. & Wooldridge B. (1997). Middle management's strategic influence and organizational performance. *Journal of Management Studies, 34*(3), 465–485.

13 — Currie, G. & Procter. S. J. (2005). The antecedents of middle managers' strategic contribution: The case of a professional bureaucracy. *Journal of Management Studies, 42*(7), 1325–1356.

Trust as a driver for innovation

The central leadership at a university can also play an important role in nurturing informal networks. In our studies, we identified different central leadership styles and how these led to a climate of trust or distrust at universities. For example, we found that when central leaders exhibited a high degree of trust toward their employees and their abilities, teachers showed increased innovation and motivation to engage in digital teaching. In other words, leaders who focused on creating supportive structures, e.g., flat hierarchies, agile administrative channels, and formalized exchange spaces, gave teachers the freedom to experiment with digital tools and formats. In such university climates, informal networks continued to flourish. However, we also observed the opposite dynamic, namely that central leaders who sought to regulate digital teaching by placing strict rules on the use of digital tools and formats created a climate of distrust between leaders and teachers, which complicated and, in some cases, discouraged individuals' creative efforts and hindered the digital adaptability of the whole institution.

Reflection

In this article, we explore how the COVID-19 crisis led to the emergence of informal networks at universities. These networks became hubs of innovation that teachers used to exchange best practices about digital instruction. Such networks, we found, were crucial in the crisis, as many teachers lacked formal training in digital tools and formats. These networks thus became fertile ground for knowledge-sharing. Our research indicates that these networks often operated independently from the university leadership, signaling the importance of small units at the university. However, university leadership (middle managers and central leaders) can still play important roles in supporting these networks by promoting a spirit of trust and collaboration with teachers. That is, creating organizational structures—flat hierarchies, participatory decision-making, available resources—and then stepping back allows academic freedom to thrive. In addition, it is important to provide space for informal leaders to emerge, as well as strengthen middle managers' abilities to allocate resources and recognize internal talent.

4. Aiming the Magnifying Glass at Inequalities in Higher Education: A Unique Opportunity to Use the Pandemic Experience to Mold a More Equal Future

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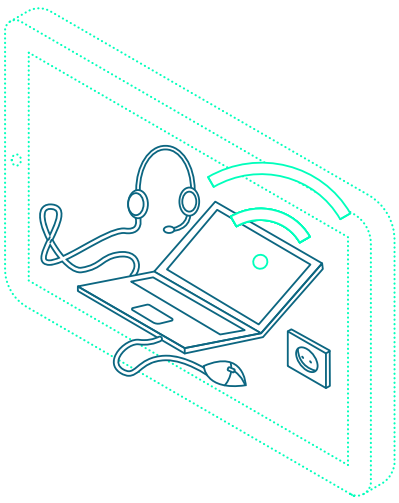
Founded in 1950 under the auspices of UNESCO, the International Association of Universities (IAU) is a membership-led organization that seeks to advance higher education and its role in society. IAU is an independent non-governmental organization that brings together more than 600 member institutions and organizations from 120 countries to identify and reflect on common priorities and acts as the global voice of higher education. www.iau-aiu.net

With physical distancing and travel restrictions as the key measures to curb transmission, COVID-19 certainly shook the world of higher education. Before the pandemic, the very idea of the university was overwhelmingly based on students and staff's physical presence for intellectual exchange, whether in classrooms, lecture halls, or conferences. Libraries and laboratories were collective learning and research spaces where students would come together to share books, equipment, materials, and other resources; social gatherings were a defining feature of campus life, from extra-curricular activities to student life in dormitories. Yet suddenly, universities had to operate remotely due to the pandemic. This sudden and unplanned shift in operations demonstrated universities' agility in responding to emergent challenges and innovation driven by a shared ambition of minimizing the disruption and negative effects of the pandemic on academia. As never before, higher education institutions (HEIs) have had to endeavor to ensure that all students experience quality teaching and are able to continue with their studies.

In this world of change, it is important to acknowledge the stability of the core mission of higher education in society during the bumpy ride through the pandemic. At the IAU, this was eloquently framed in the preamble to the Association's constitution in 1950[14] and is translated into the core values[15] which are promoted by the Association, including quality in learning, equity in access and success, and international collaboration. These values permeate the different strategic priorities of the Association—including the digital transformation of higher education—and they are more relevant than ever in a rapidly changing context.



This continuity is important to keep in mind when discussing digital transformation in teaching and learning. This transformation is operational and not part of the core mission and values of higher education. Transformation remains important as new means and pedagogies can be explored and developed with a two-pronged goal of providing quality education and shaping the future of higher education.

14 — International Association of Universities. (2022). *IAU constitution.* Retrieved from https://www.iau-aiu.net/IMG/pdf/iau_constitution-en-2.pdf

15 — International Association of Universities. (2022). *Vision, mission and values.* Retrieved from https://www.iau-aiu.net/Vision-Mission

To monitor the pandemic's initial impacts on higher education, IAU conducted an initial global survey[16] at the outset, when universities were just starting to pivot to remote teaching and learning. A second and more comprehensive survey[17] was conducted one year into the pandemic and examined its impact on a broader range of activities, considering governance issues such as financing, student enrollments, and the impact on human resources, teaching and learning, research, and community engagement. This second survey received replies from 496 institutions based in 112 countries or territories and provides a snapshot of the situation one year into the pandemic—when HEIs had become accustomed to uncertainty, operating remotely, and the impossibility of reliable long-term planning. The survey responses are well distributed among global regions (Africa, the Americas, Asia and the Pacific, and Europe) compared to the number of institutions per region in the IAU World Higher Education Database (WHED).[18] Notably, 92% of replies from the Americas are from Latin America and the Caribbean.

16 — Marinoni, G., van't Land, H., &, Jensen, T. (2020). *The impact of COVID-19 on higher education around the world*. IAU Global Survey Report. Retrieved from https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf

17 — Jensen, T., Marinoni, G., & van't Land, H. (2022). *Higher education one year into the COVID-19 pandemic.* Retrieved from https://www.iau-aiu.net/The-Second-IAU-Global-Survey-Report-on-the-Impact-of-COVID-19

18 — International Association of Universities. (2022). *IAU WHED*. Retrieved from www.whed.net

The pandemic exacerbated inequities in higher education

Overall, the results show good adaptability of HEIs to their new requirements but also global inequities in access to higher education that need to be analyzed further. It is important to acknowledge that one year into the pandemic, almost all HEIs were able to graduate their students—only 3% of the surveyed HEIs indicated that they could not. In total, 62% were able to graduate all students, 30% replied that they were able to graduate most students, and only 5% indicated that they only graduated some students. These numbers demonstrate the degree of resilience amongst institutions and how, despite the shift in operations, they were able to continue their missions and ensure that students continued along their learning paths, albeit under constrained circumstances. While graduation ceremonies and the social celebratory rituals surrounding graduation may have been canceled, to the regret of both institutions and students, the great majority of students graduated as planned, despite the difficult study conditions during the pandemic.

However, while some students were able to graduate despite the ongoing pandemic and its effects on teaching and learning, a significant percentage of students globally were not able to participate in digital teaching and learning. Institutions relied as never before on digital communication technologies; 89% of HEIs confirmed resorting to remote teaching and learning. They reported that they connected with 86% of their students, and, while this is still a high majority, the situation was detrimental for the remaining 14% of students who could not be reached.

Furthermore, the data reveal severe discrepancies among different regions. For example, 39% of HEIs in Europe indicated reaching out to 100% of their students, whereas only 14% of HEIs in Africa did so. The same trend appears when looking at HEIs reaching out to less than 50% of their students. While in Africa, 24% of institutions expressed being unable to reach 50% or more of their students, only 2% in Europe reached less than half of their students. These results indicate the diverse starting points for institutions to shift to remote operations. Internet penetration is greater in Europe than in Africa. In the same vein, more students in Europe had access to digital devices and data before the pandemic, something that remains an issue in many African countries. The survey results demonstrate significant inequalities in the face of the pandemic, highlighting existing inequalities that were exacerbated by the crisis. The number of HEI graduates indicates the overall strong resilience of the higher education sector during the pandemic but also highlights regional disparities that need to be addressed to leverage the opportunities of digital transformation to benefit and improve learning outcomes for students all over the world.

This remains a concern despite the reinforcement of digital infrastructures in all regions of the world, including Africa. A great majority of HEIs expressed an increase in digital communication with students (95%), increased use of learning management systems (81%), learning analytics (68%), and the use of online learning (96%). While the latter statistic may have been artificially inflated by pandemic restrictions, it has generated new experiences and knowledge within HEIs globally on using digital tools to support operations. How this will impact higher education over time remains in question, especially in a world where, we hope, social activities are no longer a threat to public health and institutions will select digital tools by choice rather than by necessity. This important transformation pressures HEIs to reflect on how they wish to shape higher education in an increasingly digital world.

The experience during the pandemic has—for better and for worse—contributed to creating a new understanding of the opportunities and challenges related to digital learning. We have seen expanded online collaboration; new doors have been opened for international cooperation, not necessarily to replace former types of collaboration but rather as complementary alternatives, creating a more diversified range of opportunities. We have observed more flexibility in higher education systems, which are often based on longstanding traditions and can be very rigid and resistant to change. This has created opportunities for innovation and testing new approaches, as well as questioning former practices. Obviously, not all new initiatives prove to be better or more useful than established practice, but experimentation has generated new knowledge and experiences that can contribute to the lessons learned and inform decision-making going forward. It is also clear that solutions must be anchored in local contexts and consider their limitations and opportunities. Even within institutions, we have seen different needs arise, each one molded by the particularities of different disciplines. Despite the challenges, these are examples of positive impacts of the pandemic that can contribute to shaping the conversation about the future. As demonstrated above, the pandemic has served as a magnifying glass to highlight challenges, limitations, and inequalities of access to opportunities. Digital devices, online connection, and access to data are increasingly essential to access information, teaching and learning, and communicate and participate in communities, which has only reaffirmed the need to scale up efforts to bridge digital divides.

Despite recent progress, there is still an evident need to build technical infrastructure and ensure access to devices and data for both students and staff, which remains a challenge in many places. Some universities and learners are still faced with unstable electricity, so it is important to acknowledge that the conditions for leveraging digital transformation are diverse. The second important step to bridging divides is about sharing experiences and knowledge among institutions through international collaboration. For the latter, IAU has developed a program where members from around the world visit HEIs that use digital technologies innovatively to foster inspiration and create international networks for peer-to-peer learning to share knowledge, experiences, and opportunities, as well as challenges that may be adapted to the local situations of different institutions.

Universities' social role

When we think about how to leverage digital learning moving forward, it is also important to stress another aspect that the pandemic has underscored, namely, that universities play an essential social role in society. They enable students to meet, exchange, and develop beyond the formal curricula and credentials delivered by the institution. This function is less tangible than the number of degrees awarded at the end of the

year but no less important as a result. We are set to fail if this role is not recognized as integral to the quest to broaden access to higher education, often with no additional resources. Many traditional campus-based universities must seek to find the right balance between exploring the potential of digital learning as a complement to face-to-face learning, weighing the advantages offered by digital learning opportunities against the quality of students' social interactions on campus. Other institutions will specialize more specifically in providing online education, targeting learners who need the flexibility that online learning offers. This will ultimately create a more diversified higher education landscape that provides multiple types of learning opportunities to a broad variety of learners. This will allow all learners to access HEIs, which will inevitably lead to greater equity in educational opportunities.

We must discuss how HEIs can take advantage of the opportunities the pandemic has opened up while addressing the inequities it has created.

It is the core question underlying the use of the pandemic experience to mold the digital future. To provide a foundation for this discussion, the IAU has developed a new policy statement that outlines important values and principles that must underpin any digital transformation in higher education.[19] If we jointly support the transformation of higher education into a digital world for the global common good, based on the principles laid out in this statement, then we will share an ambition to explore the potential of digital transformation while addressing its risks for the good of humanity, regardless of the different forms that this transformation may take from one institution to another. This will allow us to build bridges rather than divides in an interconnected world.

19 — International Association of Universities. (2022). IAU policy statement: *Transforming higher education in a digital world for the global common good.* Retrieved from https://iau-aiu.net/IMG/pdf/whec2022_open_knowledge_product_iau_policy_statement__digital_transformation_of_he.pdf

5. The Silver Lining of the Pandemic: An Opportunity for Greater Accessibility, Affordability, and Quality in Higher Education

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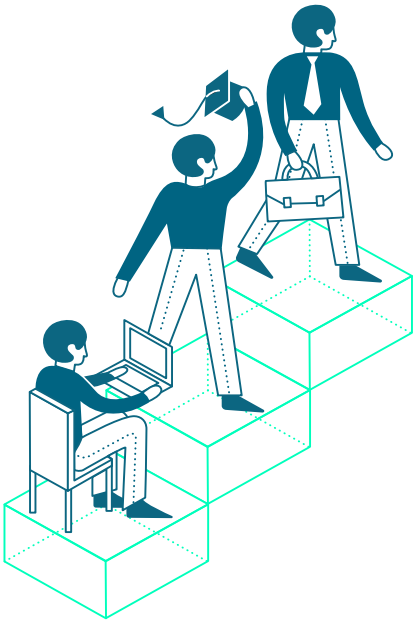
Kaplan, Inc. is a global education leader that helps students advance their education and careers, universities attract and support students, and businesses maximize employee recruitment, development, and advancement. Long known for preparing students for high-stakes admissions tests, Kaplan has built on its roots of educational access and advancement to become an important partner to universities and employers as well, focused on developing talent for the future workforce. https://kaplan.com/



The world did not need a devastating global pandemic to know that higher education has problems. Well before COVID-19 hit, countries around the world were confronting challenges of access, quality, and cost in higher education. Employers were complaining that university graduates were not "work-ready," and international students found their options limited.

At first glance, the disruption brought by COVID-19 appeared to magnify these longstanding problems. Students were forced to leave their campuses and enroll in hastily-created online classes taught by professors with little expertise in delivering distance education. Unsurprisingly, the results were often poorly received, with early student surveys showing widespread dissatisfaction.[20] The difficulties some learners faced in accessing reliable technology, the layoffs and school shutdowns that affected many adult students with jobs and families, and the border shutdowns that often made international study impossible exacerbated these issues. Little wonder that the challenges facing higher education worldwide were frequently presented as a crisis, and why so many viewed the return to the pre-COVID-19 status quo of largely in-person teaching as imperative.

Paradoxically, the pandemic served to jolt higher education into action in ways that reveal a much more promising future for the sector—showing us the enormous opportunities that digital education presents. Within weeks, every student around the globe became an online learner, and every teacher an online instructor. The transition was inelegant, but with so much change happening so rapidly, bumpiness was inevitable. In one survey by Digital Promise, the portion of students who were "very satisfied" with their classes dropped from 51% to 19%.[21]

20 — Means, B., Neisler, J. & Langer Research Associates. (2020). Suddenly online: *A national survey of undergraduates during the COVID-19 pandemic*. Digital Promise, 6. Retrieved from https://digitalpromise.org/wp-content/uploads/2020/07/ELE_Co-Brand_DP_FINAL_3.pdf

21 — Ibid.

The pandemic as a driving force toward digitization

However, there is every reason to believe that online education will emerge from this period stronger than ever, better positioned to serve a broader and more diverse population of students with high-quality instruction. That includes educating more disadvantaged learners, expanding hybrid models that combine work and learning, and mixing online and in-person models to create unprecedented approaches to study worldwide.

To understand this optimism, it helps to recall that the seeds of today's educational changes have been germinating for years. A decade ago, in my book Change.edu,[22] I predicted that higher education would become more mobile, more personalized, more focused on learning outcomes, more accessible, and more global. There has not been a straight-line progression toward those outcomes. Resurgent nationalism, for example, has at times slowed down or reversed international student mobility, even before COVID-19. Yet the broad trends I saw beginning in 2010 are coming into clear focus—and they may accelerate as an unexpected silver lining of the pandemic.

To be clear, the stop-gap version of distance learning that was implemented under the crisis conditions of COVID-19 hardly resembles the successful practices pioneered for decades by forward-looking providers. A closer look at students' COVID-19 experiences shows that their satisfaction was much greater when professors used proven practices to teach online, like breaking up class activities into shorter presentations and active learning activities, offering live sessions and other discussion opportunities, and giving frequent assessments. Institutions that had engaged in high-quality online instruction for years were well ahead of the majority, and their students' responses reflected that learned experience. Clearly, when online education is implemented with attention to quality and outcomes, it offers many possibilities for solving some of the core issues that have plagued education for generations, leading to improved learning at a greater scale, with lower costs. That enormous potential seems clearer than ever.

Work readiness driven by a digitized higher education landscape

Digital learning can also significantly align higher education with work readiness. Already, hybrid education, combining online and in-person instruction, has become entrenched. The sheer convenience of being able to replay lectures anytime or complete self-paced interactive assignments on a flexible schedule means that many current learners never want to return to the status quo ante. A survey found that 79% of students want to keep recorded lectures available online after COVID-19 and nearly half want the option to switch between in-person and online class attendance.[23]

This embrace and expansion of hybrid instruction have big implications for all students—and especially for the growing population of working adult learners. In the U.S., for example, dramatic shifts in the age and life circumstances of the typical undergraduate are well underway. Economist Nathan Grawe has projected a 15% drop in the number of traditional-age students in the U.S. by 2026.[24]

While this is deeply concerning to leaders at campuses that have relied on traditional student tuition revenues and public funds, it is also an opportunity to do much more to reach the growing population of working adults, who often have families and are hungry for more education to advance their careers. Flexibility is

22 — Rosen, A. (2011). *Change.edu: Rebooting for the new talent economy*. Kaplan Test Prep.

23 — Ezarik, M. (2021, March 24). COVID-era college: Are students satisfied? *Inside Higher Ed & College Pulse*. Retrieved from https://www.insidehighered.com/news/2021/03/24/student-experiences-during-covid-and-campus-reopening-concerns

24 — Jaschik, S. (2018, January 8). Are prospective students about to disappear? *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/admissions/article/2018/01/08/new-book-argues-most-colleges-are-about-face-significant-decline

crucial for people who are juggling education with other parts of their lives. Online offerings allow them to watch lectures or complete assignments at night when their children are in bed. Precious travel and face-to-face time can be reserved for activities that educators believe are the highest priorities for in-person sessions.

Technology can also do much more to meet students' specific workforce-preparation needs. The Hybrid Campus, a 2021 report from Deloitte's Center for Higher Education Excellence and Strada Education Network, offers numerous examples of the evolving academic world that COVID-19 is helping to create.[25] These include the use of real-time data on changing workforce needs to create innovative, flexible academic programs, the report says, citing Kaplan's "Credegree" program, which combines traditional degrees with industry-recognized skills and credentials that can be delivered online.

Such innovations are likely to grow for all kinds of students as businesses continue to more actively engage in using education as a benefit and an engine of transformation and productivity. Other promising practices include employers' use of remote internships, matching undergraduates with alumni for virtual job shadowing, and building a hybrid career services model that includes virtual career fairs.

International developments

Digital learning also opens many opportunities in an increasingly global higher education landscape. Millions of students each year seek education, cultural exposure, and job opportunities far from their home countries. The troubling combination of resurgent nationalism and COVID-19 led international student numbers in the U.S. to plummet in the last few years. However, there are encouraging signs of a resurgence, with new student visas being issued at a record pace and the Biden Administration announcing "a renewed U.S. commitment to international education."[26] Furthermore, online learning promises to topple borders worldwide and enable innovative combinations of distance education and in-person study.

The world's pivot to online teaching forced "a reexamination of the concepts of time and space in the education world," writes Diana El-Azar, the senior director of strategic communication and thought leadership at the Minerva Project, on the World Economic Forum's website.[27] The acceleration of digital teaching, she observes, means more than simply combining virtual and physical classrooms. It allows the kind of immersive learning that lets students apply classroom theory to real-world practice. A new bachelor's degree offered by the European business school Esade,[28] for example, gives students what El-Azar calls "a truly hybrid" experience by mixing in-person classes on campus in Barcelona, online learning, and on-the-ground experience developing social enterprises in Berlin and Shanghai.

This kind of creative approach holds huge potential for the students and institutions that can create and participate in new educational ventures. In one sense, however, the most radical and far-reaching impact of new online and hybrid ventures is not how much they can improve the quality and flexibility of education for existing students but what they can do to provide options for students who previously had none.

In a country like India, simply maintaining the current overall postsecondary enrollment rate of around 27% would require increasing enrollment by millions of new students—an almost unthinkable task if done entirely in person.[29] (Meanwhile, the Modi government has announced a goal to increase the enrollment rate to 50% by 2035.[30]) Free online offerings from foreign universities and MOOCs can fill a small part of the demand. Only with the 2018 reversal of its ban on online classes in

25 — Selingo. J. J., Clark, C., Noone, D. & Wittmayer, A. (2021, January 27). The hybrid campus: Three major shifts for the post-COVID university. *Center for Higher Education Excellence, Deloitte and Strada Education Network.* Retrieved from https://www2.deloitte.com/us/en/insights/industry/public-sector/post-pandemic-hybrid-learning.html

26 — McLaughlin, M. (2021, July 27). A renewed U.S. commitment to international education. *Homeroom: The Official Blog of the U.S. Department of Education.*

27 — El Azar, D. (2022, February 7). 4 trends that will shape the future of higher education. *World Economic Forum.* Retrieved from https://www.weforum.org/agenda/2022/02/four-trends-that-will-shape-the-future-of-higher-education/

28 — Ibid.

29 — Government of India, Ministry of Human Resource Development. (2020). National Education Policy 2020 Report. Retrieved from https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf;

Government of India, Ministry of Education, Department of Higher Education. (2020). *All India Survey on Higher Education* 2019-2020. Retrieved from https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/aishe_eng.pdf

30 — Niazi, S. & Sharma, Y. (2019, June 6). Ambitious Modi plan to restructure HE and boost research. University World News. Retrieved from https://www.universityworldnews.com/post.php?story=20190606162707699

domestic institutions did India permit its universities to use technology to meet the massive demand from people who would otherwise be what Clayton Christensen called "non-consumers" of higher education.[31]

Similarly, in Nigeria, many students' options for post-secondary education amount to online study, usually from an international provider, or nothing at all. Between 2010 and 2015, only 26% of the 10 million people who applied to the country's tertiary institutions were admitted.[32] When demand outstrips supply by that magnitude, education technology is a passport to a new world.

Outlook

These possibilities may seem to be wishful thinking, given higher education's reputation for being enormously resistant to change. That reputation is unfortunately quite true. However, one last crucial and decisive lesson of the pandemic is that higher education showed that when it truly had to, it could transform almost overnight. We can now see that, at least in a crisis, dramatic change is possible. The pandemic revealed possibilities for education that extend far beyond the inefficient and redundant model of Higher Ed 1.0.

To realize the promising future digital education offers, universities must double down on the nimbleness they discovered during COVID-19 and continue to be open to innovation and new business models. Governments will have to do their part as well; as the example from India above shows, regulation can—and often does—choke off innovation (India is hardly an outlier in that regard). Regulators or voluntary university consortia will need to agree on data standards that enable the appropriate assessment of institutional performance while being fair to all stakeholders. All of higher education's constituencies—including employers, governments, and edtech providers, as well as universities and students—will need to embrace greater collaboration and partnership. During the pandemic, all of these groups stepped up. Given the upsides of continuing to do so, should we demand less going forward?

To be clear, online education cannot solve every challenge in the postsecondary sector. However, the undeniable difficulties we have endured during the pandemic should not distract from all of the ways in which digital learning offers solutions. From creating access for underserved students to providing badly needed flexibility for working adults, to enabling new hybrid approaches to cross-border learning, technology can open doors for more people, affordably and at a higher quality, than ever. The pandemic showed how quickly higher education can act in an emergency. That should give all of us hope for a brighter postsecondary future.

31 — Ojomo, E. (2016, July 27). Non-consumption is your fiercest competitor – and it's winning. *Christensen Institute*. Retrieved from https://www.christenseninstitute.org/blog/non-consumption-is-your-fiercest-competition-and-its-winning/

32 — Parr, C. (2018, June 29). Two million applicants for 750k places: Nigeria's bid to tackle its capacity issue. *The PIE News*. Retrieved from https://thepienews.com/analysis/two-million-applicants-for-750k-places-nigerias-bid-to-tackle-its-capacity-issue/

6. Never let a Good Crisis go to Waste: The New Normal is Hybrid and Flexible

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Microsoft's mission is to empower every person and organization on the planet to achieve more. Microsoft Education provides schools and universities with solutions, technologies, and educational expertise to accelerate opportunities for all learners to achieve their potential. Microsoft can help drive innovative student engagement, transform operations, harness data for better outcomes, and ensure a secure, connected campus to empower users to reimagine education for a hybrid world.
https://www.microsoft.com/en-in/education

In reflecting upon the use of information technology in higher education during the pandemic, we can clearly define three phases: respond, recover, and reimagine.[33] These overlapping "3 Rs" not only highlight the key priorities of each phase but also signify a spectrum from reactivity to proactivity, as well as the stages from crisis response to the transformative opportunity that promises to enhance participation and equity in higher education. Winston Churchill's famous quote to "never let a good crisis go to waste" comes to mind as quite apt. With the extensive documented benefits of this global experiment in online education, this crisis must not be wasted. The lessons learned should serve as unique catalysts for sector-wide transformation and our generation's contribution to education.

Respond

In the spring of 2020, the COVID-19 pandemic was in full force. With the ensuing lockdowns and prolonged stints of academic disruption, educational institutions needed to respond to an unprecedented situation. After all, how could institutions achieve academic and operational continuity alongside essential and support services through completely remote delivery? Moreover, the transition had to occur literally over a weekend, with all students and faculty working remotely starting the following Monday.

This challenge called for an unparalleled use of information technologies and the teams that support them. Overnight, this extraordinary response essentially led to the digitization of the physical campus and exposed the need for new technologies that could transition from on-campus life to the new "digital campus". This was especially true in support for the online delivery of academic functions, which for the most part had focused on online-only course offerings. In response, Microsoft's CEO Satya Nadella

33 — The New York Times. (2020, May 14). *What Satya Nadella thinks*. Retrieved from https://www.nytimes.com/2020/05/14/business/dealbook/satya-nadella-microsoft.html

characteristically said, "As COVID-19 impacts every aspect of our work and life, we have seen two years' worth of digital transformation in two months,"[34] with more than 183,000 educational institutions using the Microsoft Teams collaboration software at the time.[35]

Recover

Gradually, institutions moved to a second phase, the recovery phase, in which they began to build upon the lessons they had learned during the response phase of the crisis. With prolonged exposure to remote-only learning, endless experimentation, and iterations, institutions saw the gaps and opportunities in their existing pedagogical approaches during the recovery phase. Student feedback had been mixed, academic burnout was evident, and the dependence on IT and campus support teams was omnipresent. The "temporary" approaches employed to overcome an immediate crisis were not delivering the quality or equitable access that students demanded. A growing body of literature and industry recommendations, as well as the looming existential threat of reduced student numbers, forced institutions to rethink and improve their online service delivery. This required adjustments in both the underlying learning technology ecosystem and century-old academic processes and teaching strategies. The recovery phase served as the incubation period, during which universities often diverged. At the time of writing, many institutions are still firmly in the grips of recovery, while others now look to the future and what needs to change in the subsequent reimagining phase.

Reimagine

With the pandemic moving us into the often touted "new normal" of hybrid delivery, with some students and faculty physically present and others remote, we have a once-in-a-lifetime opportunity to advance into a third phase: a reimagining. The goal of reimagining is digital resilience at an organization level, but, more importantly, to ensure equitable access to higher education (including accessibility), focus on employability, and equip learners with the skills required for the fourth industrial revolution. In this phase, every institution will need to rethink academic skilling, data-driven operations, and, ultimately, the very definition of higher education. Digital technologies, most of which had not reached their current maturity a few years ago, will be the key to success.

Using technology efficiently and effectively

In assessing the impact of technology, we must first clearly distinguish between efficient and effective usage. In this context, efficiency can be defined as doing things the right way, while effectiveness is the notion of doing the right things.

In describing the factors impacting the efficient use of technology, we must always include the need to train both faculty and students to use software, alongside providing enabling infrastructure, such as devices and broadband connectivity. Infrastructure to support faculty is often neglected, which ultimately leads to a poor experience for students. Hybrid learning naturally requires academics to have access not only to a laptop, but also to secondary monitors, quality headsets or microphones, production lighting, fast broadband connections, and physical spaces with limited distractions. We have similarly learned not to assume that students have access to sufficient infrastructure to support learning. Even in higher

34 — Spencer, M., Nadella, S. & Hood, A. (2020). *Microsoft fiscal year 2020 third quarter earnings conference call.* Retrieved from https://www.microsoft.com/en-us/Investor/events/FY-2020/earnings-fy-2020-q3.aspx

35 — Spataro, J. (2020). *2 years of digital transformation in 2 months.* Retrieved from https://www.microsoft.com/en-us/microsoft-365/blog/2020/04/30/2-years-digital-transformation-2-months/

education, families often share a single laptop and often have poor Internet connectivity. We have all learned firsthand the need for a physical space in which to work and learn. This is simply not possible, however, in shared accommodation turned into workspaces, thus resulting in split attention and increased cognitive load.

Through these issues alone, we can see significant challenges to student equity in remote delivery settings. Equity, inclusion, and accessibility are multifaceted problems that each extend into the cores of the platforms that universities have chosen to support hybrid learning. What, then, can institutions do to ensure equity for their students and include all learners in a safer, accessible digital campus? Access to low-cost yet sufficiently capable devices is one of the simpler opportunities that could have a significant impact. Using platforms that encourage collaboration, provide tools for accessibility and personalization, and, ideally, transcend simply replicating classes via video playback or self-paced streaming with rich feedback, student-to-student communication, and sharing are further ideas. It is also important for universities to ensure that any students who want to return to campus are prioritized to do so. Governments can also play a significant role by subsidizing devices and working with telecommunication providers to ensure affordable broadband connectivity.

The effective use of technology is where learning science becomes truly intertwined with technology usage. Fundamentally, faculty must ensure student engagement and inclusion. For a learner, the idea of listening to yet another monotonous voice reading slides is not a high enough return on investment (ROI) to stay in higher education. The key lesson here is that the traditional lecture format and associated content-first approaches to learning do not directly transfer to an online setting. This model needs to be rethought, made collaborative, and clearly aligned to meaningful tasks and outcomes that provide authentic, collaborative learning experiences.

The HyFlex campus

The present and future of higher education are hybrid and flexible (HyFlex).[36] Several pioneering lecturers are already exemplifying how the HyFlex campus can be supported by using modern technology with minimal investment or change to the management overhead. Even before the pandemic, these educators had already implemented digital ink, shared class notebooks for collaborative work examples, rich hybrid chats and questions during live lecture recordings, multi-camera switching, Mesh, and even SharePoint spaces for augmented reality (AR) experiments as a part of their course delivery. Importantly, educator agency, sponsorship, and ongoing support from leaders and university technology teams are critical to the success of HyFlex delivery models. Only a campus-wide partnership that heightens student engagement can deliver immersive learning experiences on the digital campus.

Effective teaching and learning are much more than replicating online lectures and endless self-paced clicking on content links. They are social, based on bringing the lived experiences of diverse individuals together on the digital campus. So much learning happens beyond the timetabled lesson that it needs to be considered and provided for in the digital campus. Students learn together and from each other all the time. Breakout rooms, Microsoft Teams, and channels for deeper group discussion and collaboration are simple ideas but also key first steps to empowering learners.

36 — HyFlex Learning Community. (n.d.). *Welcome to the HyFlex learning community!* Retrieved from https://www.hyflexlearning.org/

Similarly, inquiries and valuable questions often go missing in an online setting. Students leave the digital campus to enter group chats on various social networking platforms that are entirely ungoverned by the university and prevent educators from supporting them or obtaining feedback. This common practice demonstrates how meaningful social learning is to students. Some more pioneering lecturers have, however, sought to bring this rich, authentic higher education experience back into the learning environment. By harnessing the power of Microsoft Teams in conjunction with artificial intelligence (AI)-powered bots,[37] they have created powerful social learning environments and, ultimately, thriving communities of learning. Students can freely ask questions at any time, from any device, and the AI bot will respond automatically. Fellow students may also respond and are rewarded for doing so. If the student is unsatisfied with the answer they receive, they can escalate the question to their classroom teaching assistant (TA) or the lecturer. The AI bot stores the final answer, as well as analyzes trends, makes content recommendations, and informs the teaching team of any gaps in students' understanding. AI does not replace teachers but rather gives them time back, deepens insights, and engages learners autonomously so that the instructors can, in turn, better reinforce learning and deliver higher quality experiences during class. This also forces students to ask questions, be heard, and be engaged in discussions. One might ask how we know that this technology-savvy approach works for learners. A statistically significant increase in both student satisfaction and course pass averages demonstrate this method's efficacy.[38]

The new normal: embrace the move to hybrid, flexible teaching

The pandemic has changed the way we work and learn, and the feedback is unequivocal that employees want the best of both worlds, with over 70% of workers wanting flexible remote work options while over 65% crave more in-person time with their teams.[39] We have experienced the time-saving benefits of skipping lengthy commutes and being more able to combine the demands of work, study, and our lives and families than ever before. At the same time, we increasingly long for the deeper social interactions that have been denied by lockdowns. All of us need to feel empowered to make choices about when we want to be physically present and when to work or learn remotely.

Learners demand an equally rich and fulfilling environment whether they are in-person or remote. They demand the same quality and flexibility regardless of the delivery mode, and they want to decide when to go to class or stay at home; they also want to learn at their own time and pace. The new campus must be enticing to attract students back while fostering rich collaboration between in-person and remote students. It must be flexible and adaptive and support hybrid learning and collaboration. Significantly, it needs to reflect and replicate the future workplace and expose learners to the tools and skills they will need upon graduation.

The HyFlex model addresses today's needs and represents the future of higher education by expanding equity and empowering learners. This bright future cannot be realized with yesterday's tools or without a plan and the effort, investment, and collaboration of all of the constituent parties. Teaching must be prioritized over other activities, both at the faculty and institutional levels. Faculty must be trained in the efficient and effective use of technology and pedagogies that support the new HyFlex environment. Institutions must now, more than ever, invest in change management and consider creating a culture that will encourage a focus on HyFlex

37 — Microsoft. (2020). Qbot is here—Creating learning communities supporting inclusion and social learning in teams for education. *Microsoft Education Blog.* Retrieved from https://edublog.microsoft.com/en-au/2020/01/qbot-is-here-creating-learning-communities-supporting-inclusion

38 — Microsoft. (2018). *UNSW pilot program delivers innovative learning experiences, increases student engagement with Microsoft Teams.* Retrieved from https://www.microsoft.com/en-us/microsoft-365/blog/2018/02/08/unsw-pilot-program-delivers-innovative-learning-experiences-increases-student-engagement-with-microsoft-teams/;

Cloud Collective. (2019). *Cloud Collective takes the Microsoft Teams platform to the next level at UNSW Sydney's School of Mechanical Engineering.* Retrieved from https://www.cloudcollective.com.au/antares-solutions-case-study-qbot-unsw-sydney/

39 — Microsoft. (2021). *The next great disruption is hybrid work—Are we ready?* Retrieved from https://www.microsoft.com/en-us/worklab/work-trend-index/hybrid-work

teaching and learning. Rankings should move beyond the scope of research to reflect institutions' support for and quality of HyFlex environments. Institutions that innovate and empower their people through HyFlex work, teaching, and learning must be recognized so that their lessons can promote sustained improvement across the sector.

7. Collaboration as the New Currency: Paving the Way for Flexible and Seamless (Digital) Student Journeys

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The German Academic Exchange Service (Deutscher Akademischer Austauschdienst, DAAD) is the world's largest funding organization for international academic cooperation and the international exchange of students and researchers. Its members are German institutions of higher education and their student bodies. The DAAD's presence in more than 100 countries worldwide is the foundation of its international expertise.
https://www.daad.de/en/

Context and challenges: Transforming international academic mobility and exchange

The digital transformation in the international higher education system has accelerated: Lectures now take place via video streaming—often across university and national borders. International conferences and specialist lectures are more accessible to students and researchers, and new teaching and learning formats are being tested. Digitalization transforms international academic cooperation, mobility, and exchange, placing collaboration at the forefront of any international efforts.[40] The disruption caused by the pandemic significantly affected many higher education institutions' (HEIs') international activities, particularly international mobility. Digital means to engage in international academic collaboration and exchange have thus experienced a further boost.[41]

At the same time, this jump in the development of digital learning methods draws attention to the education systems' new and existing obstacles. To leverage the potential of digital solutions for learners to benefit from international digital education, we must be aware of potential challenges throughout the learning journey:

The need for infrastructure (hardware and connectivity), as well as the skills to use it, pose the most basic obstacles to participation in the digital and hybrid learning sphere—regionally, institutionally, and socially, severe inequities exist that may deepen through the shift to more digital learning. With these bases covered, students interested in international digital learning need to be able to find information about the study offerings suitable for their learning paths and qualifications. Meeting admission requirements can be a challenge to any form of student mobility. Prospective students often lack transparent or well-linked

40 — Global Learning Council. (2021). *Digital transformation of higher education—Global learning report.* DOI: 10.21241/ssoar.73580

41 — Deutscher Akademischer Austauschdienst (DAAD) & Deutsches Zentrum für Hochschul- und Wissenschaftsforschung (DZHW). *Wissenschaft weltoffen 2021.* Facts and figures on the international nature of studies and research in Germany and worldwide. Retrieved from https://www.wissenschaft-weltoffen.de/content/uploads/2022/01/wiwe_2021_web_en.pdf;

DAAD. (March 2021). *COVID-19 and the impact on international student mobility in Germany. Results of the second DAAD survey of International Offices in the winter semester 2020/21.* (Working paper). Retrieved from https://static.daad.de/media/daad_de/pdfs_nicht_barrierefrei/der-daad/analysen-studien/corona_ap_final_engl.pdf

information on the recognition of credentials, easy ways to produce the necessary documentation, and how to identify possibilities to gain the missing qualifications to start their desired study path.

Administrative and legal questions resulting in the unclear status and handling of international students participating in digital offerings in HEIs create insecurity for learners: Access, as well as the skills to navigate potentially unfamiliar software or learning platforms, are necessary to effectively participate.

The learning design is crucial as well: A focus on synchronous live learning elements (including assessments) can pose challenges due to time zones or specific restrictions in learners' schedules. Also, teaching and learning formats that do not consider different learning types or abilities (such as hearing, seeing, or language proficiencies) might hinder students from benefiting from an offering. For more inclusive international digital learning, didactic issues like the selection of materials, potential cultural misunderstandings, and the need for language skills and digital literacy instruction and support should also be considered.

Lastly, students need to be able to prove their acquired competencies in the form of secure, internationally recognized certificates. Certification can pose serious challenges at an organizational level to international digital education.[42]

42 — Deutscher Akademischer Austauschdienst (DAAD) & Deutsches Zentrum für Hochschul- und Wissenschaftsforschung (DZHW). *Wissenschaft weltoffen 2021.* Facts and figures on the international nature of studies and research in Germany and worldwide. Retrieved from https://www.wissenschaft-weltoffen.de/content/uploads/2022/01/wiwe_2021_web_en.pdf

Vision: Establishing seamless international learning pathways

Digitalization should be leveraged to broaden access to international higher education. Students and researchers from within a country and abroad should be able to use the educational offerings of universities worldwide more easily, both on campus and digitally. Adding digital solutions and processes, whether flexible or remote, can meet the specific requirements of international online learning and cater to the needs of diverse groups of digitally mobile learners at different stages of their international learning journeys.

Establishing international digital learning pathways that enable learners to move seamlessly through the global education landscape must be the goal. This can only be achieved by taking the entire student journey into account, starting with orientation and specific preparation and admission into a study program, if needed, through the study program and any virtual, hybrid, or physical mobilities and exchanges, all the way to graduation and certification. Hence, rather than creating isolated solutions, the aim should be to make digital services broadly available and affordable, as well as to enable networked solutions that complement each other.

The DAAD helps domestic and international students to benefit from international higher education and exchange, including through digital means. The following are some current initiatives from the DAAD that coordinate with this vision of seamless international education for students through addressing the above-mentioned challenges:

Orientation and admission

Until now, many services related to studying in Germany have been available, but they are rarely linked together meaningfully and are, therefore, difficult to find. The DAAD portal "My Guide" supports prospective international students who are still finding somewhere to study. Based on their individual interests and qualifications, as well as the relevant admission requirements, they can search for suitable degree programs at German higher education institutions and contact the relevant local contact people.

Digital study preparation — Deep dive

Most prospective students who have finished their secondary education outside the EU do not have a direct higher education entrance qualification in Germany and must, therefore, complete a preparatory course before studying in Germany. Research has shown that the phase before arriving in a foreign education system and preparation for a mobility experience has gotten little attention so far, although digital study preparation can positively influence international students' success.[43] The use of digital or hybrid solutions opens up new ways to make international learning paths more accessible.

In addition to information about study programs, the "Digital Campus" initiative bundles offers to prepare for a study visit in Germany through a web portal. Prospective international students can obtain the necessary qualifications for their desired degree program. For example, to support those who wish to study STEM subjects in Germany, an online preparation program is being developed through the research and development (R&D) project "VORsprung: A digital head start for engineering and science studies in Germany." The course allows prospective students to study whenever and wherever they please without restricting them to a schedule or mandatory presence. By ensuring online preparation without the need to travel abroad before beginning their studies, "VORsprung" enables prospective international learners to take the first digital step of their student journey in their home countries, thus reducing the financial and bureaucratic hurdles. The participants are trained in mathematics, computer science, chemistry, and physics and take their language skills to the next level. They will also learn about German culture in general and the learning culture at German universities, along with other relevant skills, such as time management and collaboration. Although the program promotes digital rather than face-to-face teaching, specifically trained tutors are available online to help participants along the way.

The curriculum was developed based on an analysis of the target group and their needs in three pilot countries: Egypt, India, and Mexico. The selected pilot countries have different types of secondary schools that offer German language programs, as well as a high interest in Germany and studying in Germany and diversity of geographical location, economic performance, population size, and language. The user research includes the perspectives of prospective students, as well as their parents and teachers. This reveals the gaps a successful preparatory program must close and how the teaching–learning scenarios should be designed.

At the end of the course, which lasts approximately eight months, the participants will be prepared to take the traditional assessment test (Feststellungsprüfung) and the "Test for Academic Studies" (TestAS) as well as the "Test Deutsch als Fremdsprache" (TestDaF). This further demonstrates how "VORsprung" can reform international access and admission in higher education and aims to break down barriers for international students, who are overwhelmed by the many opportunities of the German higher education landscape and their differing prerequisites.

Studies and mobilities

During the study phase, a variety of formats offer new possibilities for students to gain international education experience: from online teaching and learning formats to platform-supported, innovative concepts for global exchange and new modes of cooperation between HEIs across Germany and internationally. Through virtual

43 — Pineda, J., Kercher, J., Falk, S., Thies, T., Yildirim, H. H., & Zimmermann, J. (2022). Internationale Studierende in Deutschland zum Studienerfolg begleiten: *Ergebnisse und Handlungsempfehlungen aus dem SeSaBa-Projekt (DAAD Studien)*. Retrieved from https://doi.org/10.46685/DAADStudien.2022.01

mobility and virtual exchange formats, new and diverse students can benefit from international education through alternative pathways. This is especially advantageous as the rising demand for international competencies and the ability to collaborate digitally can be addressed. These skills are becoming more and more relevant for employability. To use the full potential of these new possibilities, curricula and study programs should be designed to be digitally supported and transnational.

With this need for HEIs' digital and international capacities to grow, open education is becoming more significant. Digitally sharing new solutions, experiences, and project results will be the standard operational mode. This is already indicated by the increase in international cooperative projects and communities of practice.

Catering to increasingly non-linear education paths will also become more important. A current example is the R&D project "Bildungsraum Digital" (BIRD). As a German hub of existing educational platforms, which can be connected to European initiatives, it links digital teaching, learning, and service offerings across all levels of education (schools, universities, vocational training, and continuing education). By crosslinking content, tools, learners, and teachers, BIRD enables maximum hypermobility that serves the overall goal of continuous skill development.

Graduation and lifelong learning

The digital processing of educational certificates is an essential building block for internationally compatible academic mobility. Digital technologies open new possibilities for students to prove their acquired competencies in the form of digital certificates and share their issued degrees digitally. This allows students to seamlessly continue their educational paths or provide certification to future employers.

Micro-credentials may contribute to making educational pathways for lifelong learners more flexible in an increasingly technological and fast-changing employment market. HEIs consider micro-credentials most applicable in continuing academic education and lifelong learning. At the same time, micro-credentials are gaining importance for internationalization and mobility.[44]

Recommendation: Fostering international and digital collaboration and learner-centered development

As demonstrated, picturing digitalization activities along students' journeys helps to highlight the connections and interdependencies of digital internationalization offerings and the organizational processes linked to any educational path. To avoid a multitude of isolated digital solutions, higher education needs to collaboratively work toward the goal of a seamless digital learning pathway. Any activity should contribute to networked and internationally connectable solutions with national and international partners.

For more learners to benefit from these international digital learning offerings, HEIs need to build capacities and experiment with new formats. These should be designed to promote diversity and flexibility. This might come with the need for new support offerings for learners and teachers, such as intercultural, technical, or collaboration training. Including learners in the development of both new learning and new support offerings can unleash untapped potential for innovation in teaching and learning formats through co-creation with the students. Sharing inspiring practices with other organizations and co-developing solutions for common challenges also promises a steep but worthwhile learning curve.

44 — Nationalen Agentur Erasmus+ Hochschulzusammenarbeit at DAAD (2022). *Umfrage zu Microcredentials. Kleine Lerneinheiten an deutschen Hochschulen.* Retrieved from https://static.daad.de/media/daad_de/der-daad/kommunikation-publikationen/presse/eu04_infosheet_auswertung_mc-survey_final.pdf;

DAAD (2022). Micro-Credentials in Europäischen Hochschulnetzwerken. *Auswertung der Umfrage im Rahmen des nationalen Begleitprogramms 2022.* Retrieved from https://static.daad.de/media/daad_de/der-daad/kommunikation-publikationen/presse/auswertung_micro-credentials_eun_final.pdf

To remain connected to the transforming global ecosystem of digital learning, HEIs should tackle questions of recognition and new forms of credentials and degrees in line with national qualification frameworks and quality assurance requirements.

For future digital educational certificates to document individual learning paths nationally and internationally, legal and political preconditions must be met in addition to technical ones. To address the important question of education certification, stakeholders from all over the world must join efforts: The international Groningen Declaration Network (GDN) aims to create a global ecosystem of student data that focuses on students, their learning data, and proof of competence, as well as on the security of these digital credentials. To further support those activities, more research and development initiatives are needed.

8. Future-ready, Steady, Go: En Route to Co-creatively Shaping the Blended University of Tomorrow

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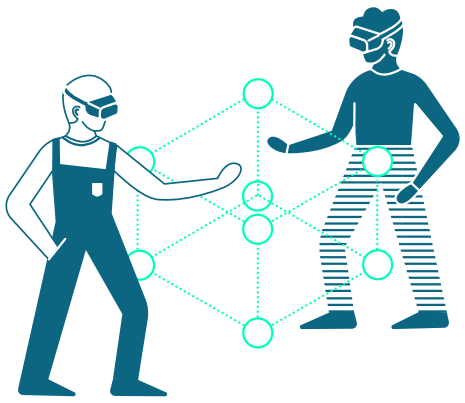
As a nationwide think-and-do-tank, Hochschulforum Digitalisierung (German Forum for Higher Education in the Digital Age, HFD) brings together a broad community around the digital transformation in higher education, creates visibility for new developments, and pilots innovative approaches. It is a joint initiative by Stifterverband, the CHE Centre for Higher Education, and the German Rectors' Conference and is funded by the German Federal Ministry of Education and Research.
https://hochschulforumdigitalisierung.de/en

In the spring of 2020, universities became—virtually overnight—real labs for digital teaching and learning. Although a mere 17% of German universities sporadically had online-only teaching before the COVID-19 pandemic hit,[45] 91% of university courses were digitally offered during the spring/summer 2020 term.[46] This was achieved through a commendable effort by all groups, an unprecedented collective learning experience, and a courageous can-do attitude to find pragmatic and innovative solutions to the challenges that COVID-19 posed for higher education.

Fast-forward to spring 2022: After the emergency remote teaching and learning that characterized the beginning of the pandemic, we have entered a seminal transition phase that requires courageous and proactive steering. With the alleged glimpse of fully returning to campus physically in the spring of 2022, the discourse should not be shaped by the dichotomy of analog vs. digital but rather by the question of how to create future-ready universities and secure good and inclusive education that is focused on learners and their lived realities, learning outcomes, and individual learning paths.

In assessing their digital study experience, students have expressed appreciation for the flexibility of digital teaching and learning scenarios and the independence of time and place (e.g., through course recordings). Most learners wish to benefit from digital offerings and blended approaches in the post-pandemic future.[47] It is paramount to take these voices seriously and involve students as partners in the process of shaping future teaching and learning environments. Taking advantage of the increase in experiences with a variety of learning scenarios—analog, digital, and hybrid—is a crucial opportunity to take bold steps toward further manifesting the shift from teaching to learning. Besides, it is part of the university's responsibility to prepare students for a digital working and living environment and ensure that they



45 — Wannemacher, K. (2016). *Organisation digitaler Lehre in den Deutschen Hochschulen.* Arbeitspapier Nr. 21. Retrieved from https://hochschulforumdigitalisierung.de/sites/default/files/dateien/HFD_AP_Nr21_Organisation_digitaler_Lehre_web.pdf

46 — Winde, M., Werner, S., Gumbmann, B. & Hieronimus, S. (2020). *Hochschulen, Corona und jetzt?* Future Skills – Diskussionspapier 4. Retrieved from https://www.stifterverband.org/download/file/fid/9313

47 — Ibid;

Horstmann, N. (2022). *CHECK – Informatik, Mathematik, Physik: Studienbedingungen an deutschen Hochschulen im zweiten Jahr der Corona-Pandemie.* Retrieved from https://www.che.de/download/masterstudium-corona/

can actively navigate and participate in a VUCA (volatile, uncertain, complex, and ambiguous) world society as responsible citizens. In this endeavor, digital inclusion and equal opportunities for vulnerable groups and students with care responsibilities must be given priority.

The prospect of returning to on-site teaching and learning should not be seen as an opportunity to forget the creative, innovative approaches of the past years. It would be a considerable setback to neglect the innovative teaching, learning, and exam scenarios that have been generated as a result. It is now important to perpetuate and further develop new concepts and maintain the attitudes that made large-scale collaboration and experimentation possible. It is also essential to establish a true failure culture that allows us to share and learn from failures rather than try to conceal struggles. As iteration is an integral part of experimentation, it is unsurprising that new digital learning concepts often failed to work out as planned and required readjustments, allowing all involved parties to learn and grow in the process. We must reframe these failures as relevant learning experiences and, thus, starting points for joint reflections and approaches for improvement and new solutions. For instance, the experience of a lack of personal contact and exchange opportunities that all groups reported during digital semesters can initiate a cross-group discussion about what universities are essentially about and what kinds of social spaces universities are and should be.

Given the decisive phase we inhabit now, it makes sense to consider both future concepts that are already being implemented and what is further needed to jointly shape the blended university of tomorrow.

Quality education through collaboration and innovation — Future concepts at work

The new normal that educators, learners, university management, and virtually all other groups had to adapt to and shape in response to the pandemic was particularly challenging. More than ever, sharing international good practices, content and methodological expertise, materials, and lessons has been crucial—and these have been particularly helpful when presented as methods to be implemented according to both specific contexts and disciplines.

There are many examples in Germany, as well as international contexts, that display innovative future concepts (e.g., serious games, use of AR/VR, and international project-based learning) already in use. Nationwide networks such as HFD and European initiatives (e.g., European university alliances or the European Digital Education Hub) play crucial roles in highlighting these good practices and facilitating their transfer across universities and countries. For example, HFD's multidimensional activities range from organizing inspirational lead events and smaller community formats to facilitating in-depth peer learning experiences. To support the needs of teachers during the pandemic according to their needs (e.g., first-time digital teachers), HFD and its partners have created qualification series and expanded demand-oriented offerings in the last two years, ranging from micro-trainings on digital accessibility to qualification workshops on designing and conducting digital exams.

A key pillar of the inspiring future concepts that have already been implemented is based on involving students at eye level in the digital transformation process. When given the opportunities and spaces, they can function as innovation partners, change agents, and creative solution-finders for cross-university challenges. In various places, students are taking on active roles as partners in shaping

strategic digitalization and university development processes (e.g., as student vice presidents and student digital officers). Students contribute significantly to the digital progress of higher education when they actively participate in academic advisory boards, tender juries, and public discourse (e.g., as speakers or authors). Unfortunately, their innovation potential is not yet being tapped on a large scale. HFD's future working group, "DigitalChangeMaker," presents a model for fostering student participation. Its student members actively participate in the discourse on the digital turn in teaching and learning, develop visions for higher education, and are supported in realizing their own change projects. The initiative is an example of the impact and transfer potential of good practices as several universities have replicated the concept and are building local DigitalChangeMaker groups.

Now? All hands on deck to sail forward!

Despite the good practices and future concepts at work, much remains to be done to enable universities to use the potential of digitalization on a large scale. Four central fields of action will be addressed in the following: (1) the need for the participatory development of visions for higher education, (2) the need for new learning spaces, (3) the need for further professionalization and peer learning opportunities, including the facilitation of these processes, and (4) the need for real student participation on an institutional level.

1. Now is the time to co-creatively re-envision desirable futures of our higher education institutions.

To actively shape the future, desirable future images and scenarios must be created. We need visions for higher education that are courageous and focus not only on what is feasible within the status quo but also what is possible in the future. This process needs to be participatory and set up as an ongoing, iterative negotiation process. Only together can the futures of learner-centric, flexible, inclusive, and sustainable blended universities be crafted. It is high time to take action and develop sustainable building blocks for shared visions with all affected groups. Many aspects require bold future scenarios, e.g., internationalization and international mobility through digitalization, blended or hybrid learning architectures, sustainability in teaching and learning, and the social dimension of digitalization. While this process is inherently shaped by local angles, we also need regional, national, and international structures and facilitation to develop visions in higher education together and provide direct implementation opportunities.

2. Collaborative, flexible, and modular learning requires new concepts for learning spaces.

With shared desirable futures in mind and positive attitudes toward change processes, bold steps in various fields of action can be deduced. For instance, teaching innovations and new forms of collaborative learning require adequate new learning space concepts and technical equipment. Learning and teaching cannot be understood in absolute terms but are ever-evolving. Thus, the learning architectures of the future must meet this promise of constant change and promote the development of future skills such as digital key competencies (e.g., digital interaction, adaptability, and entrepreneurial thinking) or transformative competencies (e.g., innovation competence). For instance, flexible and modular spaces (e.g., those

with movable tables that can be arranged as needed), smart wiring, and basic requirements such as campus-wide stable Wi-Fi and sufficient outlets need to become the new standard. In addition, digital learning environments must be further researched and developed in a learner-centric and inclusive manner.

> 3. For the sake of sustainability, innovation, and cross-institutional transfer in higher education, more professionalization opportunities and peer learning spaces need to be created and facilitated.

Future skills are needed for all future employees, including teachers, as designers of future-ready learning scenarios. Thus, universities, alliances, and networks need to offer more professionalization and collaboration models. A significant precondition for success is sustainably funding and facilitating these peer learning programs. To promote and live openness, these processes should also occur at local, regional, federal, and global levels.

> 4. To shape future-ready universities, a students-as-partners mindset and structures for real student participation at all levels are needed.

To use students' innovation potential and involve them at eye level, we need an overall paradigm shift that acknowledges that learners are hardly passive recipients of education but drivers and changemakers shaping the digital transformation in higher education. They should not only be at the center of decisions regarding future-ready, accessible higher education but also central partners in the decision-making process. They need to be viewed as active change agents and co-creators of their learning environments. To ensure real participation by a diverse student body, different and holistic participation opportunities—from planning to implementation—must be created. In addition, new incentive structures are needed, e.g., financial compensation for voluntary commitments, anchoring participation in curricula, and adequate salaries and working conditions for student employees at universities. Especially for student participation in events and processes, reserved student seating should not be an exception but rather the rule. In this context, we also need more suitable forms of recruitment (e.g., by random selection) and further qualification measures for all actors to emphasize the benefits and potential of participating in change processes.

9. An Accessible Future for All Students: Using Technology to Realize Higher Education's Greatest Promise

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Amazon Web Services (AWS) is on a mission to accelerate the digital transformation of education for the full education community, including learners, educators, administrators, and researchers. More than 14,000 educational institutions harness AWS to provide flexible, affordable technology solutions that support their core missions and deliver on strategic institutional priorities, turning data into wisdom, enriching the student experience, and accelerating time to science.
https://aws.amazon.com/education/higher-ed/

In 2020, after the global pandemic brought the world to a halt and, for a few shocking weeks in March, froze higher education institutions' (HEIs') ability to teach students, institutions realized that they needed to radically shift their entire delivery model. In many ways, this immediate pressure to do something lifted the pressure to get it right. In a matter of weeks, and sometimes mere days, institutions moved entire course catalogs online. They learned in that moment that the impossible could become possible. They learned to collaborate, experiment, and do the best they could within numerous internal and external constraints. The spirit of innovation and perseverance that characterized the first months of the pandemic has a critical role to play in the future of higher education and will be at the heart of the industry's ability to deliver on one of the greatest promises of higher education: to create pathways for social and economic mobility and opportunities to do work that matters. There are significant barriers to the realization of this promise, however, and these barriers only intensified during the pandemic.

Addressing barriers to student success

The first of the barriers we would like to address is affordability. College in the U.S. and many other countries is expensive. After adjusting for inflation, federal student debt in the U.S. increased sevenfold from 1995 to 2017, rising from $187 billion to $1.4 trillion.[48] Federally funded financial aid is not keeping up with the rising costs of tuition, and 70% of students who receive a bachelor's degree have education debt by the time they graduate.[49] In addition to financial barriers, the lack of access to the Internet and high-quality, reliable technology prevent many students from accessing classes or class material consistently. We saw, during COVID-19, that disparities in technology and Internet access affected students in rural, urban,

48 — Congressional Budget Office. (2020). *The volume and repayment of federal student loans: 1995 to 2017.* Retrieved from https://www.cbo.gov/publication/56754

49 — Urban Institute. (n.d.). *2016 national postsecondary student aid study.* Retrieved from http://collegeaffordability.urban.org/covering-expenses/borrowing/#/

and on-campus settings, with students experiencing a lack of affordable Internet access or a lack of access altogether, interruptions in service, and working on shared, outdated, or broken computers. Many of these students were forced to rely on their cell phones as their primary point of access.

The second of these barriers encompasses mental health and well-being, which have become central issues at many colleges and universities. Students, staff, and faculty are tired, stressed, and overwhelmed. When colleges shut down in March 2020, some students did not have safe homes to return to. Others faced additional pressures from the distractions and responsibilities that came with living and learning from home. Many students have struggled to establish and maintain peer connections and sustain feelings of belonging during the pandemic, both of which are critical to success in college. In 2021, 44% of college students reported symptoms of depression and anxiety, and 75% of college students who faced mental health challenges were reluctant to seek help.[50] Colleges and universities, already challenged to meet their students' growing mental health needs, have struggled further to provide those services remotely.

Learning is also deeply impacted by issues of access and accessibility. While online courses increase flexibility for students who have professional or family responsibilities outside of school, many courses are not designed with accessibility in mind. Students with accommodations in face-to-face classes typically have access to a wide range of services in and around their classroom experience, including accessibility software, alternate testing options, tutoring services, and more. These services are not consistently available online and some online teaching and learning software may introduce additional accessibility barriers. With colleges and universities increasingly embracing technology in education and prioritizing employability, they must be tenacious about addressing the attendant, significant gaps in equity and access.

The last barrier that we will consider here is tied to workforce readiness. In a comprehensive national assessment, the American Association of Colleges & Universities (AACU) found that less than half of employers find graduates "very well prepared" in competencies that are deemed essential by faculty and employers alike. These include working effectively in teams, analyzing and interpreting data, and applying knowledge and skills in real-world settings.[51] The thoughtful integration of information literacy and numeracy, as well as digital pedagogy in teaching and learning, can support the development of these competencies and enhance student learning outcomes.[52] However, most faculty lack backgrounds in digital pedagogy and have little experience embedding information literacy or numeracy concepts into their courses. Without adequate pedagogical support, it is difficult for faculty to build these skills effectively in their courses, and without the opportunity to develop these skills on campus, students are less likely to be fully prepared for success when they graduate.

Building equitable and accessible education for all

Across the globe, the pandemic significantly disrupted the delivery of academic, cocurricular, and support services for college and university students. The disruption caused by the pandemic also created greater urgency for change. It pushed colleges and universities to move more quickly than they had before to override policies, implement new tools, and align efforts in a unified direction. It allowed institutions, at least temporarily, to become less risk-averse, more innovative, and much quicker to change. However, that change may be fleeting. As the pressures of

50 — Mayo Clinic Health System Staff. (2021, September 7). What parents need to know about college students and depression, *Mayo Clinic Health System*. Retrieved from https://www.mayocliniche-althsystem.org/hometown-health/speaking-of-health/college-students-and-depression

51 — Association of American Colleges & Universities (2021, April 1). *How college contributes to workforce success*. Retrieved from https://www.aacu.org/article/how-college-contrib-utes-to-workforce-success.

52 — Clark, R. C. & Mayer, R. E. (2021). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning* (4th ed.). John Wiley & Sons.

the pandemic wane, the tendency to return to the old ways of doing things will only grow. In a 2021 Inside Higher Ed survey, 37% of institutional presidents strongly agreed that the pandemic created an opportunity to make changes that they had been wanting to make anyway; in 2022, that number declined to 27%. Similarly, in 2021, 62% of presidents said that their institutions would keep COVID-19-related changes after the end of the pandemic. That number dropped to 52% in 2022.[53]

We believe education should be equitable and accessible for everyone. The pandemic exposed challenges to this vision but also highlighted how institutions can move more agilely and creatively toward a different future. What could it look like to sustain a culture of innovation and build a more accessible future for all students in higher education?

How to use technology for the digital future of higher education

First, we recommend leaning into flexible modes of learning, leveraging the best of what in-person, hybrid, and online modalities can provide. Course recordings posted online allow students to review content that they may not have understood the first time and can provide instructors with insight into the segments of a lecture that students did not understand. Trained instructional designers and course redesign cohorts can help institutions create consistent standards for thoughtful, accessible, and inclusive learning models for in-person, online, and hybrid courses. We recommend integrating existing educational experiences into new modalities and including skills-building and training to support global citizenship, information literacy, and workforce readiness programs. The integration of high-impact practices (HIPs) can also accelerate student success. HIPs are evidence-based practices that increase retention and graduation rates for students with a range of backgrounds, particularly those who have been historically underserved in higher education. HIPs include internships, e-portfolios, service learning, undergraduate research, learning communities, capstone courses, and more. By rethinking curricular models, many of which have been in place for half a century or longer, institutions can align disciplinary studies with stackable credentials that prepare students for success after college.

Second, institutions must reimagine the delivery of their services, decoupling them from time and place to ensure that they can be accessed by students when, where, and how they need them. Here, technology can play a significant role in creating equitable and inclusive student services. The same virtual computing lab that provides access to classroom software for an online student hundreds of miles away can also benefit a single, working parent who lives on campus but can only study after their child is in bed. A mental health support mobile application can comfort a student who is anxious about taking a test and quickly identify and guide another student with more acute mental health issues toward a virtual or in-person counseling session. Existing learning technologies can be configured to create auto transcripts from online sessions to enhance accessibility, and new technologies can be utilized to identify at-risk students and quickly personalize interventions or direct them to support resources to help them succeed.

53 — Lederman, D. (2022, March 2). College presidents confident, with an asterisk. *Insider Higher Ed*. Retrieved from https://www.insidehighered.com/news/survey/college-presidents-confident-finances-upbeat-about-race-relations

Core questions to support thriving institutions and student success

Finally, we would like to return to the challenge and promise of cultural change. A colleague and former institutional leader recently observed, "Sometimes we spend so much time in higher education doing the thing right, we don't actually make sure we are doing the right thing." How can higher education leaders flip this paradigm? As a starting point, we encourage leaders to consider the following questions: How can they embrace a culture of innovation and iteration, testing solutions quickly to learn what does and does not work? How can they create a campus culture that not only makes risk-taking less hazardous but incentivizes it? How can they ensure that student data is private and secure but still available to drive informed decisions? How can institutions leverage data to understand where students struggle, what support resources are most effective, and how new interventions can be piloted, assessed, and scaled up where appropriate? How can institutions share the blueprints for their most successful programs with other campuses to ramp up success more quickly for more students? We believe that the institutions that are most willing to ask these questions and most courageous in finding new answers will best serve their students and be most likely to thrive in the rapidly changing context of 21st-century higher education across the globe.

Outlook: The Vision of Higher Education

Christin Schemmann (GLC)

The future of higher education is digitized. Even if the degree of digitization is left to each higher education institution (HEI), digitization will undoubtedly change higher education systems. We have already seen these changes in the past two years of the COVID-19 pandemic. Institutions have adapted their tried-and-true teaching and learning formats to the new conditions. This has been accompanied by a cultural shift in HEIs. Cultures of innovation have emerged at institutions normally characterized by traditional structures, showing a willingness to change and adapt, break down old communication structures, and become centers of innovation.

A digitized higher education landscape offers numerous advantages over traditional higher education when implemented in a data-driven and demand-driven manner. This report's contributions by various authors from the higher education sector have highlighted the many paths to the digitized higher education landscape. Although the report shares various digital education stakeholders' perspectives, there is unanimous support for a common vision of higher education that consists of five defining characteristics. The goal of this vision is to improve and align educational outcomes globally as inequalities in higher education have become more apparent than ever during the pandemic.

1. Accessibility

The first and one of the most important dimensions of a digitized higher education system is its accessibility. A digitized higher education landscape could lead to the diversification of that very landscape. If HEIs use digital tools according to their individual contextual factors, identities, strategies, and goals, as this report recommends, the path to higher education will be made more accessible to a more diverse learning community. Different types of learners and learners with special needs could choose learning opportunities based on their requirements for the desired learning situation. Ideally, this would create equal educational opportunities for populations worldwide.

In their article, Alexandros Papaspyridis and Jason LaGreca explain how the flexibility of digital and hybrid learning under the "HyFlex" model helps to balance family and work or study, simplifying high education access for learners with caregiving responsibilities. Taking courses independent of time and place contributes to time savings and efficiency. The compatibility of learning and other areas of life should not be underestimated, given the empirical findings that Andrew S. Rosen presents on the growing number of enrolled working adult learners. The average age of learners in higher education will increase in the coming years, as the U.S. example shows. At the same time, more learners will be working or need to care for children and, therefore, rely on flexible, digital, and hybrid learning models. So-called "stackable credentials," as Liv Gjestvang and Raechelle Clemmons propose, may also be attractive to learners who want or need to gain work experience in parallel with education. Stackable credentials are progressively earned certificates that add up to a degree but can also be used as individual credentials. They can be earned digitally or in face-to-face classes and modernize higher education regardless.

Expanding access to higher education is also about creating more study spaces that can be allocated to interested learners. Andrew S. Rosen uses empirical examples from the international higher education landscape to show that digital teaching can meet the strong demand for higher education. This is true, for

example, in populous countries such as India. Digital or hybrid formats can serve more learners than physical campuses can.

It should also be noted that digital mechanisms can improve not only access to an HEI but also cross-organizational collaboration at the regional, national, and international levels. Digitized exchange, research, and mobility formats allow for a more intensive exchange of knowledge and experience with fewer bureaucratic hurdles, which also teaches intercultural skills. Against this backdrop, Dagmar Willems and Alexander Knoth walk through the student journey to explain how international student mobility can be made more seamless and experiential with the help of digital mediation mechanisms. This could be an incentive to offer more learners the opportunity of international exchange and remove the barriers to taking advantage of this opportunity. Digital platforms can be the first step to expanding students' ability to discover suitable courses of study or take preparatory classes.

Similarly, Yasmin Djabarian and Kevin Saukel illustrate that cross-organizational professionalization and collaboration models should help teachers learn the necessary digital competencies for future teaching and learning scenarios. The lack of these competencies creates a barrier to equivalent learning experiences. In contrast to such "peer-learning programs," which require matching funding, Melissa Laufer, Bronwen Deacon, and Len Ole Schäfer have found that informal, internal innovation hubs between teachers can also successfully and sustainably address digital competency inequalities among staff. This knowledge-sharing can thrive with middle management that fosters trust at the institution.

In addition to the opportunity to acquire digital skills (which are also important for learners), digital access to and between HEIs requires basic technical equipment on and off campus. This means that teachers and students must have access to laptops, tablet computers or smartphones, high-quality cameras and microphones, and stable Internet connections. This is the basis of the access barriers to a digitized HEI. As Trine Jensen illustrates empirically, the lack of digital resources is one cause of the disparities in teaching between HEIs in Africa and Europe during the COVID-19 pandemic. While there were fewer resource deficits in Europe, African HEIs found it significantly more difficult to reach their learners digitally.

Barriers to access are directly related to the affordability of digital teaching and learning. Therefore, HEIs might consider advocating to develop special support programs for learners who lack the financial means to purchase the necessary materials for access. Subra Suresh, in his interview with Rosa Ellis, describes how his university attempted to establish such programs for struggling students during the pandemic. The government can also step in and support learners directly or fund HEIs to create new digital infrastructures or improve existing ones.

2. Inclusion

Through the targeted and demand-driven use of digital technologies, HEIs can also become more social and open. In addition to access to higher education, everyday teaching and learning can become more inclusive.

Yasmin Djabarian and Kevin Saukel define the creation of new learning spaces and potentials as one of their four central fields of action for digitized higher education transformation. This serves to further develop key digital competencies in physical and digital spaces while breaking down existing barriers in everyday life. The authors advocate providing appropriate spaces on campus equipped with furniture that enables interactive group work. In addition, digital resources such as a stable Internet connection and sufficient power outlets should become standard.

Appropriately designed learning spaces encourage collaboration among learners on campus and provide opportunities to engage with other learners and work together in a hybrid fashion. Independent sourcing of supplemental learning materials from the Internet also becomes possible.

The ability to participate in collaborative learning environments both on and off campus is important, as digital-only learning opportunities can create additional barriers for some learners. Liv Gjestvang and Raechelle Clemmons provide an example of using technology to enable collaboration among learners. By integrating the latest technologies into video conferencing platforms, for example, automatic captioning or audio files could enable communication between individuals who would otherwise not be able to participate with the same intensity. This also applies to digitized teaching offerings. The live broadcasting of face-to-face classes or subsequent availability via an on-demand stream with such automated features ensures comprehensive accessibility.

In this context, we must remember that HEIs also play social roles. Through interaction with others, learners acquire extracurricular skills that are crucial for their future lives and successful careers. Trine Jensen specifies finding the right balance between digital teaching and interactive, social experiences in everyday HEI life as one of the most important future issues for institutions.

It should also be noted that successful digitization requires the involvement of all relevant stakeholders. Lauren Herckis and Anne Leiser refer to their joint participation in the implementation process of their respective HEIs' strategies as one of the prerequisites for successful digitization. Yasmin Djabarian and Kevin Saukel also advocate actively involving learners in shaping the digital future of higher education.

3. Individuality

The choice between different learning types in a differentiated higher education landscape enables personalized, individual, and self-determined learning. Individual learning paths can be supported technologically, such as through the automated submission of tasks and digitized assessment, which can be communicated directly and transparently to the learner. This can be done, for example, via special mobile learning applications or other HEI platform applications. Using special algorithms and artificial intelligence, learners can be given tasks tailored to their levels, similar to learning support from a private tutor.[54] These can, of course, be accessed on a flexible schedule, promoting self-directed learning. Digital learning applications can also be designed to appeal to learners' different perceptual channels, such as visual or auditory learning types.

Self-directed learning can also include the ability to re-watch video and audio recordings of a learning session via on-demand streaming to review content that was not initially understood. Again, technology can be a valuable supplement to classroom instruction. Integrating certain technical features can also allow instructors to see which sections of the lecture have been replayed particularly often. This gives instructors insight into where most of the learning difficulties lie, as Liv Gjestvang and Raechelle Clemmons illustrate. To further support instructors, Alexandros Papaspyridis and Jasen LaGreca propose using artificial intelligence-based chatbots that provide automated responses to learners, which would in turn indicate the content that instructors should reteach.

54 — Hesse, F. (2022, May 12). Schlagworte reichen nicht. *Frankfurter Allgemeine Zeitung*, 6.

Individualization does not equate to reduced communication between teachers and learners and between learners and learners. Therefore, even in a digitized higher education landscape, any form of teaching that requires active student participation should be encouraged. Communication and interaction are also important for mental health. Just as technology can be used to filter out learning deficits in learners, it can help identify learners whose mental health is compromised. Mobile apps can then direct them to appropriate support options and refer them to in-person therapy services. This is what Liv Gjestvang and Raechelle Clemmons see as one of the most important benefits of digital technologies for higher education. As Lauren Herckis and Anne Leiser point out, mental health limitations significantly disrupt education, so inequalities among learners can quickly widen. In the new campus vision, higher education should prioritize teaching and learners' needs, which include mental health and well-being.

Individualization, in the vision of the new higher education, also means that learners can engage with and learn extracurricular competencies that strengthen their character. Extracurricular competencies, such as social skills, are important for later career success. Employers and HEIs often believe that graduates lack these essential skills (see Liv Gjestvang and Raechelle Clemmons, Dagmar Willems and Alexander Knoth, Yasmin Djabarian and Kevin Saukel, and Andrew S. Rosen, among others).

4. Sustainability

Learning outcomes and successes are lasting and sustained because they result from a learning process that is tailored to the learner. In addition, learning is consolidated through a shift from traditional teaching methods to interactively designed formats that increase student satisfaction and improve learning outcomes.

Increased student engagement can occur through, for example, internships, exchange programs, learning communities, ePortfolios, and theses, among other HIPs. In their article, Liv Gjestvang and Raechelle Clemmons argue for integrating these practices further into everyday teaching and learning. HIPs aim to achieve better learning outcomes through learner interaction and engagement. They provide opportunities to integrate existing educational practices into new modalities that improve workforce readiness and lead to higher retention and completion rates in higher education.

Another example of student engagement is the flipped classroom model (see the interview with Matthias Kleiner and Subra Suresh), in which learners apply knowledge by preparing for class independently and then engaging with the content together. Active content engagement strengthens both in-school and out-of-school skills that are relevant to employability today. These include verbal expression, social empathy, and critical thinking. A prerequisite for the flipped classroom model is advance access to the learning content to be discussed. This can be done effectively through online platforms, which in turn helps learners develop digital literacy skills.

To improve teaching and learning outcomes, the latest technologies, such as 3D printing and virtual reality, can also be used in higher education. Using the example of organ printing with a 3D printer, Matthias Kleiner and Subra Suresh show how prospective medical students can learn about the structures of human and animal bodies without having to deal with ethical issues and the limited availability of organs. This process could also be used in other disciplines, such as art. Collections of valuable forensic finds and unique historical specimens, such as those from

museum collections, can also be duplicated for research and learning purposes. Virtual reality offers direct, hands-on interaction with bodies of work from learners' courses of study.

In addition, Matthias Kleiner and Subra Suresh explain how digital higher education can contribute to achieving SDGs. Whether in digital, hybrid, or face-to-face formats, combining their benefits leads to a higher education experience that offers quality education, fewer inequalities, and contributes to economic, social, and climate stability.

A sustainable, positive long-term effect on learners' future lives should also go hand in hand with the international recognition of their certificates and degrees, as Dagmar Willems and Alexander Knoth point out. Ideally, these should reflect the learners' individual learning paths.

After all, an essential task of higher education is to prepare learners for their future workplaces. In addition to mobility programs, international digital internships or virtual matchmaking and virtual career fairs can be implemented. More joint study programs between international partners are also conceivable, as Andrew S. Rosen reports. This would strengthen intercultural exchange and the international application of theory to practice, ultimately increasing work readiness.

5. Quality of teaching

The last, but perhaps most important dimension of the vision of digitized higher education is the quality of teaching. This is significantly related to its sustainability. Although many of the proven teaching methods such as short lectures, active learner participation, discussion groups, and other formats (see Andrew S. Rosen) have been shown to increase student satisfaction in the digital space as well, we cannot assume that every pedagogical approach to face-to-face teaching is transferable to the digital space. Moreover, the point is not to digitize higher education for the sake of digitization but to use digital tools efficiently and effectively to support teaching and learning as needed. This conscious decision-making can also draw on the sciences of learning and motivation according to the principle of "learning engineering."[55] Lauren Herckis and Anne Leiser emphasize, in their article, the extent to which HEIs' goals, strategies, and contextual factors influence their digital transformation processes, resulting in varying degrees and forms of digitization in higher education.

The conditions for data-driven and demand-driven digital transformation must be created at the institutional level. To this end, institutions' strategies and digital transformation goals must be formulated and communicated to all relevant stakeholders. The management of the institution is essentially responsible for this step. Two challenges arise for the teaching staff. The need for appropriate digital skills has already been discussed above. Second, they need support and training in how and which pedagogical approaches can be transferred to the digitized education being developed and which must be learned anew. In addition to such institutionalized offerings, HEIs should work, especially at the middle management level, to ensure that teachers exchange experiences about their best practices in the informal innovation hubs that Melissa Laufer, Bronwen Deacon, and Len Ole Schäfer describe.

55 — Meng, G. & Epstein, B. (2022). What edtech can learn from covid vaccines. *EdSurge*. Retrieved from https://www.edsurge.com/news/2022-04-19-what-edtech-can-learn-from-covid-vaccines