

1 Introduction to the Book: The Digital Turn in Higher Education Multi-Disciplinary and International Perspectives

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Digitalization is affecting our world and thus our individual lives to an increasing extent. We may envisage a digital turn leading from the book-based Gutenberg Galaxy to the 'internet-based' Digital Age. This ongoing change affects the academic field as well as all other parts of society. Not only research and knowledge communication but also teaching and learning in higher education are increasingly 'going online'.

The digitalization process alters the media upon which learning processes are founded. In higher education, digitalization permits decentralized, action- and product-orientated teaching and learning. To implement this kind of modern, digitally based learning, it is essential to develop scientifically grounded approaches to teaching and learning in a digitalized world. This challenge requires suitable theoretical, epistemological and ethical foundations as well as practice-oriented methods.

Alongside such possibilities, digitalization also presents a challenge for higher education. One objective of modern higher education is to ensure that students acquire the media skills they need for professional life in the Digital Age. Apart from the harmonization of Europe's higher education, the employability of students is a major concern of the Bologna Process. The harmonization process itself requires an international and interdisciplinary discourse on changes in higher education at the dawn of the Digital Age.

This discourse necessitates critical thinking – an essential feature of any scientific perspective on the world. Drawing on Derrida's concept of an unconditional university, the university can be understood as a space in which to reflect on digitalization and its effects on society. From this perspective, universities could provide the discursive space for analyzing the societal impacts of digitalization and discussing the ethical dimension of changing media. Consequently, the university may be expected not only to react to digitalization but also to become an actor in its own right.

As a forum for scientific, critical thinking, universities also represent a space for innovation. Higher education can itself play a key role as a driver of innovation. Learning scenarios implemented and evaluated in higher education can become best practice examples to be adapted for the professional world.

It is clear that digitalization challenges higher education on multiple levels. One aim of this book is to address the challenge by providing a multi-disciplinary, international perspective on higher education during the digital turn. It therefore presents epistemological, ethical and theoretical approaches, and best practice examples, from universities in different countries (Poland, Denmark, France, Germany and the USA) using different learning strategies (including problem-based learning, mobile learning, heutagogy, and inquiry-based learning). The book can be understood as an international and interdisciplinary collection providing heuristic strategies for handling the digitalization of higher education in theory and in practice.

Individual contributions are introduced below.

I The Digital Turn in Theory – Theoretical Reflections on Higher Education in the Digital Age

This chapter presents contributions which reflect on different disciplinary approaches to changing media in higher education.

The 'digital turn' can be defined in two ways: as an analytical tool to discuss the digitalization process affecting society, and as a description of the digitalization process itself. Media change in the academic sector imposes new demands on higher education. According to the objectives of the Bologna Accord, higher education must ensure students' employability in the professional world. But, at the same time, the university is a space for critical reflection on the impact of digitalization. Birte Heidkamp and David Kergel discuss in their article "*The Digital Turn in Higher Education – Towards a Remix Culture and Collaborative Authorship*" the ambivalent position which higher education occupies as a result, and advocate an approach which fosters critical thinking and modern project management simultaneously by harnessing the collaborative potential of digital media.

In his article "*The Return of the One. Some Perspectives on the Analog and the Digital and their Uses and Abuses in Education*" Tadeusz Rachwal addresses theoretical and epistemological issues related to what has been termed 'digital turn' with an eye on the shift from the analog to the digital communication and the postulated division into two realities (actual and virtual). This division is approached in the text from the perspective of its broad consequences for education not only as regards the use of digital media in teaching and learning, but also as a new possibility of revising the relationship between man and technology and as a potentially effective means of rethinking the binary/dual cognitive ordering of various categorizations of the real, which ordering, especially as regards higher levels of education, need not be taken for granted. Bringing in the post-philosophical ideas of, among others, Francois Laruelle, the paper considers the coming of the dual to visibility through digitization as a possibility of critical bringing alternative ways of thinking to the educational agenda as a possible effect of the digitalization of the social/cultural milieu by way of what may be called a return of the One which encompasses all kinds of pluralities, and not only the ones decisionally enabled by binary oppositions. The digital turn, as Rachwal claims in the paper, may also be thought of in terms of an educational turn in which technology is not only used as tool, but which may also be constitutive of students' less externally oriented self-consciousness.

Birte Heidkamp & David Kergel reconstruct the development of E-Learning in German higher education. In their article "*From E-Learning to eBologna in an Augmented Reality – The Past and the Future of E-Learning in German Higher Education*" the authors trace E-Learning from the end of the 1990s up to the current perspective of an eBologna, which is defined by a European-wide international mobile learning. In this context digital media are not part of an 'E-Learning' as distinguished from an 'analog learning.' Rather, mobile learning uses the ubiquity of the internet as an additional media dimension through which we can perceive the world and which opens up new learning worlds. The polydirectional and collaborative features of digital media could be used, to establish an European-wide international co-teaching and co-learning in higher education.

David Kergel discusses in "*The Postmodern Dialogue and the Ethics of Digital Based Learning*" the ethical implications of digital based learning. Starting point is a postmodern understanding of communication and the dialogue as idealimage of postmodern

communication. The dialogue can be considered as postmodern ethics in communicative practice. Such a communicative practice is defined by a decentral and polydirectional dimension of communication. Web 2.0 tools provide the media-landscape to realize a digital based postmodern dialogue. Formulated the other way round: the media-landscape of Web 2.0 tools bears ethical implications: The polydirectional and decentral structure of Web 2.0 media enable a postmodern dialogue – one might speak of the ethical implications of Web 2.0 tools. Consequently, E-Learning 2.0 which bases on Web 2.0 tools bears ethical implications. For the E-Learning practice, one challenge is, to transfer such theoretical reflections into learning-scenarios, which meet the requirements of a postmodern dialogue. As a proposal for such an transfer from theory-to-practice, a best practice example for a Web 2.0 based learning-scenario is provided.

II How to do the Digital Turn? Methodical and methodological Approaches for Higher Education in the Digital Age

This chapter collects contributions which outline strategies for implementing innovative, digitally based methods in higher education.

Claudia De Witt and Christina Gloerfeld introduce in their article *“Mobile Learning and Higher Education”* the concept of mobile learning to higher education. Drawing on Schrock’s analysis of apps, which in turn refers to Bloom’s taxonomy of learning, the authors provide analytical strategies for unlocking the didactic potential of apps in mobile learning scenarios. Subsequently, de Witt and Gloerfeld analyze the actual implementation of mobile learning in higher education. The mobile learning offerings of nine top universities are compared for this purpose. One main finding is that “universities lack behind developing scalable didactical concepts for mobile learning”. But universities increasingly “transfer e-learning solutions or prolong face-to-face learning scenarios to mobile devices.” A full-scale shift has yet to take place, but seems inevitable in view of the ongoing evolution of media and the increasing ubiquity of the mobile internet.

Dirk Jahn and Allesandra Kenner introduce in their article *“Critical Thinking in Higher Education: How to foster it using Digital Media”* the concept of critical thinking which is, not least, an explicit priority of the Bologna Accord. Critical thinking can be viewed as a basic skill for researchers, especially in times of an increasing media change. The authors provide a systematically grounded approach to implement critical thinking in higher education. For this purpose, they discuss the need for critical thinking in the context of digital literacy and provide strategies to foster critical thinking and a modern, participative use of digital media in higher education. These strategies open up possibilities for the digitally supported implementation of appropriate participative teaching and learning strategies in higher education.

In their article *“Inquiry-Based Learning 2.0 – A Didactic Framework for Inquiry-Based Learning with Digital Media”* introduce the concept of a inquiry-based learning 2.0. Inquiry-based learning 2.0 combines elements of contemporary E-Learning (i.e. E-Learning 2.0) with elements of inquiry-based learning. To facilitate a systematic implementation of inquiry-based learning 2.0 strategies in higher education, a so-called didactic framework for inquiry-based learning with digital media has been developed. This article introduces the framework, first providing a working definition for inquiry-based learning. It will then go on to introduce the didactic framework with reference to the working definition. As a further step, it will discuss

the concept of e-science/e-research. The didactic framework for inquiry-based learning with digital media emerges from these considerations.

Ronald Arnett provides in his article *“The Lecture as Testimony: In a Technological Age”* a semiotically oriented re-reading of the meaning of the lecture in the Digital Age. According to Arnett, the Digital Age facilitates a decontextualization of the lecture. The lecture can be consumed independently, outside a specific time and space. But despite these media-led changes, the lecture in the Digital Age is also a form of ‘testimony’ – it is “a public test of opinions, moving ideas from the private space of reading, writing, and self-talk to collective engagement.” In this sense the lecture could be the starting point of a dialogue: it is not a vehicle for content demanding passive listeners. Rather, the lecture as testimony “announces the interplay of content and commitment from the speaker that necessitates critical listening and discernment from attentive listeners”. In the Digital Age, the lecture can “invoke the local while influencing well beyond the moment of saying”.

In her article *“Self-determined Learning (Heutagogy) and Digital Media. Creating integrated Educational Environments for developing Lifelong Learning Skills”*, Lisa Blaschke introduces the learner-centered, theoretically based concept of heutagogy. Heutagogy is a form of self-determined learning which is defined by “the key principles of learner agency, self-efficacy, capability, and meta-cognition (knowing how to learn) and reflection.” Blaschke outlines strategies for implementing this approach in higher education. In a further step, she identifies digital technologies – particularly in social media – which can be used to support heutagogical learning in teaching or learning scenarios. This type of digitally supported learning can “equip learners with the necessary skills for a lifetime of learning” in the Digital Age.

III The Digital Turn in Practice – Best Practice Examples for the Digital Turn in Higher Education

This chapter presents examples of higher education incorporating digital media, from different countries.

In *“Establishing a sense of community, interaction and knowledge exchange among students”* Thomas Ryberg and Jacob Davidsen work with the idea of establishing a form of third platform between the dominating social platform of Facebook and the formal academic platform of Moodle. To test the idea they introduce Google+ Communities as a digital tool for students who are, in groups, working on their semester projects. The course is part of a problem-based learning program, which allows the projects to be student driven, forcing them to establish their problem of interest in the project, and to manage a successful communication within their groups and form productive links between lectures, supervision and their project work. Ryberg and Davidsen argue well for the need of this third platform, and conclude that their experiment showed that it is possible to create such interfaces. However, their study also detect different problems in doing so, amongst them the importance of support, and not least usage from the side of the lecturers.

Mia Thyrré Sørensen looks closer at students’ choice of ICT tools in her chapter *“The students’ choice of technology – A pragmatic and outcome-focused Approach.”* Sørensen claims early in her chapter that although students are familiar with social media, some to the extent of being ‘digital natives’, they have trouble transferring those digital competences to learning capabilities. Based on this assumption, Sørensen discusses a study on students’ motif and rationale for their choice of ICT tools. The study has been carried out on 5th semester

students, by observation, survey and qualitative interviews. The results from the study are very interesting, showing e.g. that students prefer ICT tools that they are used to, such as Facebook and Google docs, and have more difficulties in adapting more academically adequate tools such as Refworks or Zotero. But the study also shows that the students reasoning behind their choice have little to do with the ICT tools ability to expand their learning process, and more about the tools not being too complicated, or time consuming, and they tend to disregard tools that they do not have prior knowledge of. Sørensen clusters the students reasoning into a pragmatic paradigm with e.g. cost-benefit analysis, and concludes that although the students chose quite conventional and general tools, the tools are working for them.

In “Addressing EAP Students' Needs in the Tertiary Context – on the Use of Digital Course Books in English for Language Teaching Academic Purposes,” the authors Agnieszka Gadomska and Jarosław Krajka discuss the needs of EAP students and teachers in terms of the development, adaptation and usage of IT based teaching resources. The chapter focuses not only on practical aspects underlying teaching EAP with the use of technology, academic writing in particular, such as: the use and adaptation of digital course books, implementation of IT based materials in the classroom with the use of interactive whiteboard technology, but also on the methodological issues of teaching EAP in the Digital Age, such as: learner autonomy, teacher training and material design.

The role of ICT for overcoming disabilities is the theme of Ulla Konnerup's “*Inclusive Digital Technologies for People with Communication Disabilities.*” She claims that there is a lack of research on the subject of how digital technology can mediate learning for learners with special needs and disabilities. From the theory of social learning and situated learning Konnerup deduce that communication is a vital part of any learning process. She focuses on two cases of learners suffering from aphasia (impairment of language skills), and through ethnographical interviews and phenomenologically inspired studies Konnerup looks closer into how digital tools can increase the subjects communication skills and thereby their learning potential. As one part of this, a special web based learning environment called BaseCube was designed. In all, Konnerup can conclude that making ICT a part of the rehabilitation of the patients with aphasia, as a result of brain injuries, has positive results. The ICT tools are flexible and motivate the participants, who show progress on all communicative parameters, and are able to create themselves a form of alternative voice.

Appendix: A technical-didactical Perspective on the Digital Turn in Higher Education – an Informatic Approach

This section provides approaches from the field of Computer Sciences.

In their article “*Trace-Based Multi-Criteria Preselection – Approach for Decision Making in Interactive Applications like Video Games*” Hoang Nam Ho, Mourad Rabah, Samuel Nowakowski and Pascal Estraillier thematize the process of decision-making in the context of interactive applications for game-based learning: Decision-making in games is essential to make them more automated and smart. A decision algorithm performs its calculations on the set of all the possible solutions. This increases the computation time and may become a combinatorial explosion problem if there is a huge solution space. To overcome this problem, the authors present their work on relevant solutions preselection before making a decision. The authors propose a two-steps strategy: 1.) the first step analyses the system's traces (users

past executions) to identify all the potential solutions; 2.) the second step aims to estimate the relevance, called *utility*, of each of these potential solutions. The result is a set of alternative solutions that can be used as an input to any decision algorithm. The authors illustrate their approach on the Tamagotchi game.

One of the rapidly developing tools for online learning is learning through mobile environment. Therefore, developing and improving of mobile learning environment is an active topic. One of the ways to make learning environment more accurate to user's needs is to use his context. Context of user consists of current context in online learning environments and physical context. In their paper "*Analysis of Means for building Context-Aware – Recommendation System for Mobile Learning*" Larysa Shcherbachenko and Samuel Nowakowski concentrate on such physical contexts and develop solutions to improve the user's experience in learning environments by using actively the context. For this, an ontology-based system is presented and a learning context ontology was extended for user context ontology. A set of use-case scenarios is provided to show situations which will be covered by such an approach.