Austrian Council
for Research and Technology Development (ed.)

Prospects and Future Tasks of Universities

Authors:

Hannes Androsch, Bilal Barakat, Gerald Bast,
Mats Benner, Günther Burkert, Jörg Dräger,
Daniel Fallon, Ulrike Felt, Max Fochler,
Julius David Friedrich, Johannes Gadner,
Anton Graschopf, Anita Gufler,
Markus Hengstschläger, Thomas Henzinger,
Bettina Hölker, Helmut Holzinger, Dieter Imboden,
Wolfgang Knoll, Wilhelm Krull, Gertraud Leimüller,
Dieter Lenzen, Antonio Loprieno, Wolfgang Lutz,
Lisa Mordhorst, Ruth Müller, Ulrich Müller,
Helga Nowotny, Hans Pechar, Elmar Pichl,
Wolfgang Rohe, Sylvia Schwaag Serger, Peter Scott,
Klara Sekanina, Sascha Spoun, Michael Stampfer,
Hans Sünkel, Antje Tepperwien, Marijk van der Wende,
Oliver Vitouch, Claudia von der Linden,
Sebastian Weiner, Barbara Weitgruber, Georg Winckler,
Martin Wirsing, Karl Wöber.

Austrian Council
for Research and Technology Development (ed.)

Prospects and Future Tasks of Universities

Digitalization – Internationalization – Differentiation

LIT

Project management: Anton Graschopf

Austrian Council for Research and Technology Development
http://www.rat-fte.at/
office@rat-fte.at

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available on the Internet at http://dnb.d-nb.de.

ISBN 978-3-643-90937-4 (hc.)
ISBN 978-3-643-95937-9 (PDF)

A catalogue record for this book is available from the British Library

Klosbachstr. 107
CH-8032 Zürich
Tel. +41 (0) 44-251 75 05
E-Mail: zuerich@lit-verlag.ch http://www.lit-verlag.ch
Distribution:
In the UK: Global Book Marketing, e-mail: mo@centralbooks.com
In North America: International Specialized Book Services, e-mail: orders@isbs.com
In Germany: LIT Verlag Fresnostr. 2, D-48159 Münster
Tel. +49 (0) 2 51-620 32 22, Fax +49 (0) 2 51-922 60 99, e-mail: vertrieb@lit-verlag.de
In Austria: Medienlogistik Pichler-ÖBZ, e-mail: mlo@medien-logistik.at
e-books are available at www.litwebshop.de

CONTENTS

17.

Higher Education Institutions Need Strategies for the Digital Age

Dr. Jörg Dräger, Julius-David Friedrich, Lisa Mordhorst, Ulrich Müller, Ronny Röwert

CHE Centre for Higher Education (Centrum für Hochschulentwicklung)

Abstract

Digitalization is changing our higher education institutions – a transition that needs to be shaped. Higher education teaching and learning would particularly benefit from comprehensive use of digitalization. Nevertheless, most German higher education institutions are far from adopting a strategic approach. It is now time for higher education leaders to assume responsibility for developing strategies for the digital age. To this end, we analyze two approaches. Digitalization can contribute to modernization, for example, by helping an institution to overcome existing challenges such as an increasingly heterogeneous student body. Going further, higher education institutions could also use digitalization to enhance their profiles and link it closely to a specific institutional identity. Using national and international case studies, we depict various options for enhancing one's profile, some of which are only made possible through digitalization.

Strategies of higher education institutions and digitalization

Digitalization is shaping society and higher education institutions

The CD collection? It has long since been replaced by music streaming services. Online shopping and online banking have likewise become routine for many people. Car-sharing services enable finding and booking nearby rental cars via mobile apps, and they can now be found in almost every large city. New opportunities are also being opened up within the field of medicine: in the past, doctors could only rely on their own knowledge and the corresponding scientific literature for diagnoses and decisions about treatment. Nowadays, thanks to artificial intelligence technology such as "Dr. Watson," it is possible to evaluate a wide range of research-based data to find the evidence-based information relevant for treatment. Digitalization involves changes in almost all aspects of society.

The formative effects of digitalization also become evident in higher education institutions. Digitalization is affecting higher education institutions as a whole, result-

ing in consequences for the three academic missions (teaching, research and "third mission"[1]) as well as for administration.

- *Teaching* can benefit considerably from digitalization: With digital technologies, learning paths and learning pace can be tailored to the individual needs and abilities of each student. Re-using content (e.g., in the form of videos) allows teachers to intensify the individual mentoring of students and to discuss the contents of the previously shared learning videos in lectures or seminars. The technology does not replace teachers; instead, it changes their role from conveyer of knowledge to mentor for learning.

  Additionally, online teamwork opens up new didactic possibilities. Online learning communities can collaborate independent of location and without additional teachers. Online teamwork makes it possible to facilitate learning in intercultural or transcultural groups, for example, for people who are not able to participate in an exchange program ("virtual mobility"). Furthermore, creative experimentation in multi-media laboratories allows for re-creation of real situations that would, for example, otherwise be very expensive to set up or even dangerous.
- In the field of academic *research*, new opportunities arise not only in research itself but also in the exchange between academics. Employing "big data" can fundamentally alter the approaches to research. In the past, research data was collected for a particular question and evaluated with the goal of answering that question. Using large data sets for research allows for a diametrical approach. Now, posing the question can in some cases follow a discovery. Data sets can be evaluated in their entirety, rather than just as statistical samples. Researchers can discover patterns that, due to their rough granularity, had previously remained undetected. Connections are being uncovered, and even without particular research questions correlations become visible.

  Furthermore, digitalization enables new forms of exchange. Digital communication technologies simplify networking among researchers around the world. Virtual research groups can work together using cloud services and video conferencing for quick exchanges, thus avoiding time-consuming business trips.
- In terms of the *third mission*, digital media can facilitate easy exchanges with external actors, for example, for the purpose of effective public dissemination of research results. Open educational resources and open access research databases can be used for wide-ranging public access to academic education and academic knowledge. Furthermore, higher education institutions help shape the change of society by digitalization as a part of their portfolio.

[1] "Third mission" entails those activities (including research findings and their consequences) of higher education institutions that have direct effects on society and the economy, as well as currents from society and the economy that, in turn, shape higher education institutions. Third mission is thus characterized by interaction and can also be described as "transfer of ideas, knowledge and technology" (Innovative Hochschule 2016). It requires recourse to research and/or teaching but goes beyond them. Ideally, third mission contributes to the development of society (E3M-Project 2012; Roessler, Duong & Hachmeister 2015; Henke, Pasternack & Schmid 2016).

- With regard to the *administration* of higher education institutions, the use of campus management systems, apps and databases simplifies administrative and service processes. Enrolment and renewal of matriculation can be done by students themselves via the campus management system; certified transcripts can be ordered independently. Using a mobile app, students can check the menu of the cafeteria or organize their library accounts. Digital systems for administering alumni relations and separate online platforms for alumni exchanges are increasingly in use. These software solutions simplify the administrative side of student support.

Higher education institutions should use digitalization strategically

Higher education institutions operate in a segment of society that is being lastingly shaped and changed by digitalization. They, themselves, are part of this change. However, these processes of change are not taking place strategically in many German higher education institutions, especially in the area of teaching. Higher education institutions could proactively make use of digitalization in exactly this core activity.

Digital learning formats are only selectively becoming part of teaching in German institutions of higher education. This was shown in the Centre for Higher Education (CHE) study "Students' Perspectives on Learning with Digital Media" ("Lernen mit digitalen Medien aus Studierendenperspektive," Persike & Friedrich 2016), which was prepared in the framework of the *Higher Education Forum on Digitalization*. Only one out of five students use the complete spectrum of digital media, such as learning games and social communications tools, for educational purposes. If digital media were an obligatory part of the learning process, it is more likely that they would actually be used (ibid.).

Currently, positive examples of the use of digital media in teaching scenarios can mostly be traced back to the engagement of individual instructors. Digitalization is seldom a part of a comprehensive and institutionalized strategy for higher education; it rarely truly shapes the everyday life of students. In this sense, digitalization of teaching continues to have a limited effect on German higher education institutions, and much potential remains unused. With the engagement of individual professors, partial enrichment of teaching by use of digital media is possible, but nothing more.

Management of higher education institutions must strategically embed digitalization

If digitalization is to be used for the development of higher education institutions, an overarching strategy is needed. If instructors adopt methods for using digital media individually and without centralized support, direction and coordination, the process of digitalizing higher education will become a laborious and disconnected endeavor. For that reason, a new approach is necessary. Higher education leadership must proactively shape the change process brought about by digitalization and ensure strategic orientation for the entire institution.

In terms of the origination and implementation of a higher education strategy for the digital age, it is not only a matter of building an appropriate digital infrastructure (e.g., institutional networks with sufficient server capacities and comprehensive access to Wi-Fi[2]), but also a matter of shaping the profiles of the three missions (teaching, research and third mission), of adapting the organizational structure and culture – including comprehensive professional education for staff, and of "carving" strategic decisions "in stone" (for example, if the teaching method of "inverted classrooms"[3] becomes a common practice, large lecture halls will become less important.)

Of course, higher education institutions depend on engaged professors – but decentralized activities that are part of a bigger picture that interlinks activities and defines both common goals and an agreed-upon approach, have a very different effect compared with the detached initiatives of some individuals. Higher education leaders need to put digitalization in the service of the overall institutional strategy as best as possible – that is, to think about how the individual parts fit together and how to set up a suitable framework to bring about an overall institutional structure. Such a process, like every change management process, can only succeed if all actors, higher education leaders, students, and staff alike work together constructively and with full participation.

Higher education leaders face the challenge of tying loosen threads apart to develop and implement a suitable overall approach. In short, a strategy for the digital age is needed, not just a digital strategy. A strategy of this sort must also meet the minimal standards at the process level, for instance, a systematic SWOT analysis as the foundation and objective grounding for such considerations is indispensable. The formation of the strategy and the definition of goals should also not be imposed top-down, as a lack of acceptance would certainly follow. Instead, a feedback process should be implemented, so that not only the expertise of the responsible vice president is noticed and taken into account, but also the know-how of experienced pioneers in the field of teaching, as well as the reticence of skeptics.

Implementation of the defined objectives also requires coordination of structures, processes and activities. A systematic implementation of the strategy must be built upon operational management, including incentive structures, for instance. Only by doing so will it be possible to bundle existing and planned individual measures and align them with the overall strategy that supports the institution's mission.

Fundamentally, higher education institutions can pursue two different paths in their strategic approach to digitalization. On the one hand, digitalization can be used for modernization. In this case, existing *challenges* will be addressed by adopting digital solution strategies. On the other hand, higher education institutions can deploy digitalization to shape their institutional profile – in this case, *institutional identity* will be directly linked to digital formats. In both cases the activities required for digitalization should be aligned with the institution's goals, even though the first approach

[2] For additional information on digital infrastructure see Thuy (2016).

[3] In this form of inverted learning, the transmission of information takes place outside of the lecture, for example, via videos that are made available for the students. Deepening that knowledge and exchanges about the material take place when students and teachers are physically present.

(modernization) is limited to systematic coordination and organization of digitalization's potential for solving problems. In the second case (shaping one's mission and profile), however, there is a close and prominent link between the institution's identity and digitalization. Digitalization contributes significantly to the implementation of the institution's mission; in part, it would not even be attainable without digitalization.

Addressing challenges: modernization via digitalization

The leadership level at many higher education institutions still sees digitalization itself as a challenge to be overcome. The opposite is the case. If properly integrated, the possibilities of digitalization can be used to master challenges that higher education institutions are confronted with anyway.

In concrete terms: A key challenge for higher education institutions is a student body that is continually increasing in size and is becoming ever more heterogeneous. In Germany, more than half of the cohort of a given birth year will enroll in higher education – it is becoming the normality (Dräger & Ziegele 2014). People who enroll are not only the traditional 19-year-old secondary school graduates but also persons with master craftsman certificates, single fathers, or female managers. A variety of educational biographies has replaced the "traditional" student. Higher education institutions have to adapt to this new diversity and adjust the system so that students who, for example, must cope with multiple burdens or who are first-generation students will be able to complete the course of study successfully. Among other measures, this requires low-threshold introductory classes and orientation courses, preventative measures aimed at reducing the drop-out rate, and early and effective vocational guidance. Digitalization opens up new opportunities in this area. There is considerable potential in personalizing courses of study, which can be simplified by digitalization. Personalized digital education options can be offered according to prior knowledge and personal needs, which either enables students to autonomously tailor an individual curriculum or allows institutions to provide guidance for students by creating pre-structured programs and learning units. The latter is particularly helpful for students who find it difficult to assess their own abilities or the requirements and the variety of offerings at higher education institutions. The problem of dropping out can partially be addressed if, instead of a single large examination at the end of the semester, digital means are used for continuous monitoring of learning progresses and direct feedback, consequently identifying knowledge gaps during the learning process and allowing for effective countermeasures in the course of the semester. Personalized learning or continuous assessments are unquestionably also possible in on-site teaching. However, as a result of the current large number of students, analog equivalents are hardly affordable. A professor can ensure personalized learning for a student group of 10, but this is impossible for 500 students. Methods such as the inverted classroom format can create opportunities for a more intensive exchange between professors and students.

Digital technologies are used in many fields, and they are not sparing higher education. As a result, it is not a matter of *whether* they will be applied, but rather *how* they can be applied sensibly for the benefit of all students. That means it is not an either-or question, digital or analog, but a matter of successful hybrid formats. It is long overdue that higher education institutions use the opportunities of digitalization purposefully and strategically to address current and future challenges proactively.

Digitalization can thus be understood and used as a means for modernizing teaching, research, third mission and higher education institutions' administration to successfully deal with the increasing heterogeneity of students, to manage the trend of academization and to provide individual support despite large numbers of students. Digitalization also contributes to modernization in terms of general technological measures such as infrastructure (Wi-Fi) that are (or should be) implemented in all higher education institutions as part of a "digital mainstreaming."

FOCUSING INSTITUTIONAL IDENTITY: SHAPING ONE'S MISSION AND PROFILE WITH DIGITALIZATION

Digitalization can be used for modernization in the sense of (better) mastering existing challenges. Going beyond that, however, higher education institutions can gain competitive advantages by using digitalization to sharpen their missions and profiles. Appropriate strategies for the digital age tie the institution's identity directly to its digital offerings. If, for example, continuing education is an area the institution chooses to focus on, it can be enhanced by digital courses and increase its reach significantly. While modernization through digitalization is compulsory, developing an institutional identity through digitalization is optional.

Higher education institutions can and should use the opportunities presented by digitalization to attain their desired profile and the portfolio of offerings that they are aiming for. Thus they can better reach the intended target groups and achieve the strategic development goals they have defined. This potential can only be realized if higher education institutions link digitalization to their strategy – that is, the achievement of their overarching goals and the means to achieve them. Consequently, as noted earlier, it is essential for university leaders to act as a driving force.

The following German and international examples show some options of how higher education institutions can shape their mission and profile in the area of teaching. The examples illustrate how the technological possibilities of digitalization can support various strategic directions. They also highlight possible unique selling points. The examples demonstrate how the digital components shape or will shape each institution's identity. This can take place both on an overarching institutional level and on the level of sub-units, such as individual faculties – as sub-units also represent and enhance the image of the institution as a whole. Furthermore, mission shaping is also conceivable as an effort across multiple institutions, for example in associations of higher education institutions. In all three categories, higher education leaders are responsible for setting up the necessary framework, for ensuring that the

activities related to digitalization are strategically embedded, and for ensuring the implementation of the institution's strategy by digitalization.

The options for shaping institutional identity overlap in part not only in the themes they address but also in how the technological means are used. Some courses of development, missions and profiles would simply not be possible without digitalization, while others are merely strengthened by digitalization. The list of strategic options is by no means exhaustive. The possibilities discussed are intended to serve as examples and as food for thought.[4]

Diversity-serving university

With nearly 42,000 students, the University of Duisburg-Essen is one of the ten largest universities in Germany. The university is situated in the middle of a region that is undergoing an immense structural change. The university's digitalization activities are linked to the goal of enabling "non-traditional" students to successfully complete their degrees. More than half of the students at the University in Duisburg-Essen are "educational climbers" – a higher share than at any other university in Germany (Universität Duisburg-Essen 2013). The young university defines itself as a higher education institution that serves diversity – including a Vice Rectorate for Diversity Management – and uses the technical possibilities of digitalization to meet these ends (ibid.).

Consequently, the university's development plan includes the target of implementing e-learning elements in each course of study by 2020 (Liebscher et al. 2015; Rektorat der Universität Duisburg-Essen 2015). The university's main approach is the development and establishment of blended-learning formats as a flexible solution for the key target group of students who, for non-academic reasons (e.g., family, profession) are not able to be present at all classroom meetings. By means of alternating phases of learning on-site and learning in digital learning environments, flexible formats are created to meet this demand while simultaneously reacting to the requirements that are relevant to the university's student body.

The financial support received from the *Qualitätspakt Lehre*[5] has been used to develop a technical infrastructure that enables the use of blended-learning approaches across the entire university (Universität Duisburg-Essen 2016). This includes, for example, the introduction of a system that allows for computer-assisted exercises and tests with direct evaluation of individually provided tasks as well as automated feedback (Goedicke 2016).

[4] It should be noted that the examples have been selected based on the organizations' external portrayal. These are purely conceptual examples, which are not based on empirical investigation. To what extent the self-representations of the institutions reflect the reality is beyond the scope of this paper.

[5] *Qualitätspakt Lehre* is a quality pact for teaching. This funding line by the German Federal Ministry of Education and Research, in cooperation with the states, aims to strengthen the role of teaching at universities and universities of applied science, as well as art and music colleges (BMBF 2017).

As part of an economics module, a lecture with more than 700 participants was extended by use of online tutorials, exercises and tests based on virtual feedback, as well as a Moodle course, enabling students to learn independent of place and time. The results of the project and the strategy process in general show that the use of e-learning formats can motivate students, promote successful courses of studies, and enhance the flexibility of studying (Berthold, Jorzik & Meyer-Guckel 2015).

CONTINUING-EDUCATION UNIVERSITY

The higher education consortium Virtual University of Applied Sciences (*Virtuelle Fachhochschule*) is a multi-state association of universities of applied sciences that offers accredited bachelor's and master's online study programs for professionals. The universities of applied sciences form a virtual network and have agreed upon common curricula, and examination and study regulations. Students can freely choose at which institution within the consortium they want to enroll and take their examinations. Online support and on-site seminars are both managed according to unified standards.

The virtual consortium offers flexible courses of study, particularly for the increasing group of professionals with limited time. In doing so, the increasing need for life-long learning in addition to a career is met alongside simultaneously enhanced demands ("industry 4.0", "knowledge society"). The universities participating in the program thus make the field of continuing education a more prominent part of their profile. Beyond the online study programs, the members of the consortium also offer their on-site students the opportunity to take modules from the range of online courses (idw 2001).

OPEN-ADMISSIONS UNIVERSITY

Arizona State University, with nearly 80,000 students and 300 study subjects, is the largest campus-based university in the United States. Its strategic goal, similar to the University of Duisburg-Essen, is to enable all students, including those from non-academic backgrounds, to complete their degree programs successfully. To meet its goal, Arizona State University starts at admissions. The university has introduced a far-reaching policy of openness: as part of its *Global Freshman Academy* any person anywhere in the world may participate in its introductory classes free of charge, with no admission tests or access restrictions. These classes are equivalent to the first year of college, and the credits are fully transferable to the regular courses of study. Final admission is determined by the students' achievement in the online courses. There is little risk for students; no tuition fees are due until after successful completion of the examinations, and the costs of less than $6,000 for the first year of study are moderate by American standards (Dräger & Müller-Eiselt 2015).

The University is not afraid of on-site studies being crowded out by the online offerings. Quite the contrary: the University expects the digital introductory year for

everyone to be positive marketing and attract new target groups, particularly "non-traditional" and international students (ibid.).

The guidance university

The increasingly heterogeneous student body has varying needs concerning teaching and learning. Digitalization of teaching makes it possible for the contents to be tailored to meet individual styles, spaces and goals in learning, as well as to give immediate feedback or to systematically use peer-learning elements.

In addition to personalization at the level of the individual contents of learning, analysis of student data also offers the possibility of recommending courses, or of finding indicators that point toward whether or not a student will pass a course. This is the approach taken by Austin Peay State University in Clarksville, Tennessee (ibid.). With its "Degree Compass", the University has created a system for course recommendations that offers suggestions for courses best matching the student's ability based on the student's previous performance, as well as on the results of fellow students in previous years. In this manner, the system recommends courses that the student is most likely to pass, and thus makes successful graduation more probable. This is both an opportunity and a risk. On the one hand, the risk of dropping out is minimized, but on the other hand, there is a risk that students will blindly rely on the recommendations and no longer follow their own interests.

Using appropriate systems allows for identification of students who are most likely to fail several courses and who are therefore at greater risk of dropping out. These at-risk students can, for example, benefit from student counselling to identify their individual difficulties and prevent dropping out at a later stage. Personalization as a means of shaping university's identity always entails the difficulty of maintaining a balance between protecting an individual's opportunities for personal development on the one hand and using the possibilities of big-data analysis to improve the probability of successfully completing a course of study on the other. At the same time, it is important to find means of utilizing student data that fit appropriately with the idea of data sovereignty[6].

Working within university consortia

While the collective action of the Virtual University of Applied Sciences (see CONTINUING-EDUCATION UNIVERSITY, above) primarily uses online study programs to create a flexible educational model, the Bavarian Virtual University *(Virtuelle Hochschule Bayern*), a consortium of Bavarian universities and universities of applied sciences, is taking a different approach. The multi-university platform enables on-site students enrolled at a Bavarian university to take part in the high-quality

[6] For a possible multi-dimensional approach to the subject, see "Rethinking Privacy Self-Management and Data Sovereignty in the Age of Big Data. Considerations for Future Policy Regimes in the United States and the European Union" (De Mooy 2017).

online courses offered by other universities free of charge and to have the credits transferred to their home institution. The development of courses is done collaboratively within the consortium. Following a two-step process, all universities within the consortium are invited to propose new courses. After the members have contractually agreed to recognize these courses, the consortium then decides which course production will be supported. With this approach, cross-university division of labor in terms of enlarging and extending the offerings of in-person courses is sensibly supported by digitalization. The appeal of higher education is also improved by course formats that are spatially and temporally flexible (Hochschulforum Digitalisierung 2016).

Online teaching consortia can also help to retain niche subjects, since not all courses have to take place at a particular university; instead, online courses can also be used by other universities.

THE SOCIALLY-ORIENTED UNIVERSITY

In order to enable public access to academic knowledge, the cross-university initiative Hamburg Open Online University develops online learning formats that are open to everyone. With this approach, the state's institutions of higher education are meeting the demand for open educational resources. Simultaneously, the initiative offers interested citizens the opportunity to take part in interdisciplinary project teams and contribute to the conception and creation of publications. Hamburg's six public higher education institutions aim to strengthen their profile as regionally networked actors. Simultaneously, they position themselves in the field of opening up higher education for new target groups. The initiative also strengthens the city of Hamburg in its role as a center of science and digitalization (Hamburger Zentrum für Universitäres Lehren und Lernen 2016). Such an initiative can also be connected to the third mission.

THE CREDENTIALING UNIVERSITY

An extreme case, for which there is not yet a comprehensive example in reality but which could nevertheless become possible with digital approaches, would be a purely credentialing university. An institution of this type would specialize in auditing skills gained informally online and transforming these into university credits, or to compile credits that were collected in online seminars of other universities to form a recognized university degree. Such an institution could develop flexible models that enable students to convert ECTS points which they already obtained, to accumulate them, or to gain credit for tested skills and bundle these into a university degree.

Such institutions of higher education would require neither their own professors nor their own campus. However, with this altered model of a university, personal interaction as a key element in the processes of learning and development would be lost. For that reason, it would likely be a niche model, which could only be used for particular target groups. For the majority of first-generation students this model of a purely credentialing university would not really be an option, because this target group, in

particular, benefits greatly from intensive personal, and in-person interactions with teachers and advisors on their path to successfully completing their degree.

This type of institution does not yet exist in Germany. Given the current state of German regulation of higher education, it would also not be realizable. However in other countries, it would be possible. In the United States, Western Governors University offers a mixture of credentialing and teaching skills. Existing skills can be recognized by examination. The additional skills needed for a degree can be gained in online courses (WGU 2016; Dräger & Müller Eiselt 2015).

A university specializing in digital teaching support

In addition shaping one's mission and profile via study programs, entirely new possibilities open up for a higher education institution to make a name for itself in offering support structures for digital teaching and learning. Teachers need technical and didactic support to implement digital teaching, and not all higher education institutions provide this kind of assistance and support. Organizations offering help with the production and pedagogical implementation of digital teaching could become another opportunity for shaping one's profile. A fully-owned subsidiary of the Lübeck University of Applied Sciences, "oncampus GmbH", has specialized in offering part-time online distance-learning study programs and online continuing education courses in Germany, as well as supporting instructors in creating these courses. In addition, the organization has introduced the opportunity for interested instructors to create MOOCs, which are then offered on the platform "mooin." At the end of some courses, it is possible to take an examination at partner institutions, meaning students can obtain ECTS points for these MOOCs (on campus 2016).

Conclusion

In a diverse higher education system, not all institutions will rely on digitalization to the same extent or in the same way – but in the medium term no higher education institution will be able to manage without them. Digitalization is changing higher education institutions. It enables them to handle existing challenges – and to find entirely new ways of reaching their development goals. While modernization by digitalization is certainly necessary, it is up to higher education institutions to go further and link digitalization closely to their institutional identity and use it to enhance their mission and profile.

Higher education institutions that understand more quickly and more convincingly than others how to utilize digitalization to serve their general strategy have a great opportunity to use the benefits of digitalization for their overarching goals. However, it is inevitable that some institutions will run into dead ends during this innovation process.

In the long term, advantages will accrue to higher education institutions that actively shape the process of transformation instead of just observing it passively. In

order to use digital media systematically and holistically, higher education institutions need strategies for the digital age. The conception and implementation of such a strategy cannot simply be delegated to special representatives for e-learning, to the directors of computing centers or to CIOs. Higher education leaders must promote the development and implementation of an adequate and stringent strategy, while cooperating with institutional stakeholders.

Last, but not least: The options for shaping one's institutional identity discussed above show a remarkable positive effect, when looked at as a whole. Through digitalization, teaching regains a place in the strategic focus of higher education institutions. The design of teaching was, for a long time, more the individual concern of professors and seldom consciously used as a means to shape the profile of higher education institutions. The reputation of an institution has mainly been determined by its research and in parts by the content of its course offerings, but not by its teaching methods. Higher education institutions such as Maastricht University with its problem-based learning, remain the exception (University Maastricht 2016). It is to be welcomed that digitalization and the related options to shape mission and profile contribute to a clear appreciation of teaching.

Table 1: Overview of options how to shape university's missions and profiles

PROFILE	PARAPHRASED KEY ASPECT OF THE PROFILE	EXAMPLE	PRIMARY TARGET GROUP	APPROACH
Diversity-serving university	"We carefully consider students' backgrounds and needs."	University of Duisburg-Essen	"Non-traditional" students	Flexible formats for studies, blended-learning approach in the breadth of courses of studies.
Continuing-education university	"We enable flexibly scheduled coursework."	Virtual University of Applied Sciences	Professionals	Mainly online study programs, a higher-education association reaches critical mass.
Open-admissions university	"Potential students obtain access to higher education on a trial basis without an entrance examination."	Arizona State University	People from non-academic backgrounds who are interested in university studies	Digital introductory year without limitations in access: entry-level classes are available free of charge, credits for online courses count towards a university degree (examination fees)
The guidance university	"We prevent dropping out and ensure successful studies."	Austin Peay State University	Prospective students who are success-oriented or risk-averse	Analysis of data to enhance students' academic success and orientation

Profile	Paraphrased key aspect of the profile	Example	Primary target group	Approach
Working within university consortia	"Whoever comes to us has access to an extensive set of program offerings."	Bavarian Virtual University	Students at member universities	Production of online courses (cooperation among member institutions) with mutual guarantee of recognition
The socially-oriented university	"Students, instructors and citizens learn from researching together."	Hamburg Open Online University	Members of society with interest in academic issues	Open, collaborative learning platform for all public higher education institutions in Hamburg
The credentialing university	"We certify your knowledge and your skills."	To date, no example exists in Germany. In the USA, first efforts have been made, e.g., at Western Governors University.	Students who have gained knowledge and skills (e.g., via online courses) but have no certification or formal degree	1.) Online examinations of previously acquired knowledge and skills, conversion into certificates that are recognized at the higher education institution 2.) Bundling of online course offerings (e.g., MOOCs) into structured curricula and recognized degrees
A university specializing in digital teaching support	"We support professors in implementing online courses."	oncampus GmbH	Professors and other instructors	Support structures for digital teaching

Bibliography

Berthold, C., Jorzik, B., & Meyer-Guckel, V. (2015). *Handbuch Studienerfolg.* Accessed on 28 October 2016 from http://www.stifterverband.de/pdf/handbuch_studienerfolg.pdf

BMBF (Ed.) (2017). Qualitätspakt Lehre. Accessed on 05 May 2017 from http://www.qualitaetspakt-lehre.de/

BMBF (Ed.) (2016). *Innovative Hochschule.* Accessed on 15 August 2016 from https://www.bmbf.de/de/innovative-hochschule-2866.html

De Mooy, Michelle (2017). Rethinking Privacy Self-Management and Data Sovereignty in the Age of Big Data. Considerations for Future Policy Regimes in the United States and the European Union. Accessed on 26 April 2017 from http://www.bertelsmann-stiftung.de/de/publikationen/publikation/did/rethinking-privacy-self-management-and-data-sovereignty-in-the-age-of-big-data/?tx_rsmbstpublications_pi2%5Bpage%5D=1&cHash=f7b78f0fb56ebbc4cdccde884361a11c

Dräger, J., & Müller-Eiselt, R. (2015). *Die digitale Bildungsrevolution – Der radikale Wandel des Lernens und wie wir ihn gestalten können.* Munich: Deutsche Verlags-Anstalt.

Dräger, J. & Ziegele, F. (2014). *Hochschulbildung wird zum Normalfall – Ein gesellschaftlicher Wandel und seine Folgen.* Accessed on 10 August 2016 from http://www.che.de/downloads/Hochschulbildung_wird_zum_Normalfall_2014.pdf

E3M-Projekt (2012). *Green Paper-Forstering and Measuring "Third Mission" in Higher Education Institutions.* Accessed on 10 August 2016 from http://www.e3mproject.eu/docs/Green%20paper-p .pdf

Goedicke, M. (2016). JACK – Ein automatisches Übungs- und Prüfungssystem. Accessed on 28 October 2016 from http://www.s3.uni-duisburg-essen.de/jack/

Hamburg Open Online University (2016). *Wie lernen wir in Zukunft?* Accessed on 18 October 2016 from http://www.hoou.de/p/konzept-hamburg-open-online-university-hoou/

Hamburger Zentrum für Universitäres Lehren und Lernen (HUL) (2016). *Hamburg Open Online University (HOOU)*. Accessed on 20 August 2016 from https://www.hul.uni-hamburg.de/schwerpunkte/digitalisierung-von-lehren-und-lernen/hoou.html

Henke, J., Pasternack, P., & Schmid, S. (2016). Third Mission von Hochschulen – Eine Definition. *Das Hochschulwesen*, pp. 16-22.

Hochschulforum Digitalisierung (2016). *"Auf Zusammenarbeit setzen!" – Paul Rühl von der Virtuellen Hochschule Bayern im Interview*. Accessed on 14 August 2016 from https://hochschulforumdigitalisierung.de/de/blog/paul-ruehl-virtuelle-hochschule-bayern-interview

idw (2001). *Hochschulverbund Virtuelle Fachhochschule (VFH)gegründet – Virtueller Campus für 28.000 Studierende*. Accessed on 29 July 2016 from https://idw-online.de/de/news33627

Liebscher, J., Petschenka, A., Gollan, H., Heinrich, S., Van Ackeren, I., & Schmid, S. (2015). E-Learning-Strategie an der Universität Duisburg-Essen – mehr als ein Artefakt? *ZFHE* (Vol. 10, Nr. 2), pp. 97-109.

on campus (2016). *Richtig studieren im Netz.* Accessed on 18 November 2016 from http://www.oncampus.de/partnerhochschulen.html

Persike, M., & Friedrich, J.-D. (2016). *Lernen mit digitalen Medien aus Studierendenperspektive. Sonderauswertungen aus dem CHE Hochschulranking für die deutschen Hochschulen.* Accessed on 27 October 2016 from http://www.che.de/downloads/HFD_AP_Nr_17_Lernen_mit_digitalen_Medien_aus_Studierendenperspektive.pdf

Rektorat der Universität Duisburg-Essen (Ed.). (2015). *Hochschulentwicklungsplan.* Accessed on 28 October 2016 von https://www.uni-due.de/imperia/md/content/webredaktion/2016/hochschulentwicklungsplan_2016-20.pdf

Roessler, I., Duong, S., & Hachmeister, C.-D. (2015). *Welche Missionen haben Hochschulen? Third Mission als Leistung der Fachhochschulen für die und mit der Gesellschaft.* Accessed on 10 August 2016 from http://www.che.de/downloads/CHE_AP_182_Third_Mission_an_Fachhochschulen.pdf

Thuy, P. (2016). *Finanzierung digitaler Lehre. Themengruppe "Governance & Policies" des Hochschulforums Digitalisierung.* Accessed on 27 October 2016 from https://hochschulforumdigitalisierung.de/sites/default/files/dateien/HFD_AP_Nr%2019_Finanzierung_digitaler_Lehre.pdf

Universität Duisburg-Essen (2013). *10 Jahre Universität Duisburg-Essen.* Duisburg: Der Rektor der Universität Duisburg-Essen. Accessed on 20 August 2016 from https://www.uni-due.de/imperia/md/content/webredaktion/2015/10-jahre-ude.pdf

Universität Duisburg-Essen (2016). *Diversity Management*. Accessed on 15 August 2016 from https://www.uni-due.de/de/universitaet/diversity_management.php

Universität Duisburg-Essen (2016). Ziele und Maßnahmen des Qualitätspakts-Lehre-Projekts. Accessed on 28 October 2016 from https://www.uni-due.de/bif/

University Maastricht (2016). Education. Small-scale and international. Accessed on 18 November 2016 from https://www.maastrichtuniversity.nl/education

Western Governors University (2016). A School Unlike Other Schools. Accessed on 27 December 2016 from http://www.wgu.edu/about_WGU/overview#

ZEIT (2015). *DIE ZEIT Nr. 48/2015, 26. November 2015*. Accessed on 15 August 2016 from http://www.zeit.de/2015/48/uni-duisburg-essen-ulrich-radtke-hochschulmanagement

Short Biographies

Jörg Dräger has been Executive Director of the Centre for Higher Education (CHE) since 2008; he is also a Member of the Executive Board of the Bertelsmann Stiftung. A PhD physicist, Dräger was Hamburg's (non-partisan) Senator for Science and Research from 2001 to 2008. His work focuses on education, integration and digitalization. At the CHE his chief interests have included higher education in the digital age, and university education becoming the norm.

Julius-David Friedrich leads the CHE project Higher Education Forum Digitalization 2020. Following his education in economics and the management of cultural and non-profit organizations at the University of Bielefeld and the Technical University of Kaiserslautern, he led the development of the Higher Education Forum Digitalization, together with the Stifterverband and the German Rectors' Conference. Key aspects of his work include higher education in the digital age and international rankings of institutions of higher education.

Lisa Mordhorst has been Advisor to the Executive Directors at CHE since 2016. She earned a B.A. in applied cultural studies and an M.A. in educational sciences, both from Leuphana University of Lüneburg. In addition to her work with the Executive Directors, she leads the project "Higher Education Manager of the Year". Key aspects of her work include higher education in the digital age and the development of higher education systems.

Ulrich Müller is Head of Policy Studies at CHE. He earned an M.A. in pedagogy, psychology and sociology at the University of Bonn. From 1998 to 2002 he worked on the staff of the Federal and State Commission for Educational Planning and Research Promotion in Bonn. Key aspects of his work include governing boards, student financing, student services, laws on higher education, and public management.

Ronny Röwert is an expert on the development of higher-education institutions, with special emphasis on questions of strategies for the digital age. In the Higher Education Forum Digitalization, which is supported by Germany's Federal Ministry for Education and Research, he directed the working group "Change Management and Organizational Development" for the CHE. Currently, he is responsible for German academic partnerships at Kiron Open Higher Education.

This report is originally published in German and has been translated into English.