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DISCUSSION PAPER

20 Theses on Digital Teaching and Learning in Higher Education

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The German Forum for Higher Education in the Digital Age

There is hardly any area in modern society that is not affected by technological change. Processes and structures in the realms of business, politics and science are being subjected to far-reaching changes or are beginning to open up to the potential offered by digitalisation. In Germany, there is a great need for clear communication about the potential of digitalising inventories of knowledge and research and teaching platforms, and about virtual learning environments, organising academic studies and supervising students.

As an independent national platform, the German Forum for Higher Education in the Digital Age provides the framework for discussing these questions. Between 2014 and 2016, some seventy experts worked for almost three years in a total of six expert groups on pressing questions relating to the digitalisation of higher education.

The six groups – New Business Models, Technologies & Lifelong Learning, Internationalisation & Marketing Strategies, Change Management & Organisational Development, Innovations in Teaching, Learning and Assessment, Curriculum Design & Quality and Governance & Policies – develop recommended courses of action for higher education institution administrations, teachers and political representatives. Parallel to this thematic work, the German Forum for Higher Education in the Digital Age is compiling outstanding real-life examples and reinforcing new and innovative initiatives.

The objective of the German Forum for Higher Education in the Digital Age is to develop practical action plans for everyday university life as well as strategic options for universities and policy-makers.

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DISCUSSION PAPER

20 Theses on Digital Teaching and Learning in Higher Education

For the Mid-term Conference of the German Forum for Higher Education in the Digital Age

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INTRODUCTION

How we obtain information, communicate and interact with each other, work and shop: Digital media is firmly entrenched in our everyday life. It is increasingly changing our social coexistence and has far-reaching effects on social, economic and political levels. At universities, the changes and challenges brought about by technological change are even more fundamental and structural in nature. According to this definition, the term "digitalisation" refers to more than the technical transfer of analogue information and behaviour patterns to a digital format. Rather, digitalisation represents a fundamental process of change that involves existing forms of disseminating knowledge and acquiring expertise, understanding of roles and organizational structures, and cooperation in and around universities as well as the political framework. This discussion paper draws attention to the potentials of technological change and digitalisation for higher education, but also to the challenges and the pressure to act that they pose for policy-makers, university administrators, professors and other members of staff, through descriptions of the state of affairs, trends and general recommendations or demands. It is apparent that the scope of technological change is not only limited to teaching, but has a far reaching impact on the entire university. In addition to creating digital teaching and learning activities, technically and academically, it is necessary for universities to critically examine digitalisation and the setting of a favourable political agenda.

Consequently, digital education cannot be considered separate from existing fundamental challenges in the higher education system. The increasing number of students and the corresponding diversity of these numbers are just as important as the slowly increasing mobility of foreign students and the somewhat higher college dropout rate among undergraduate students. The increasing demand for highly trained professionals and advanced level academic programs will require new solution models for the emerging demographic changes. In the wake of globalization universities in Germany are under more pressure from the competition to innovate even though core funding remains the same or is decreasing.

In this context digital education can exasperate existing challenges and aggravate naturally tense relationships, for example funding for universities. It also creates its own set of challenges, particularly with respect to the regulatory framework. At the same time digitalisation addresses many of the existing challenges and identifies potentially new solutions. Last but not least it offers new opportunities to further advance teaching and learning as well as the university as such. The effects and the dynamics of these changes, in particular with respect to urgent university policy design processes, will be addressed in the following theses.

The theses are the preliminary result of a joint effort of more than seventy experts from academia, science, business, civil society and policy-making. All experts collaborate in six expert groups of the "German Forum for Higher Education in the Digital Age," an initiative by the Stifterverband (a business community initiative advocating long-term improvement of the German education and research landscape), the HRK (German Rectors' Conference) and

the Centre for Higher Education (CHE), funded by the Federal Ministry of Education and Research (BMBF). The objective of the Forum is to examine the potentials and challenges of digital education and to develop specific action plans for universities and policy-makers. During the project, one of the main tasks of the Forum will be to address current changes and developments in digital education and unite key participants from the different fields of business, politics and academia in one comprehensive dialogue. The discussion paper serves as a foundation for this debate and encourages critical discussion and careful consideration of the current developments at German universities.

Furthermore, as the technological change triggers a dynamic process far beyond the borders of national educational systems, these results may also provide added value to higher education executives and policy stakeholders outside of Germany. Broad exchange and networking on an international level around new initiatives and innovative approaches, addressing what we called "The Digital Turn" in our midterm conference last autumn, will remain of high interest for the German Forum for Higher Education in the Digital Age; now and in the future. For this reason the "20 Theses on Digital Teaching and Learning in Higher Education" which were initially published in September 2015 have been slightly updated and translated into English.

ON THE RELATIONSHIP BETWEEN TECHNOLOGICAL CHANGE AND CURRENT DEVELOPMENTS IN HIGHER EDUCATION

1. *The* digital university does not exist. Technological changes trigger a new, comprehensive process of differentiation in the higher education system.

The German university landscape is characterized by great diversity and heterogeneity. A standardized method for the digitalisation of higher education teaching is hardly possible due to this level of variety. In addition, digital education requires that universities develop a more distinct profile than ever before. Digital teaching and learning resources and curriculum and course structures need to be tailored precisely to the needs of respective universities, target groups and cooperation partners. One example is the interaction of digital teaching and learning resources with classroom teaching, which can vary for each group of students. Whereas the right track for "traditional" students may consist of digital teaching and learning resources enhanced by classroom teaching, digital education predominantly offers "non-traditional" students new options for combining work and study or study and family. The process of transforming university teaching and learning can vary widely from university to university. However, enhanced differentiation through digital education can also open up new possibilities for positioning universities both within Germany and especially in the international higher education landscape.

2. Intense competition in the global higher education market requires universities to adopt a holistic communication and branding strategy.

Digital media increases the competition on the national and global level. Digital teaching and learning resources such as Massive Open Online Courses (MOOCs) or online Open Educational Resources (OER) not only draw attention to universities worldwide but also offer prospective students the opportunity to familiarize themselves with the programs offered by a university and establish initial contact with professors. These media also provide differentiation potential as a marketing instrument for the university - and are already being used as such worldwide. Especially small German universities, which so far could do little to position themselves on the cutting-edge of research in the international field of higher education, now find potential to develop a profile as an excellent provider of education through digital education resources. Furthermore, digital media generally offer new and enhanced ways to learn about course offerings and research activities of the university. University websites and social media channels are already the most widely used sources of information for prospective foreign students. Even though many German universities are still

lacking a target group-oriented international website for presenting course offerings and research activities, especially in the form of a multilingual information resource. Universities should use digital media to create a holistic marketing and communications strategy with programs aimed at specific target groups. This increases visibility on the national and international education market and leads to a better recruitment rate.

3. New target groups are reached through digital teaching and learning resources.

The utilization of digital teaching and learning resources aids higher education institutions in providing support to an increasingly diverse student body at the various stages of their academic career. Digital teaching and learning resources allow non-traditional students easier access to higher education, because they are more flexible regarding individual needs and wishes of students, different lifestyles, educational biographies and approach to academic study. Not only professionals but also students with family responsibilities and persons with disabilities can complete a more flexible (with respect to time and location) program of study through digital teaching and learning scenarios. This also applies to students from abroad, in particular from developing countries and from crisis regions, who, through flexible enrolment and digital resources, are supported during the preparation and implementation of their study program. Furthermore, new teaching and learning resources can be created digitally as demand for continuing education increases in the context of lifelong learning. It is important to note that academic success of non-traditional groups of students in virtual teaching and learning environments depends heavily on the accompanying resources available.

4. Digital teaching and learning resources promote international student mobility.

As part of the individualization and flexibility of academic studies, the use of digital teaching and learning resources promotes international mobility and allows students to integrate foreign travel more efficiently into their studies at a higher rate of success and a richer overall experience. This takes place on three levels: Through a clever combination of classroom and distance learning and digital exams, time spent abroad can be better integrated into the individual course of study, for example, in the case of overlapping semesters or for completing compulsory course work. This degree of flexibility could include "virtual mobility," by which study at a German university is possible without necessarily having to spend the entire academic period in Germany. Moreover, intercultural exchange through early networking with local students facilitates the integration of foreign students. Last but not least, the use of digital teaching and learning resources can increase the success of studying abroad. The dropout rates, in particular those of foreign undergraduate students in Germany, are significantly higher than those of German students. Intelligent digital assessment tests can help universities to optimize their selection processes for foreign students according to performance and individual ability. The intensive preparation of foreign students, which seeks not only to provide adequate prior knowledge, but also to

establish a bond with the university, professors and fellow students, can then help foreign students to complete their studies successfully.

5. Through the digitalisation of large parts of higher education, university personnel are confronted with changing roles and qualification profiles.

The roles and qualification profiles of students, professors and administrative staff are all influenced by the far-reaching impact of technological change. The new forms of collaborative work and student-centered learning require students to assume more responsibility for the learning process but also provide opportunities to help shape teaching. The role of the professor in digital teaching and learning scenarios can be characterized as an accompanying and enabling function during the learning process of the individual student rather than as a broadcaster of knowledge. Also, the responsibilities of lecturers today are divided between several people working in different areas who collectively shape teaching. Media scholars support the structural and academic design of teaching, programmers set up the technical infrastructure, teaching assistants can supervise groups of students and even students can evaluate the performance of their fellow students through controlled peer-reviews. In light of these new responsibilities and roles, advisory services will be required for the education and advanced training of professors and staff, as well as the development of personnel expertise for the design of digital teaching and learning resources at the universities.

6. New locations of academic teaching and learning are created.

The university is a place of academic teaching. Even the university library maintains its purpose as a key factor in the distribution of academic knowledge. New forms of academic teaching, learning and knowledge are being produced outside of universities through the omnipresence of information and knowledge in the digital domain. The recognition and demand for knowledge and skills acquired on learning platforms is increasing, in particular within the context of professional training. This development does not signal the end of the classical university education; however, students and applicants alike will continue to promote the formal recognition of non-university, non-formal and informal expertise and take advantage of alternative learning resources. The development of quality-assured certification processes would be a first step toward utilizing this new competitive advantage. If universities want to maintain their prominent position within society, an in-depth discussion will be required on how universities and certifying bodies can respond to these trends.

ON THE RELATIONSHIP BETWEEN TECHNOLOGICAL CHANGE AND ACADEMIC TEACHING

7. Innovations in digital teaching are not just technical innovations but rather academic, curricular, organisational and structural innovations.

The structures of teaching and the organisation of learning undergo fundamental change after they are digitalised. This is both a management task for the university administration as well as a demand to design specific courses and teaching-learning materials. New educational opportunities for communicating knowledge and expertise are developing. The current trend in education to digitise academic material is not enough. Also, the use of innovative media and technical infrastructure is only the "Enabler" of further development of teaching which is always measured by its usefulness. Innovations in academic, curricular, organizational and structural terms should provide real added value. Technical and educational developments are mutually dependent here: As part of the technical progress new academic questions are raised which in return encourage technical development. Therefore, universities should not only be concerned about promoting technical innovations, for example by developing their own apps and platforms. Rather, they should accelerate academic, organizational, structural and curricular developments and rely more on cooperations, existing infrastructure and applications.

8. Collaboration is the key to success in digital teaching and learning.

E-learning resources have been used extensively at German universities over the last two decades. However, far reaching changes in teaching are only emerging slowly. The key to improving and personalizing higher education is not to just shift teaching to digital platforms, but also to enable collaborative learning and new forms of cooperation between individuals and institutions. The development of teaching and learning methods through online based resources stimulates, motivates and enables individualized learning experiences, which could not be replicated in the classroom on this scale. Practical and/or research-related collaborations can be developed via digital platforms which enable students to cooperate on specific projects through virtual guest lectures, panel discussions, Q&A sessions, jointly produced materials and much more. Cooperation between professors at a national and international level can also be reshaped through the use of digital media: Professors can work together and prepare teaching and learning materials, such as videos or they can introduce their students to teaching units available online under a free license from world-renowned lecturers and discuss the topic in more detail in classroom seminars. This not only enhances the diversity and quality of teaching but also the cooperation of the participating scientists at institutions around the world. Through the use of digital media

such innovative forms of collaboration have the potential to reshape cooperation between institutions of higher education at the international level. The institutionalization of such collaboration between scientists often presents a challenge for university administrations within the legal framework of the respective country.

9. The use of digital media contributes to the improvement of higher education teaching.

The use of digital media enables more active and student-oriented teaching which in turn expands the range of assessment scenarios. By utilizing digital teaching and learning resources students have the option to learn at their own pace and to decide which learning media or platforms to use in the process. Study content can be adapted more easily to each student's situation and to changes in vocational and academic requirements. The use of audio-visual and interactive media permits more authentic teaching materials and assignments. Digital formats that are designed with cross-cultural interests in mind and which relate to an international context can also facilitate joint learning and cooperation among students from various regions of the world, thereby strengthening global citizenship. Digitally enhanced testing formats can be used in addition to pure performance evaluations to better reinforce and support the individual learning process of students. Digital media therefore offer a variety of ways to enhance and improve existing forms of classroom teaching. They promote the students' digital competency which, against the background of increasing influence of digital media and globalization on the job market, is a key requirement of higher education.

10. The comprehensive analysis of data opens up new ways of understanding teaching and learning processes.

The comprehensive collection and statistical evaluation of teaching and learning data recorded under the heading *Learning & Academic Analytics* provides a number of opportunities which go beyond the pure teaching and learning situation and also enable the intelligent interlinking of higher education teaching with higher education management. The systematic collection and analysis of accumulating data makes higher education more transparent and comparable. In-depth knowledge about teaching and learning processes can contribute to the improvement of teaching quality and study conditions. The future use of complex data analysis could provide immediate clues to the learning level of students and enable the rapid adjustment of courses, for example, if the majority of students are having difficulty with a particular subject matter or individual students are in danger of not passing the course. Therefore, the use of *Learning & Academic Analytics* would also help to better understand the reasons for student dropouts and counteract the failure to achieve learning goals early. It would simultaneously serve as feedback for professors and possibly supplement the largely subjective teaching evaluations. Consequently, taking advantage of these technical possibilities can facilitate the more efficient use of resources and has an impact on key areas of higher education management, such as personnel capacity planning. The main requirements are that existing and newly created rules of data protection are respected and that not only the collection of personal data takes place amicably and

transparently, but also the use of *Learning Analytics* is voluntary and provides a tangible added value for the students and professors. It should also not be forgotten that the quantitative as well as qualitative data analysis has its limits, especially when it comes to the acquisition of skills such as the ability to act in complex situations. Nevertheless *Learning & Academic Analytics* provide a variety of options that previously did not exist to meet the demand of researching teaching and learning processes, to improve their quality and to optimize higher education management.

11. Technological change not only creates new virtual learning environments but also alters existing physical learning environments.

The physical learning environment also changes with the partial relocation of the teaching and learning experience into the digital domain. The inclusion of new academic teaching and learning structures at universities - for example in university libraries - is still pending in many areas. Besides the need for technical equipment in lecture and seminar halls, these structures must be designed foremost to reflect new forms of cooperation in the classroom. The classical approach to the transfer of knowledge, as constituted by the traditional lecture hall for example, is replaced by a focus on the student, prioritizing the networked and collaborative creation of knowledge. Seminar halls that meet these requirements are not "forwardly" oriented for example, where a speaker talks or presents but rather equipped with group workstations from which different working-groups can learn and work together.

OVERCOMING BARRIERS IN DIGITAL EDUCATION TO INCREASE POTENTIAL

University structures

12. There is no shortage of digital teaching and learning innovations at universities but their structural and strategic advancement is deficient.

Generally speaking the structural conditions at universities are not unfavourable to the development of innovations in the field of digital media. The high degree of autonomy can promote innovation at the level of decentralized institutes and professorships. On the other hand, the weak connection between centralized units, departments and institutes holds back the advancement of university-wide innovation. Without a centralized infrastructure and staffing decisions innovations can often only take place in localized subsystems and therefore have no significant impact on studies and teaching at the university as a whole. The university management must adopt a generally positive stance toward digital education in their core areas if comprehensive digitalisation processes, which significantly affect professors and students, are to be successfully implemented. Universities are basically places of innovation in utilizing digital media for teaching. In addition to the allocation of adequate financial funding, the primary challenge lies in the structural and strategic advancement of digital teaching and learning resources within the university.

13. The integration of digital media in teaching and learning is a complex process of negotiation between different stakeholders within the universities.

Due to the structures described, Universities are "special" organizations. The freedom of research and teaching and the subsequently high degree of independence of professors are legally protected values in Germany and therefore must be preserved and respected. On the one hand innovative development in the field of digital media and its wide implementation depend largely on the lasting commitment of university executives and their ability to persuade deans and individual professors. On the other hand, university administrations must provide space for the constructive participation of the various stakeholders. The integration of students is also very important for the successful establishment of digital media in teaching and learning, since students not only contribute to the improvement and development of digital resources but actively demand them, if they are given the opportunity to do so. Moreover, it is beneficial to look at how the various internal university levels interact with each other: the individual level of each professor, the study program level, and the level of the higher education institution as a whole. Crucial to the success of a

particular innovation is the mutual support of the three levels: this is the only way "momentum" or a self-sustaining impetus for action can evolve.

14. Not financial resources but the university's strategy ultimately determines whether the digitalisation process will succeed or fail.

When comparing different universities with similar resource endowments it appears that the financial resources of the university, although generally required, are not an absolute condition for the successful integration of digital media in teaching and learning. Crucial for the intended purpose, process and speed at which digital education is introduced, appears to be whether the media contribute to strategic positioning in research, teaching, study and continuing education or whether their implementation is only for "modernisation" of work methods and organizational procedures. University management can only be expected to establish unique selling points or perform radical structural changes and support the professors and the administrative staff freely and with great commitment if the process is strategically relevant for positioning.

Financing

15. Digital education is costly and digital educational opportunities are limited in scalability. Additional investments are necessary and worthwhile because a diverse range of returns can be expected.

Technological change presents higher education with an added financial challenge. University administrations across the board have problems financing a technical infrastructure and providing the required staffing to create digital teaching and learning resources. Moreover, it has been found that after their initial creation digital teaching and learning resources cannot be reused as often and by any number of participants as was hoped for especially for MOOCs and the US education market. Rather, it became evident that firstly, the production of high-quality digital teaching and learning resources is expensive, secondly, online teaching formats require people working in the background who supervise, examine and evaluate, and thirdly, digital teaching and learning resources require regular revision and adaptation to different groups of participants. Therefore, digital education programs are not infinitely scalable without sustainable and adequate institutional, human and financial resources. However, government investments in this field are particularly worthwhile because they provide leverage for university modernisation programs that have been neglected for a long time and which are absolutely necessary for securing excellence beyond cutting-edge research.

16. Predominant third-party funding of digitalisation projects stands in the way of long-term establishment of digital media in teaching and learning.

The funding of digitalisation initiatives has a very high proportion of external project financing. This large degree of external funding not only has advantages; it also carries risks if primarily external objectives are pursued. This produces isolated projects that are not embedded in or promote the strategic development of higher education. This development is alarming particularly in light of stagnating core financing and increasing third-party funding of universities. Therefore it is important to set financial incentives for the sustainable and structurally-strategic establishment of digital teaching and learning formats at universities, for example by connecting digitalisation projects with reliable financing structures in target agreements.

17. Digitalisation enables universities to develop independent sources of funding through new business models.

Lifelong learning has become a central issue in an aging and especially fast-paced digital society. The individualization and flexibility that digital teaching and learning resources offer participants to integrate continuing education methods into their professional life are likely to increase demand. Stagnant core financing and the disadvantages of increasing third-party funding of digitalisation initiatives promote the development of other business models which allow universities to gain a certain degree of independence. In particular, utilizing digital teaching and learning resources in continuing education can create additional sources of income even though in practice legal and competitive hurdles still have to be overcome.

Regulatory framework

18. The absence of a regulatory framework exacerbates the lack of advancement of digital teaching and learning resources at universities. Nevertheless, there are already solutions for many of the legal challenges.

Although individual professors and universities have already ventured into the creation of digital teaching and learning resources, there is still a large degree of uncertainty, in particular with respect to the regulatory framework of digital teaching. In addition, the German federal education policy creates disparity between laws that govern state universities and teaching regulations, as well as between individual universities regarding potential instruments for the promotion and recognition of digital higher education. The degree to which digital teaching and learning resources are attributed to the workload of the professor and the option to conduct tests or digital copyright-related issues during the creation or use of teaching and learning materials, are usually not regulated or improperly communicated. This is exacerbated by the fact that widespread support of digital teaching and learning resources still does not take place at many German universities and a general strategy concerning the topic of digital media on a broad basis has not been formed. On the one hand the appropriate regulatory framework has yet to be created for new issues. On the other hand universities should utilize the regulatory framework that already exists. Often individual universities have developed solutions for specific challenges thereby identifying the opportunities that exist within the present regulatory framework. This applies for example to the allocation of ECTS points for open and free teaching and learning resources or the contractual regulation of the rights to use digital teaching and learning resources, provided that they have been created with the technical and organizational support of the university. Very few legal challenges arise concerning the creation and use of digital teaching and learning resources within the framework of existing course work and the basic teaching obligations of professors with respect to students already enrolled. However, a new regulatory framework must be created for those processes which are intrinsically different from the existing production processes of teaching, such as the collaborative creation of open and free teaching and learning resources by several professors at various universities and, if necessary, from different countries. This is especially true with regard to copyright, the capacity rights and the allocation of production costs between several participating universities, but also for the creation of so-called Open Educational Resources (OER) and the use of foreign material ("Works"), which are accessible to both enrolled and non-enrolled students. Only a large degree of legal certainty and a corresponding system of incentives for professors will strategically advance the digitalisation of higher education.

19. The potential of digital media in teaching can only be fully exploited if the existing data protection laws are revised.

Currently the level of awareness at German universities of the potential of using comprehensive data analyses for academic and institutional development is very low. Although access to much of the data is governed by strict legal and institutional regulations, the technical progress of legislation is ahead of its time. In addition, the institutions have still not been able to meet staffing needs or the professional expertise required in this area and data protection issues may be handled differently. A single person in charge of data protection is no longer enough for dealing with issues that are becoming increasingly more complex. At the same time the use of *Learning and Academic Analytics* offers enormous opportunities for the exploration of teaching and learning and their qualitative and academic development. On the one hand, existing reservations and uncertainty on the part of academics and on the other hand the lack of clear rules governing the use of data prevent the realization of this potential. Participants must always be aware of the type of data that will be collected and how it will be processed. Consensual and transparent rules regarding the collection, anonymization, evaluation and deletion of individual data must be made. Furthermore, a broader regulatory framework for the subsequent use and recovery of data as well as the exclusion of possible misuse of data must be created. Business models, which maintain data indefinitely for undefined or unforeseeable purposes must be rejected due to the particular sensitivity of data in the education field.

20. Copyright reform would allow professors and students to develop teaching materials on a timely basis that can also be used and edited continuously.

The existing copyright law is still entangled in the analogue era which limits, because of long periods of protection and complex arrangements, creative and innovative scenarios for using freely available and accessible knowledge and teaching information. The federal government has announced an education and science-friendly copyright reform, which protects the interests of content producers and also enables the re-use of content in education and research. The introduction of a general *Education and Science Gateway* that would allow the free use of published works for the purpose of science and education would be an important prerequisite for the timely development of digital teaching and learning materials.

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ORIGIN OF THE DISCUSSION PAPER

The discussion paper is the preliminary result and the joint effort of the six expert groups of the German Forum for Higher Education in the Digital Age and was primarily coordinated by its office at the Stifterverband.

The six expert groups have been meeting regularly online and in person since the official kick-off date in May 2014. Implementing their action plans, initial studies and publications have been released and public workshops and events effectively conducted. Each expert group addressed their specific audience. The central task of the office is to coordinate the workflow of the various groups, to consolidate centrally the results of their work and to encourage exchange between the groups.

In order to present a collective preliminary result, the groups were asked halfway through the project to prepare theses on their respective subjects, outlining the development of the digitalisation of university teaching and also demonstrate the need for concrete action to policy-makers and universities. As a result the office has taken on a coordinating function. A comprehensive and coherent structure was formed based on these theses. Related topics were summarized, editorially revised and supplemented in some areas with more theses and explanations and provided with an introduction.

We thank all experts of the six groups who have contributed to the success of this comprehensive discussion paper. By proxy we thank the chairs of those groups.

Hans Pongratz, Executive Vice President of IT Systems and Services (CIO) of the Technical University of Munich, for the expert group "New Business Models, Technologies & Lifelong Learning"

Dr. Dorothea Rüland, Secretary General of the DAAD, for the expert group "Internationalisation & Marketing Strategies"

Prof. Dr. Wilfried Müller, Former Rector of the University of Bremen and University Manager of the Year 2012, for the expert group "Change Management & Organisational Development"

Prof. Dr. Jörn Loviscach, Faculty of Engineering Sciences and Mathematics, University of Applied Sciences Bielefeld, for the expert group "Innovations in Teaching, Learning and Assessment"

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20 THESES ON DIGITAL TEACHING AND LEARNING IN HIGHER EDUCATION

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