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Bildung in a Digital World: The social construction of future in education

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Abstract

The discussion about digital education refers to what should be taught and learned to prepare for requirements of the digital age and which competencies seem essential for coping with prospective challenges. These projections are based upon assumptions about the future. However, they hide underlying suppositions and, thus, withdraw them from further debates. The article contrasts theories from cultural studies about the 'next society' with mostly implicit assumptions underlying current competence catalogs for a digital world. In general, they rely on the idea of technology determining society's development and hide design options in negotiating the future of the - most amorphous - digital technology. We introduce Bildung's concept *in a digital world* that has emerged in the public discussion in Germany and describe how *Bildung* can be interpreted as a teleological concept that relies on generic and domain-specific competencies necessary for building the digital future.

Introduction

How can we frame the discussion about digitization in education? It seems obvious that digitization is a significant trend for the educational system and many projects attempt to demonstrate its potentials. The theoretical positioning of this discussion, however, has been neglected. In the following, I refer to the German concept of Bildung, which seems to provide a promising backdrop to frame the current discussion. The paper asks how Bildung's traditional concept can be related to the digital world's affordances: Will we need new or additional competencies, or will traditional qualifications be transformed? It analyzes current positions in the German-speaking and European context. It critically points out how these positions try to impose specific visions of the future without offering means to discuss the underlying assumptions about our society's future. Finally, this paper aims to position and further the concept of Bildung in a digital world to provide guidelines for future discussions and the development of coherent curricula.

Effects of digital technology

The discourse on ´the digital´ in education in recent decades has hardly changed. The various technologies that receive public attention may change, but their general interpretation follows a similar pattern: On the one hand, some proponents strongly associate digitization with many positive attributes. They speak of educational innovations or even revolutions, superior learning outcomes, and urge a more intensive examination of these possibilities to utilize digitization opportunities. On the other hand, a different position generally fears a decrease in educational standards and foresees a wide array of negative effects when learning with digital technology. Its proponents refer to insufficient physical activity during long periods of computer use and the associated risk of addiction. For them, the early and extensive use of computers in kindergartens and schools seems highly problematic. In this context, reference is often made to brain research, which seems to prove the negative effects of screen and computer use. Much of the international research on *Educational Technology* is dedicated to this controversy. The typical study follows a quasi-experimental research design and compares learning with digital media with a traditional teaching approach. Since the first works by Kulik (1980), many meta-analyses have been published. Based on a large number of aggregated individual studies, they show the comparatively small effects of digital media on learning outcomes: The research does not confirm the hypothesis that learning with digital media leads to significantly higher or to lower learning outcomes (Tamim et al., 2011).

Since the beginning of this research, the question has been raised to what extent such comparative studies are meaningful (Salomon & Clark, 1977; Clark, 1983): What does 'traditional teaching' actually mean? Can this label be used to sufficiently define a control group? Are e-learning, e-books, virtual classrooms, augmented reality, or MOOCs really *treatments* - or just the *wrapping* for a somehow (to be further clarified) decisive ingredient (Bernard, Borokhovski, Schmid, & Tamim, 2018; Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014)? In these studies, the effects of digital media on learning are typically are attributed to the technology itself, the hardware, or software. They are based on the presumption that it is the technology alone that influences learning outcomes, not the instructional concept, not the quality of the learner's interaction with a learning application, not the appropriateness of the instructional concept for the instructional objectives or other characteristics of the field discussed as conditions for success in instructional design and media didactics. These studies react to the debate about the pros and cons of educational technology and try to contribute to the public debate. On the one hand, the research does not substantially support either the supportive nor the contradicting position. On the other hand, the design of these studies has proved to be problematic and, thus, meta-analyses based on these studies are of only limited use. In this respect, one may not agree with either of the two positions since both assume an immediate effect on learning technology.

Instructional design discusses the more fundamental question of what effects can be expected from learning with media: are media (such as "book," "television" or "Internet") *mere vehicles which* – if correctly selected and applied – do *not* have an impact on learning by themselves (Clark, 1994)? Or does the instructional design of a medium determine its effectiveness (Kozma, 1991)? Salomon (1972) refers to the *supplantation* of cognitive processes by media that can be made responsible for some effects. Does a medium generate reality through attributions by the recipients (Schmidt, 1996, and 2003) or in the way a medium is used (via gratifications, cf. Lin, 1996)? Do media effects already occur with certain verbal connotations, explanatory patterns, or metaphors in the rhetoric about the medium (Kerres, 2003, 2017)? Or are effects of a medium already inscribed within the medium: does the medium infect the message (cf. Siever, Schlobinski, & Runkehl, 2009)? For each of these positions, references can be found in media sociology, communication studies, or media pedagogy. However, there is hardly any justification for assuming a direct effect of certain technology on learning per se.

If we broaden the discussion framework, we can state that media do have effects by creating channels of communication and defining who can communicate with whom, how, and what quality; they impact communication situations. The development of society can be described along the epochs in which different media dominate - in the transitions from tribal society (based on orality) to ancient society (with writing for cultural memory) to modern society (with the spread of printing) and global communication (via electronic and digital media); each epoch is undergoing upheavals and power shifts (Baecker, 2017).

Heavy changes associated with the digital epoch are countered by the *indifference* with which the educational system has been reacting to digital technology. So far, digital media have only had minimal impact on instructional practices and teachers and learners' behavior. Digital media can be used in concepts of a project- and problem-oriented learning and can enrich formats of direct instruction. The sheer availability of technology in classrooms hardly brings about notable changes in education. Confronted with uncertainties, teachers revert to well-established habits when coping with the new situation: the data projector in the lecture hall has probably been so successful because it supports routines for presenting and direct instruction developed for decades. It seems plausible to assume that teachers rely on heavily overlearned action routines when confronted with new options. Behavioral patterns built up over the decade are applied to digital tools, and it requires systemic approaches to school development to achieve reliable changes in actors' practices (Kerres & Waffner, 2019).

It has been the decisive merit of Paul Heimann (1976) to distinguish the decision for an instructional *method* and the choice of a delivery *medium* as separate fields of instructional planning: Although decisions on instructional methods and delivery media can be interdependent (i.e., the choice of an instructional method has implications for the choice of media), they are to be understood as independent: project-based learning can be implemented with printed materials, an e-book, or via the Internet. The choice of media does not have a fundamental influence on the method of project-based learning. Nevertheless, one should choose precisely the

medium that best suits the teaching objective, the instructional method, and other instructional field requirements.

In teacher training, we are often confronted with the assumption that digital technology *will* change the way schools operate or that schools *have to* change to be prepared for the digital age. This is often associated with the assumption that the use of digital technology will (automatically) require new forms of teaching; for example, that the role of teachers will change from that of educators to that of coaches, that in the future, students will learn in a self-directed way instead of being taught and supervised, etc. The appellative character is striking: On the one hand, the necessity to strive for school reforms is justified on the backdrop of the digital society, and on the other hand, it is assumed that digital technology itself will cause these changes in schools.

All these discussions center around the question of whether and how technology impacts our activities. It seems feasible to suppose that in the context of education, digital technology can at the same time be effective *and* ineffective. For instructional design, it seems important to understand the narrow line between theses two sides: the print book as a digital product delivered on an e-book reader does little to change my reading experience, even though it has several advantages and disadvantages that make me sometimes prefer a printed book, sometimes a digital product. At the same time, the availability of digital books is changing the entire production process - and ultimately possibly the importance of the book in a culture. Strong effects of the digital, as outlined by Baecker (2007, 2018) with reference to a “next society" can be interpreted as epochal. In contrast, weak effects can be expected in the short term, like in education's daily routines.

Design options of the digital era

It has become clear that the debate about the effects of the digital and the comparative studies both assume that technology itself would change learning and the quality of learning. Knowledge of the technology would have direct consequences, for example, regarding the competences to be acquired. In contrast, a socio-constructivist position sees the effects of the digital as the result of social negotiation processes that produce realities. They are based on the individual construction of meanings when confronted with technology. Technology opens up different routes to how its use is socially organized: when the automobile was invented, it was by no means evident that there would one day be road traffic regulations, standardized road signs, driving licenses, and penalty points for wrong driving. Let us, thus, look at the framework provided by the transition to the digital era.

Digital technology operates based on algorithms that describe a finite sequence of steps that can reliably solve a class of problems. The way the individual computer works, controlled by algorithms programmed by humans, seems mostly comprehensible, controllable, and predictable. Yet, at the level of global networked systems, this certainty loses itself. We are increasingly dependent on receiving information and making decisions without verifying the source and quality of such information. According to Baecker (2017), it is no longer just a matter of the *surplus of language references* developed in earlier epochs, the *surplus of symbols of* writing, and the *surplus of criticism* of book printing. In the digital epoch, it will be necessary to cope with the *surplus of control* that arises because computers participate in social communication with their memory. Humans are no longer able to reproduce the individual results of the digital systems' processes interacting in the network based on algorithms (Stalder, 2016). Countability, computability, and controllability of algorithms on which the individual computers are based become unmanageability and unpredictability. The "next society" has to deal with this challenge.

Another example can illustrate the qualitative difference that arises from the transition of the individual computer into networked systems. Based on the data collected on the Internet, by observing online behavior, I might receive recommendations on books, music, or videos that might be of interest to me and also for sports activities or nutrition. An individual might experience this information as supportive and adding control to his own’s life. At the social level, however, this technology eventually will decrease the control of humans.

The traditional idea of education aiming for autonomy and development seems to be reaching its limits in the digital epoch. "Digital sovereignty," as demanded by the Association of the Bavarian Economy[1] and defined with references to categories of the individual, will probably be challenging to achieve in the "next society." “Digital sovereignty” rests on the idea of *mastering* digital technology, which seems increasingly difficult to perform on the level of society. It seems that we have come to terms with the idea that mankind will not be able to retain control of digital technology; digital technology is becoming an actor in itself that we interact with whilst developing society. The limitations of traditional media education designed as training courses become apparent: They are necessary but limited. According to Baecker (2018), a view of education captured in the epoch of books underestimates the control surplus of the digital, which will lead to new relationships between social actors.

The rise of the Internet has shown how humankind has opened up spaces for exploration with technology, which in turn, have motivated technical developments that again have unlocked new routes for development. Buildings, devices, and other technological artifacts created by humans influence the actions of humans. Speed bumps on the road force drivers to reduce the speed. Seating arrangements in a lecture hall create a communication situation that distinguishes lecturers from listeners. Latour (1996) has described how humans and non-humans have started to function as equal parts in a network of actors.

The TCP-IP protocol allows data to be exchanged between computers. Unlike circuit-switched communication, the data is divided into packets whose "header" the recipient is entered. Since the beginning of the 1970s, it has been possible to send e-mails (SMTP) or retrieve files (FTP) via this Internet protocol. Tim Berners Lee used this technology in 1990 to make research results from the CERN research center in Switzerland accessible worldwide. Using the HTTP protocol, linked information marked with the HTML page description language could be accessed, which generated the "World Wide Web." Neither the inventors of the IP nor the HTTP protocol was aware of the fact that this technology would one day be used for mapping functions of radio, television, telephony or - in the course of Web 2.0 - for entirely new applications of social platforms, for advertising and the sale of goods.

The peculiarity of the digital, and in particular of the Internet and its subsequent technologies (such as smartphones, smart homes, IoT), lies in its amorphous structure. There has probably never been an artifact whose use and the benefit was so little inscribed in the layout of a technology in the history of technology. The radio receives electromagnetic waves, which are translated into auditory information; other (meaningful) variants of use are not possible. It has been developed for exactly this one purpose and is used accordingly. In its rigid arrangement, though possible, the lecture hall also allows only little variation in its use.

The World Wide Web, on the other hand, generates its meaning only from the way it is used, and society has long been struggling with how to interpret this new space: Is the Internet subject to broadcasting law, telecommunications law, or the conditions of publishing? We can understand the Internet as an information medium, as a communication medium of mass or individual communication. The Internet emulates all previous types of media and has produced new media applications – within its use. Digital technology and the Internet are essentially understood as constructivist media, where the users' perception and usage patterns generate an artifact, like social platforms. Digital technology offers spaces for building new realities - created by the users – which open up new opportunities for further developments.

The digital environment can be understood as an interplay of technology-induced developments on the one hand and the handling of the design options by users and society on the other hand. As a result, digital technology can lead to a post-democratic society, based on exploiting user-generated data and striving for far-reaching personal control (West, 2019; Zuboff, 2015). Simultaneously, the interplay of technology and actors can establish a democratic society in the digital age, based on values of sharing and participation within a culture of

[1] Association of the Bavarian Economy e. V.: (2018). Digital sovereignty and education. Münster: Waxmann Verlag.

"open" knowledge that promotes exchange as an essential mechanism for the development of the Internet. Both directions are discernible worldwide, and it seems, therefore, hardly plausible to claim that the Internet would causally lead to a specific social development.

In the educational sector, these design options can also be unraveled: On the Internet, learning can be implemented as a *regulated process,* optimized by large amounts of data and algorithms ("learning analytics"). The monitoring of learning activities on the net generates large amounts of data that can be used to enable an "intelligent" regulation of learning processes. With access to this data, one can program a regulation mechanism to optimize learning. Whoever possesses this algorithm has a considerable possibility to control and possibly manipulate students. Big data and the Internet are, thus, paving the way for the dream that the founder of behaviorism, B. F. Skinner (1958), once formulated and which is still guiding some of the proponents of Education 4.0 today:

> "One can store the knowledge stages achieved for each person utilizing an electronic educational file, one can carry out evaluations, which educational offers lead to which results. Particular mention should also be made of the individualization of learning, which is made possible by digitalization." (Scheer, 2017, IT summit)[2]

An opposite position is based on the idea of the Enlightenment, that education means liberating the person from external regulation. Education, then, is not merely the best possible appropriation of given learning content but aims to develop autonomy and independence. In this tradition, education always should be understood in relation to the world in which we live. It, therefore, has to be made accessible as a "public good." Individual learning relies on participating in cultural knowledge and artifacts objectified on the Internet; in this participation, knowledge emerges and society evolves. Open access to education, articulation, discourse, and participation could justify such an understanding of education in the "next society."

Suppose compulsory schooling and free access to education are important milestones. In that case, it is necessary to find out how education can be implemented as a public good on the Internet: the discussion on "open" educational resources, online courses, and digital ecosystems (Kerres & Heinen, 2015) is part of the global discourse on Open Education:

> "Digitalization opens up new possibilities for education: The individual can identify, visualize, and reflect on his learning processes with others. This can lead to new ways of learning that go beyond the hard-wired and algorithmic and make new things visible to the individual. " (Kerres, 2018)

The decisive point is that both visions are conceivable on the background of digital technology (they are not mutually exclusive either), and we can observe that both visions are receiving attention are taken up differently in various societies. Social reality emerges along with these design options and is to be understood as a social negotiation process. It would be naive to understand this process as a kind of democratic vote in the future. Rather, these processes often occur below the threshold of perception, for example, when we visit and register at websites and disclose personal data, or when digital companies evade taxation to countries easily. The digital society emerges with choosing the options for action while using the Internet.

New competences?

In the following, we will turn to the question of the goals of "education in a digital world" and how these goals can be defined. In this discussion, we are often confronted with a technology-deterministic view that assumes that educational contents can directly be derived from new technology attributes and features. Computers and their applications, mobile devices, and the Internet open up new possibilities. Therefore, mastering computer technology is often interpreted as a key skill, like reading, writing, and arithmetics, that needs to be added to these basic cultural techniques.

As early as 1995, an expert commission in Germany called for a change in curricula:

[2] https://www.saarland.de/it-cluster.htm

> *The mastery of modern information and communication technologies will become a basal cultural technique whose value is equivalent to reading and writing.*[3]

The Aktionsrat Bildung der Vereinigung der bayrischen Wirtschaft (2018) (Education Action Council of the Association of the Bavarian Economy) calls for *digital sovereignty* as an integral part of school curricula:

> *Education in a digitally networked world today extends media competence by the concept of digital sovereignty. In addition to learning the cultural techniques of reading, writing, and arithmetic, the confident handling of digital media is the prerequisite for a systematic anchoring of media education in the actions of each individual. (p. 18)*

In their programmatic claim, these statements aim to strengthen the relevance of digital technology in education in the arena of educational policy. The term *digital sovereignty* serves to highlight the importance of the topic and to justify public investments and other development measures. It raises digital competencies to the level of core skills and emphasizes the necessity for such investments and the urgent need for action. The argument directly relates to the emergence of the technology: the technology is experienced as *new*, and therefore, seems to require additional and new competencies.

An alternative view understands digitization as a process that *permeates* society. With the transition to a digital era, computers are not a further cultural technology; they permeate all cultural practices, including reading, writing, and calculating. This epochal change is underestimated if the digital is (only) described as something that arises *additionally to* existing social practices and cultural developments. While modern society is characterized by the rationality of its functional subsystems, according to Baecker (2017), the network society functions as an open ecology with a surprising, potentially fleeting order: "The irritable network and its overstraining complexity become figures of thought for our orientation. It is important to understand that digitization essentially permeates and irritates these practices."

The dichotomous construction of a digital versus an analog world remains limited and follows a school line of thought that underestimates the digital transformation scope. Also, the rhetoric of *digital education* suggests a difference to *analog* education, which itself is difficult to substantiate. Arguments along the lines of analog vs. digital usually connote *the analog* as something *real* and *the digital* as *something deficient*, for example, when one assumes that *real encounters* can only occur in *real life*, while our lives are already strongly impacted by digital technology. This does not deny the differences in the various constellations of human encounters; however, human relationships have long since been handled utilizing digital tools, for example, when people share their thoughts and status via *social media* and microblogs.

The implications of this *integral* position are far-reaching (Heinen & Kerres, 2017). It does not primarily conceive digitization as an additional topic to add to curricula but instead asks about the implications of digitization for *all* existing subjects and contents, for all levels and institutions. From this, several and other questions arise:

- What is the impact of digital artifacts and technology on knowledge-building and communication?
- Concerning digitization, what are new topics that have to be integrated into the curriculum?
- Starting from a reflection of the use of digital technology in the classroom, we could ask about the implications of digitalization for the individual and society.

Revising the curricula does not automatically exclude addressing the topic in a separate unit or course. However, the acquisition of these competencies can not be limited to such a course, where these questions are dealt with in isolation, i.e., without any changes to the other subjects.

The fundamental issue is still the ability to judge in dealing with knowledge and acquiring skills to position oneself in a complex and sometimes confusing world of uncertainties. On the one hand, it is necessary to define more precisely what new requirements are essential for dealing with the digital environment. On the other

[3] Education Commission NRW (1995). The future of education - the school of the future. Memorandum of the Commission "Future of Education - School of the Future" by the Prime Minister of the State of North Rhine-Westphalia. Neuwied: Luchterhand.

hand, surprisingly similar concepts will be uncovered when we talk about educational goals for "education in the digital world" in the following section.

Defining “future”

At the turn of the century, the OECD launched an international discussion on the renewal of curricula against the background of digitization with the slogan *21st-century skills.* As Dede (2010) pointed out, this discussion focuses on four core competencies that are described as essential for coping with the current and future demands of a digital society: communication, collaboration, creativity, and criticism. Typically, these competencies are positioned as questioning traditional goals of education centering around subjects. Many social groups, associations, foundations, and public institutions have developed and presented similar position papers, and, thus, there is no lack of references. In addition to national, international, and supranational institutions (Binkley et al., 2012), companies and trade associations, Trilling & Fadel (2009) have presented competence catalogs that identify competencies necessary for coping with the digital future. The common core of all proposals is that they label *digital literacy* as the major *new* competence (Mishra, Koehler, & Henriksen, 2011) and, consequently, it can be found in all competence catalogs (see also Ilomäki, Paavola, Lakkala, & Kantosalo, 2016).

Statements about the techtechnologicalures and their competence requirements can be understood as attempts to reduce uncertainty in dealing with a uncertain future due to technological development. In their analysis, the repercussions of these future drafts for social discourse can be examined (Grunwald, 2012; Häußling, 2014). These concepts are all based on the assumption that they can predict the future, and that the future is determined by technology. When we know about tomorrow's technology, we know what the future will look like because *technology* creates the future.

These papers are always based on explicit assumptions about the future. Yet, when one paper demands *curiosity*, *courage*, or *independence*, it implicitly relies on a different projection of the future than another concept that emphasizes *empathy*, *teamwork*, and *participation*. At the same time, these papers typically *hide* these assumptions and, thus, exclude them from public debate. Competence catalogs are commonly based on assumptions about how technology, work, professions, and society will be in the future. Requirements for learning and teaching are then derived by resorting to this assumed future. However, these competence catalogs do not reveal what the competencies are based on. This is hidden and, thus, eludes social discourse. How such concepts are developed also remains untold. Voogt et al. (2013) show that these papers often emerge in a context of political negotiations. It is not known which people and institutions contribute to what extent and what their agenda is.

In the German discussion, the papers on *21st-century skills* and other keywords, such as the OECD Learning *Framework 2030*[4] or the competence catalogs of the European Commission on *DigComp*[5]*,* have attracted comparatively little attention; perhaps because the concept of education has always implied a broader range of curricula and educational goals (but see Petko, Döbeli Honegger, & Prasse, 2018). In this context, the idea of “general education” has a strong tradition and has always positioned education as basically different from vocational training and curricula that shortsightedly follow merely exploitable qualification to contribute to employability.

Media Competence

Differing from this international discussion, in German-speaking countries, the debate has centered around the concept of media competence since the 1970s. While education in schools has heavily relied on books, the importance of radio, television, cinema, and magazines for information and communication has been growing. *Media competence* has taken these media into account. It has aimed to develop a critical position towards media: the ability to understand, produce, and critically reflect on the use of media (Moser, Grell, & Niesyto, 2011; Groeben & Hurrelmann, 2002). In contrast to Baacke’s (1973) original intention, media competence has often been reduced to skills in the basic use and application of media since then. In public opinion, media

[4] http://www.oecd.org/education/2030/learning-framework-2030.htm (accessed 28.03.2019)

[5] https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework

competence is often associated with basic training in the use of computer software and lectures that warn about the dangers of digital media and cyber-bullying in everyday life. Aufenanger (2000) demanded: "These technological and reassuring concepts of media competence must be overcome and should be replaced with the more general aims of education."

In 2009, a report by the German Ministry of Education marked a turning point in the discussion. Published under the title: "Competences in a digitally shaped culture" (*Kompetenzen in einer digital geprägten Kultur. Medienbildung für die Persönlichkeitsentwicklung, für die gesellschaftliche Teilhabe und für die Entwicklung von Ausbildungs- und Erwerbsfähigkeit. Bericht der Expertenkommission des BMBF zur Medienbildung*, 2009), the paper pointed out that media competence can no longer be discussed as a separate topic of education, but should rather be discussed relating to a *digitally shaped culture*. Thus, education can be based on four dimensions: a) access to the knowledge of culture as conveyed by digital media, b) participation in social discourse by using digital media, c) developing personality by appropriate use of digital media, d) competent use of digital technology in everyday life and work.

In December 2016, the ministers of education of the federal states of Germany jointly published a strategy paper on "Education in a Digital World"[6], which emphasized these considerations and initiated a process of revising educational standards in schools:

> "If the educational mandate of schools changes in the 'digital world,' then media education will no longer be a cross-sectional task for schools, but an integral part of all subjects.

Education in the digital world or *education in a digitally-shaped culture,* first of all bypasses the linguistic difficulties associated with the wording of *digital education.* Secondly, it interprets the underlying competencies not as somehow separate competencies but as prerequisites to living in a world shaped by digital technology. As digitalization permeates life, learning, and work, all our experiences are essentially based on and influenced by digital media. Our participation in culture and our communication with others are based on media. Our view of ourselves also relies on artifacts (e.g., on social platforms) that we create while operating with digital tools.

This view is in line with an understanding of education as a reflected relation of a person to things, to others, and themselves: education means setting oneself in relation to the world (e.g., Marotzki, 1990; Meder, 2007). Following a structural theory of education, Bildung can be related to the experience of uncertainty and indeterminacy in our society (Jörissen & Marotzki, 2009, p. 102). Bildung relies on experiences that change a person and the person's view of the world and themselves: "Educational processes are to be understood as higher-level learning processes where not only new knowledge is acquired, but also the relationship of the subject to him- or herself and the world undergoes a fundamental transformation." (Koller, 2016, 149). Such an understanding of education as transformation "is less about contents and subjects of education but more about structural features of the relationship of the person" (Marotzki & Jörissen, 2008, 103). This argument is in line with a pragmatic theory of education: John Dewey related education to the inquiry process and meaningful experiences that *irritate* a person (cf. Michael Kerres & de Witt, 2004). It is also in line with a view found in cultural studies, characterizing the digital epoch by interconnectedness, ambivalence, and indeterminacy (Stalder, 2016). These are attributes that do not call for *skills training* in the use of technology, but for *basic education* or Bildung's concept, which has a long tradition in the German-speaking world. Bildung can be understood as a framework to define the aims of education and as a backdrop against which competences can be derived. It provides an alternative to the attempt to derive competencies from an assumed future defined by certain digital technologies. Without a doubt, these technologies do shape our future, but they cannot provide constructive framework competencies can be derived from.

As a conclusion, we can summarize that a fundamental renewal of education's basic concepts does not seem necessary to understand education in the digital era. We can draw on Bildung's concept, which provides a framework for defining goals for education in the digital world. The competencies that are prerequisites for such *education in the digital world* can then be related to the teleological concept of *Bildung*.

[6] https://www.kmk.org/fileadmin/Dateien/pdf/PresseUndAktuelles/2016/Bildung_digitale_Welt_Webversion.pdf

Competences for "Education in the digital world"

Education (in the digital world) is more than the sum of competencies acquired in dealing with a culture shaped by digital media. Yet, at the same time, it requires several competencies to be able to participate in designing the future digital world. Let us go back to the original catalogs of media competence by Baacke (1973) and Groeben & Hurrelmann (2002), which were developed in the context of the individual being confronted with mass media. If we relate these to the current affordances of digitalization, seven fields of competence for education in the digital world can be reformulated (**Fehler! Verweisquelle konnte nicht gefunden werden.**), which relate to knowledge, skills, and attitudes.

In the emerging discussion about post-digital culture, digitization is interpreted as a transition. Looking from an (assumed future) world where digital technology has already been *processed* by society, this discussion looks (back) at the recent discourse in order to understand current debates about the digital and the processes of meaning-making (cf. Jandrić et al., 2018 in the editorial for the new journal "Postdigital Science and Education"). Instead of focussing on features of technology, it analyses our discussions about digitalization (Ryberg, Davidsen, & Hodgson, 2018). One analytical method of post-digital research is assuming the *digital* as given and removing it from current argumentations (see the brackets in **Fehler! Verweisquelle konnte nicht gefunden werden.**) to understand if and how the attribute *digital* adds or changes our view of a certain problem. We can then unravel continuities in our thinking about competencies and find out where the *digital* adds new attributes to our discussion.

For further research, the question remains to what extent the seven competencies outlined in **Fehler! Verweisquelle konnte nicht gefunden werden.** are bound to specific domains of knowledge (such as language learning or natural sciences) or prove to be generic (i.e., not linked to knowledge domains). This is important since education has to be designed differently if these competencies are acquired independently from or within knowledge domains. We would assume that some competencies can be transferred across domains, whereas other competencies are more strictly linked to knowledge domains, media technologies, or thematic contexts. For example, the ability to search for information on the Internet and skills to evaluate the quality of information could be interpreted as rather broad competencies relating to many realms. The competent use of statistical software, on the other hand, would refer to a more narrow context and is probably not easily transferable to other knowledge domains.

We do not know if and to what extent these competencies can be considered generic and easily transferable across situations. We have to assume more narrowly defined competencies that relate to a specific technology or situation. Research shows that many competencies are more domain-bound and, thus, less easily transferable than is commonly assumed (Mähler & Stern, 2006; Prenzel, 2010).

Final Remarks

We have to acknowledge that all self-observations are bound to uncertainty and, therefore, Baecker (2007, 2018) only tentatively speaks of the *next society,* which can only vaguely be foreseen. Still, we can anticipate an epochal break in the transition from a modern society shaped by books' technology to a networked society (see also Castells, 2004). In this transition, societies have to develop new and different solutions for challenges that previous societies have answered under different terms. The rhetoric of emerging *educational revolutions* and pessimistic diagnoses of *cultural decay* indicate the social search process where new orders and new semantics are set as a response to the surplus meaning of the new medium (see also Allert & Richter, 2017; Wunder, 2018). Both euphoric advocacies and fundamental criticism are based on diagnoses of our times that are difficult to maintain given the ambivalences we are confronted with.

Talking about the *effects* of the digital is utterly effective, albeit in a different way than the opponents suspect: Opponents and proponents alike typically assume that technology can create a particular future (and while articulating this attribution, they contribute to creating exactly this future). In their underlying assumptions about the *effects* of technology, both contradicting positions are similar: people are at the mercy of technology; they can try to accelerate or prevent the coming changes, but the effects of technology define the future. Perhaps in

anticipation of an expected *artificial intelligence*, the future is communicated as seemingly inevitable, and the design options of the digital era are concealed. Therefore, it is of utmost importance to reject the rhetoric about *the effects* of the digital and advance an understanding of the digital epoch as a social negotiation process that opens up very different routes for future developments.

As explained, the digital should not be constructed as an additive affordance for educational programs: as a pervasive technology, it permeates our environment and education. New, so-called digital competencies are remarkably difficult to justify. A closer look reveals basic requirements that can be addressed with references to Bildung's long-standing concept and with a return to traditional ideas of general education. Our discussion has also shown that concepts of Bildung *and* competencies are not mutually exclusive. Following the argumentation of Pietraß (2011), it seems productive to further unravel the relationship of Bildung *and* competences: *Bildung (in the digital world)* (and not the technology itself) provides the framework for inferring educational goals. The (seven) competencies describe prerequisites contributing to Bildung. It remains to be further explored where we underestimate the digital, for example, when we try to maintain the idea of an individual's *sovereignty* in a digital world, and where we allow ourselves to be deceived by the impact of the digital, which promises us something new. However, following established concepts of Bildung could already be the answer.

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