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Bildung in the Digital Age

This chapter explore how educators, teachers and students can work with Bildung-orientated teaching in the digital age. That is how they, from a Bildung perspective (see Chapter 1), can understand, apply and modify digital media (with the aim of supporting Bildung processes). We have investigated this question in depth in an action-based research project called DUFA (literately meaning *digitally supported disciplines and common Bildung*) (see Chapter 3) in dialogue with teachers, teaching in ten different subjects within science, social science and the arts. The chapter is divided into two major parts. In part one we outline the DUFA project and our theoretical framework to analyse and discuss ‘Bildung potentials’ in the ten courses that the teachers in the DUFA project developed. This framework is based on the theories put forward in the former chapters. We use it to analyse and discuss the ten DUFA courses, but it can also be used to design, analyse and discuss other courses, thus dealing with the question of how educators on a concrete level can work with Bildung in the digital age. In the second major part of the chapter, we elaborate on four different ways of working with Bildung, extrapolated from the DUFA project. The proposal of these four paths of designing and carrying out Bildung oriented teaching in the digital age, is the main focus of the chapter.¹

The DUFA Project

The DUFA project worked on how to strengthen subject-matter-specific Bildung contributions by relating to digitalisation in specific ways. In the project we initiated and analysed exemplary courses in ten different subjects. The fact that the courses are exemplary does not mean that they are perfect or comprehensive, but that they possess a Bildung potential that we then analyse and discuss.

¹ This chapter is mainly based on Paulsen and Tække (2019).

The ten courses were developed during the 2017–2018 school year at Rødkilde and Silkeborg Gymnasium in Denmark and have covered mathematics, physics, biology, chemistry, social studies, history, Danish, Chinese, design and visual arts.

The subject matter contributes to three major school areas: (1) *science* which includes maths; (2) *social science* which includes history; and (3) *the arts* which include Danish as first (literature) and second language subjects, but also subjects such as design and visual arts. We agree that the three areas are not fully comprehensive for all school education and that some subjects will fit better into the categories than others. Nevertheless, we will argue that by discussing examples in all three areas, we will deal with something that has exemplary value for much of the teaching that takes place in both primary school, secondary school and in higher education.

What we are trying to identify is how to support the main areas – the sciences, social sciences and the arts – in a broad sense, by ways of understanding and applying digital media (IT). More specifically, our concern is to identify what kind of educational Bildung engagements can be strengthened or reinvented through specific ways of using and understanding digital media (IT) in the main academic areas. This examines the most important dimensions of Bildung, namely *knowledge*, *attitude* and *existence*, but also the general development of a world relationship where one can (1) *master* oneself and the world (e.g., master grammatical rules), (2) *understand* oneself and the world as far as possible, for example, understand people who think differently than oneself, and finally (3) *create* a different and better world (e.g., act creatively, innovatively and critically).

The question we want to answer in this chapter is whether and how in the main academic areas (i.e., by perceiving man and the world as respectively nature, society and culture) one can understand and use digital media to support the Bildung engagements which is the point of having a school. An important and underlying challenge lies in the fact that digital media is both part of (1) the process, that is, in the teaching itself, which must take into account and apply digital media in an adequate way and (2) the result, namely in the formative idea that an educated citizen must be able to master, understand and improve the digital society.

An Analytical Model

In this subsection, we will briefly present an analytical model (see Figure 4.1), which is based on the theoretical framework outlined in the former chapters, but

also works as framework for the design of the exemplary digitally supported courses in the DUFA project. The model integrates (1) the three dimensions of Bildung – knowledge, attitude and existence (see Chapter 1), (2) the four different media practices (see Chapter 2), and (3) the three different waves (see Chapter 3). We will present the model here, but for interpretations of historical, philosophical and media theoretical backgrounds and assumptions we refer primarily to these former chapters and secondarily to our earlier books from the SME, BIT and DUFA projects (Paulsen and Tekke 2013; 2015; 2016; 2018; 2019). The aim of the model is to be able to analyse and discuss how one can work with (the three dimensions) of Bildung in the four different media practices, moving over time from wave 1 to wave 2 to wave 3.

Figure 4.1 An analytical model of how to work with Bildung in the digital age.

Bildung Analytics

Analytically, we see Bildung as the union of three inseparable elements namely knowledge, attitude and existence. *Knowledge* denotes the *question* of *what* students need to know about themselves, society and the world in order to create a better world than the one we have today. *Attitude* denotes the *questions* of *how* students should relate to themselves, others and the world, in concrete matters of concern. Thus, it reflects the fact that even if one has knowledge, one can still behave like a dictator. Against this background, one must be able to balance between taking good care of oneself, others and the public good. *Existence* denotes the *question* of *who* the students can or ought to be; encouraging and challenging them to raise, develop and qualify their individual voices and ways of responding to others.

Bildung is also the basic aim of Danish upper secondary education and all subject matter should therefore contribute to general Bildung. From this perspective, the various subjects can be seen as social and historical constructions that contingently contain different selections of what Bildung should be about. In our categorisation we are gathering the subjects in three different areas and distinguishing between: a scientific, a social scientific and a cultural and humanistic contribution to Bildung.

From a Bildung perspective, a successful course in a specific subject matter must always be analysed in the light of its contribution to Bildung. This, of course, also applies to digitally supported teaching, but in the phase of digitalisation that we are now in (the initial phase) it is important to discuss how the digital contributes to (or undermines) Bildung. The question thus becomes partly whether and how the use of digital technology can contribute to working critically with the questions of knowledge, attitude and existence. Also, a distinction must be drawn between process and result, in the sense that the digital, on the one hand (process) can help or not help by creating a better teaching and, on the other hand (result) can help or not help the student to act critically with shaping a digital society in better directions. However, the relationship is complex. For example, it may not necessarily help students to reflect critically on what they do with technology, that they learn to program (result). As another example, students may not achieve better learning because the teacher uses PowerPoint (process).

Media Analytics

In the analytical model we also distinguish between four media practices as explained in Chapter 2.

1. *Participation practices* (interaction) relates to the educational understanding and application of new possibilities for interaction and participation in the new media environment.
2. *Community practices* (organisation) also relates to participation, but at the organisational level. New forms of participation require the development of organisational forms, norms and ethics that enable participation, as well as the acquisition of norms when connecting to communities, groups and networks outside the classroom (third wave).
3. *Expression practices* (production) relates to the area of articulating oneself in digitalised communities. It requires knowledge and skills to express oneself in new media both socially and professionally.
4. *Impression practices* (interpretation) relate to skills to search information and conduct source criticism. With regard to all four, there is a commitment to reflexivity in relation to Bildung.

The digital media practices are educational in the sense that they can support education – and Bildung – through digitally supported teaching. However, digital media practices must be developed by teachers and students and learned by students through the various subjects to support Bildung. On the surface, they are the same in all subjects, but if we examine them closely, we see differences in the different subjects. Each subject matter must therefore contribute both to Bildung and to establishing media practices that enlarge the possibility and capacity for such Bildung contributions (see Chapter 2).

Wave Analytics

In the analytical model, the wave theory (see Chapter 3) is seen as three levels of development through which teaching transforms to new modes of communication and organisation that becomes possible with digital media. So, here it is a measurement for what kinds of obstacles and/or possibilities the teaching is working with, at each stage (wave). Yet, as we also noted in Chapter 3, it is also possible to understand the three waves, not so much as developmental stages, but as *important dimensions that can be addressed* educationally in the new emerging media ecology that includes digital media.

In the first wave, it applies to the most basic steps of Bildung, namely those relating to attention, media choices and security (including privacy and security settings, as well as network etiquette). Another aspect is that the students, who are (wrongly) regarded by many teachers as competent media users, must learn almost everything from scratch, so that they need to learn how to use word

processing programs, spreadsheets etc. The first wave is therefore analytically seen as a phase in which the school begins to work with *Bildung* in relation to the digital. This must be practiced without prohibition and indifference (see Chapter 3). To this end, it is a particularly important first-wave obstacle to work with attention in the new media environment. For example, work on becoming aware of and resisting the temptation to multi-task and of external commercial powers that through the web try to draw one's attention away from classroom-relevant activities. In addition, it must also be observed and considered whether the media most suitable for teaching are included and whether they are appropriately adjusted (regarding notifications and private settings). Wave one lies beneath the other waves and is a prerequisite for moving the teaching into them. At the same time, wave two and, in particular, the following wave three, are reinforcing awareness and concentration by motivating and engaging students – and thereby counteracting multi-tasking, that is often seen as the biggest wave one obstacle.

In the second wave, students must be encouraged, challenged and supported to handle media that enables written interaction and collaboration in the classroom, as well as entering into such virtual class intra-community and network. Work is being done on building norms regarding the new interaction situations and the transparency and registration that comes with digitalisation. For example, shared documents allow the teacher to provide process feedback. The new information situations regarding information search and source criticism are also formed at a basic level, in addition to work on processing, selection, storage, categorisation and retrieval in media chains including media platforms like Twitter, smartboard and Wiki.

In the third wave, *Bildung* relates to the contact with the outside world, where the confidence with 'internal interaction' in the first two waves is put at risk in authentic transactions with otherness from the surrounding community. Be it professionals, politicians, representatives from sport or the arts, people with a particular occupation who are professionally relevant or, for example, friendship classes. In this phase, students practice networking and forming relationships with others from outside the class.

While activities in a class can theoretically and empirically oscillate between the waves, there is a fluid transition between the three. Our studies show that a student can go from a full on 'third wave encounter' to a first wave distraction involving multi-tasking in the next lesson. On the other hand, when we observe the waves analytically, we observe whether a course has *Bildung* potentials in relation to one or more of the first, second and third wave obstacles and possibilities.

Four Ways of Working with Bildung

The analysis of the ten exemplary courses from the DUFA-project extends to more than 150 pages in Paulsen and Tække (2019). What we want to do here is to briefly outline four different scenarios based on our findings. Even a very brief summary of the courses would take up the rest of the book. Therefore, we jump directly to sketching out the four different, but overlapping and coexisting, paths of working with Bildung in digital age that was our conclusion of the analysis of the ten courses (an analysis made possible by using the analytic model above).

The big question that the DUFA project was put into the world to answer was whether certain understandings and applications of digital technologies and media can support and enhance subject matters and Bildung in school. The ten courses analysed showed that it is possible to support and strengthen subject matters and Bildung through certain ways of dealing with digitalisation. However, this does not mean that the answer is thus unconditional and unambiguous. Several factors are worth mentioning in this context. Understanding and using digital technologies and media in specific ways (which in DUFA seem to support and enhance subject matters and Bildung) does not mean that one should or can do the same in other classes. There are several reasons for this.

First, all classes are different, which means that doing the same thing in two different classrooms can give different results (all students do not have the same needs) (Dewey 2000; Biesta 2011; Hansen et al., 2019; Luhmann 2006).

Secondly, we have only examined whether certain understandings and applications of digital technology and media can support and enhance subject matters and Bildung in relation to a digital society. However, there may be other and better ways of doing this that we have not explored, including analogue means, and there may be more important problems in other contexts to focus on than those the DUFA teachers have had in mind and where the use of digital technology may not be as helpful (Postman 1993).

Third, the world is always changing. This means that the consequences of using digital technologies are changing as the overall media environment is changing. For example, using a commercial media platform such as Facebook in 2020 is not the same as using Facebook in 2010, just as in 2030 it will probably be something else (if it will even exist). The new media is radically changing the technical, commercial, social, cultural and political landscape. Thus, there may well be good reasons for using a medium in Year X that is outdated in Year Y.

Thus, simple lines should not be drawn between digitisation and teaching (see also the introduction to this book). We cannot in any way say from the DUFA studies that digitalisation of teaching supports and strengthens subject matters and Bildung. What we can say is that we have uncovered a few experiments that point to how subject matters and Bildung in specific and unique contexts could be strengthened and supported through certain ways of understanding and using digital media and technology. That said, however, in the following we will venture into a cautious extrapolation. As we evaluate it, the ten DUFA experiments, in conjunction with the research we reviewed earlier in the book (see Chapter 2), indicate that the school with advantage can take on at least four non-mutually exclusive approaches in regard to being critically-constructive about how to understand and use digital media and technologies in education:

- *Path 1*: is to develop new transdisciplinary teaching practices that embed digital media as part of a larger pallet of media and technologies.
- *Path 2*: is to develop new special educational practices to the single subject matters that, through embedding digital media and technology and by reciting subject matters and teaching to a digital society, can reconfigure what the subject matter in question is.
- *Path 3*: is working with the digital in teaching as an ‘epoch-typical key problem’ (see Klafki 2005).
- *Path 4*: is to further develop what we have called third wave activities, thus contributing to the transformation of what is meant by classroom teaching.

In the following, we elaborate on the four paths, and exemplify, based on the ten experiments, how to move along these paths and discuss what obstacles and possibilities we see in relation to each path. It should be noted that we know that it is important to be aware of other paths. These four paths are just our best estimate.

Path 1: New Transdisciplinary Bildung Practices

The first path is to develop new transdisciplinary Bildung practices that embed digital media as part of a larger pallet of media and technologies. Some of the DUFA experiments provide examples of how to support Bildung commitment in general in upper secondary school. However, the examples are by no means exhaustive. In particular, we would like to highlight the following three experiments:

- An experiment on process feedback and dialogue developed in social studies.
- An experiment on peer feedback and mutual correction work developed in biology and chemistry.
- An experiment on assignments, assessments and teacher feedback are made transparent developed in mathematics.

All three experiments are about how to use *online sharing documents* and *written interaction* to strengthen and support the following options:

- peer feedback, teacher feedback, especially process feedback, and feedback from the outside;
- academic collaboration and group work;
- cross-inspiration; and
- institutionalising independent work by drawing on the work of others.

These examples of digital support do not relate to specific subjects or disciplines, although the specific designs may differ in different subjects. It thus points to a transdisciplinary potential for education which, in particular, has to do with strengthening the way in which one can create an academically fruitful and formative expression practice in school. This is based on some of the new opportunities for participation (interaction) and community (organisation) that digital media such as online documents and online groups affords and teachers in these years develop.

What unites all four options is that they rely on the *digitalisation of writing*.² Peer feedback, academic collaboration, teacher-process feedback and transverse inspiration are not new inventions that new technology has brought us. Even feedback from the outside is not new, albeit has been an exception. Thus, it is primarily about optimisation (and support) of existing practices, with digital tools. However, in relation to the fourth option (which relates to the relationship between one's own expression and another's expression, which is included in one's own expression), there are, however, a number of additional principles that we will discuss here. In a sense, it can be said that in the digital medium, the difference between original and copy disappears. This is, for example, the thing that has disrupted the music industry, since in digital media you can copy music tracks infinitely many times for free (if you have the equipment). This is a basic

² Even pictures, audio and video exist in dynamic writing qua the computer's functional architecture – everything in digital media is, so to speak, text files written in different programming languages (Finnemann 2005).

condition that applies in principle to all digital and digitalised products.³ In principle, one can see, share and store a filmed teacher instruction as many times as necessary. In addition, we see shifts in time and space, where digital objects have a different materiality than non-digital ones. In time, one can consult, edit and produce digital objects synchronously, near-synchronously and asynchronously and even super-synchronously.⁴ In space, you can access anywhere in the parallel digital space (cyberspace) from anywhere (Tække 2002). In addition, several persons can, in principle, view and access the same digital objects with these object properties and displacements in time and space.

This opens up unlimited general possibilities for all subject matter insofar as teachers and students can master the necessary media practices. Here, however, the DUFA courses show us a number of obstacles, consisting of a lack of digital consciousness and digital competencies when it comes to teachers and students and in an undeveloped social structure. Like in the DUFA experiments (and, for example, the SME experiments in Chapter 3) the first thing is to develop social norms and a teaching practice which support the digital remediation of collaboration and feedback before the schools can go 'all in'.

Yet, we also have concerns about the current actualisation of digital support potentials. As it is now, one can choose between poorly functioning and secluded learning systems, designed for the sake of commercial interests that pull data out and seek to automate teaching into a form of learning based on profiling, big data and machine learning algorithms (Williamson 2017). Alternatively, one can choose the commercially well-known actors like Facebook, Google, YouTube and Twitter (who also use data etc.). We will not discuss this here but will stick to the fundamental possibilities that digital media opens up (however, we return to the big data issues in Chapter 5). In the DUFA courses, free, open and well-functioning digital media were used.

In the social science course with process feedback in Google docs and peer feedback in a Facebook group, it turned out that it was not bad with norms. However, one can have reservations, especially from a *Bildung* angle. The success criterion was to design exactly the assignment that the teacher had in mind: The students had to learn exactly this, X and sharing documents and written

³ Digitalisation is the term for the conversion of analogue objects into digital objects. Thus, many books, films and recordings have been digitised. All previous communication media can be remedied through digital media (Finnemann 2005).

⁴ Supersynchronous means that, for example, if you have temporarily been away from an online conference, you can catch up by playing back what has been going on while you were away at a fast pace, thereby catching up on what you have missed.

interaction were used for that purpose. Yet, the general possibility of digitally supported feedback and mutual inspiration can be dealt with in different ways. The unfolding of these potentials will also help to develop norms and culture for when not to use digital media (e.g., keeping external logic and values out of the education system which should be aimed at *Bildung*; see Tække 2019). However, two intra-educational issues need to be addressed: originality and transparency.

The issue of original/copy is affecting society for good and evil today and is most 'evil' because we live and think in the old media environment. The structures that society is built on, and which the adult generation has internalised through their own upbringing and education, are undermined by digitalisation. You can't make a living selling copies of something that is free to produce. A school is not affected in the same way, since the production or subjectivation of students into educated citizens, is not directly affected; man is not a digital object. Yet, the problem is that many of the products that students need to help them become educated are digital and can be copied, edited, etc. in time and space. Structures and rules are not geared to this new situation, which is why control systems are being built to maintain old rules and forms of teaching instead of trying to create something new.

In the DUFA courses we can see how the digitally supported scaffolding of help to self-help presumably minimises the problem of so-called plagiarism. However, over time, the educational system may react quite differently to the problem, which is really only a problem from the perspective of the old media environment. It is a basic condition that digital objects can be copied, but also edited, etc. in time and space. We already live in a participatory culture characterised by sharing, spreading, remixing, reformulation and appropriation,⁵ produsage and intercreativity; this culture is characterised by the fact that, together with others, differentiated products are produced in networks where the producer, distributor and consumer are not as clearly separated as before (Bruns 2008). Against this background, it might seem appropriate to modify teaching practice to legitimise that assignments consist of clipping together paraphrases, summaries and quotes, but with close reference to sources and explanations of the student's contribution, as well as justifications as to why they selected the materials on which the assignments are based. This would be an academicisation of the way we have actually always worked! Tasks

⁵ Jenkins (2006, xiv) defines Appropriation as: 'The ability to meaningfully sample and remix media content.'

have always had to be based on other's materials, such as a short story and previous interpretations of it, as well as texts about authorship, time and the environment, about other works that are similar or inspiring, etc. In the digital writing process it is, on the one hand, easy to find something and to cut it together, and/or to rephrase some of another person's assignment. On the other hand, the student not only has the sources selected by the teacher, or in larger tasks, also by the librarian, for the assignment, but is also required to find sources herself. In other words, the school must focus on digital teaching objects and find out through experiments how best to teach in the new media situation. This is where the last issue that we will look at in this section, transparency, comes into play.

Digital media provides opportunities for transparency that can easily get out of hand in a negative sense and transform into surveillance. In relation to the original/copy problem, legitimisation of appropriation and remix creates a basis for students to willingly provide transparency in relation to their work process. This will make possible to teach how to legitimately and academically piece together an assignment using other student's work, how to find and apply primary texts, refer and quote. In the DUFA-project we observed how already the scaffolding through shared documents and written interaction, with peer feedback and teacher process feedback, reduced headless plagiarism. In the course of mathematics, the teacher chooses not to just lay out all the completed assignments in the Padlet, but to let the students upload their completed assignments and then correct them. This allowed the weakest students to look for and use others' expressions to improve their own. However, they were fully aware that it would not help them when they were later given a test if they had simply plagiarised blindly without further consideration. In turn, it helped them to see the other's assignments and paved the way for a culture in which they gradually laid out their assignments and, by the teacher pointing out their mistakes, could gain insight into how they could have done better. Here, however, the password is culture. Culture for transparency is poorly matched to performance culture and mark tyranny where, as a student, you are judged by what mark you get. The method of using Padlet to submit assignments asynchronously creates a situation where, if the students are told to share their work with each other, they tend to wait to share until the end of the allocated period because they are also encouraged by the school system to think of themselves as competitors. Weaker student thus risk failing the exam without Padlet assistance.

If we look at the transdisciplinary practices (with shared documents etc.) from the perspective of the three dimensions of *Bildung*, there are ways to use

the new digital media to challenge the students both according to their *knowledge*, *attitude* and *existence*.

Knowledge of mastering and handling digital objects can be promoted, encouraged and challenged in all subject matters. You will be able to sit in different places and times and work on the same document or coordinate other teaching activities through written interaction. If you are at home and have a problem with a math piece, you can, for example get help via written interaction, for example in a media with the same functionality as in a closed Facebook group. Student's understanding of themselves, media and the world is likewise helped along as one can interact with otherness elsewhere in the geographical space. Finally, creative forms of knowledge (i.e. creation and innovation) can be promoted and challenged because students either from the classroom or from their home (or elsewhere) can now be encouraged to take part in productions and appropriation communities and networks.

Attitude is a crucial educational prerequisite for knowledge to flourish sensibly and not result in antagonism and a world that is worse. Attitude turns out to be crucial in all four forms of media practices (see Chapter 2), but let's just mention 'community practice' here. In all three of the transdisciplinary experiments highlighted above, good and appropriate forms of community were developed. One example was that, in all three courses, we saw that students were willing to share their knowledge, interim calculations and results. This is not a matter of course but is 'culture dependent'. The experiments indicate that with the right cultural work in the classroom as well as the right organisation of the activities within digital media, the students are encouraged and supported to be helpful and generous towards each other. Also, the new transdisciplinary media practices seem to offer more possibilities to understand how others understand and thus more opportunities to relate to how you understand yourself. In the above experiments, we see, for example, how students partly gain insight into how the teacher understands a task, and partly how the other students in the class understand the task and how the students work with their own understanding. One could say: they practice *an understanding-seeking attitude*, where one diligently and consciously pivots between the understandings of others and their own understanding. The result seems to be that the students succeed in creating a community where they have a 'good attitude' to each other in class.

When it comes to *existence*, it is obvious that in the era of social media, one must write oneself into existence (Sundén 2003, Tække 2007). With Facebook, the distinction between one's online self and offline self has disappeared. This

means that we will have to co-create our social self in both speech and written interaction. In the digital age, we make traces as communication takes place in a storage and retrieval medium. In this situation the school must help students to write their way into existence. If this is successful, the students (all else being equal) can build up their self-relationship critically and find the voices that harmonises with who they are becoming in conversation with the otherness they meet digitally and analogously. This self-work that is scaffolded in the school through good community practice will provide the prerequisites for mastering oneself and the world (e.g., one's insecurity) and help one to find one's own voice in various situations. Initially, this will only be by meeting with the teacher and the other students, but eventually through encounters with external alterity as well. This also helps to support the understanding of oneself and the world that develops over the school years in the encounter with otherness and the greater experience of who one is, what abilities one has and who one wants to be; and perhaps also lays the foundation for creating a better world of coexistence.

Path 2: New Special Subject Matter Bildung Practices

The second path is to develop new special subject matter Bildung practices which, through embedding digital media and technology, reconfigure what the subject matter in question is and thereby redefine it. This transformation involves a clear shift in the teaching and, to some extent, also a shift in educational aims. In particular, five of the DUFA experiments point in this direction and thus provide inspiration for reflection on how it can happen and whether it should happen. Since all technology has a faustic aspect, in this context one should not only look at what new possibilities a media offers, but also on the obstacles; what is lost, neglected or impossible (Postman 1993). The five DUFA experiments that exemplify the redefinition of subject matters through digital embedding are:

- A course in designing an allotment hut, in design and visual arts.
- A course about social media and political elections, in social studies.
- A course in embedding digital timelines, in history.
- A course in programming physics learning games, in mathematics and physics.
- A course about social media in China, in Chinese.

In the design and visual arts course, the technological development of 3D mathematical drawing programs caused a shift in both means and aims. Besides

the use of media in general, the use of SketchUp⁶ was central. As a means, part of the practical work in the subject has now shifted to the acquisition and use of this program. Manual work with pencil, calculator and ruler has been replaced with a program that has all the features needed to make 3D models of physical objects that can be virtualised in geographical contexts. This, in the first place, allows the educational aim of the subject matter to be reinterpreted to the acquisition of higher and more realistic standards when it comes to the 3D product. Second, the aim can be shifted to actual design, aesthetic, and social assessment criteria such as we saw in the Swedish research in Chapter 2 (Marner 2013; Marner and Örtengren 2013). It is not a part of a house designed with a pencil and ruler that is assessed, but the actual location of the house in the landscape, its socio-cultural characteristics in relation to the target group, etc. Third, students now work in a mode comparable to that architects and engineers work in, which is why students gain a more realistic insight into the design work. They gain insight into the virtual work and are assessed on design criteria and not on fine motor control in ruler use. The Faustian aspect here is whether the students who have shifted to virtual work lose touch with the physical world: working with a ruler, or, for example, a two-metre ceiling height. This is a risk, but it is taken into account in the exemplary course, as students have to make a total physical measurement of their rooms at home, which should be modelled in the 3D program as in the first exercise. During the observations, a student forgot to measure the door height in her room. It gave rise to many attempts to remember the height, e.g. her own body in relation to the ceiling height, and in relation to the height of the doors in other rooms. In addition, there were measurements of the classroom's basic areas, physical LEGO exercises, etc. The design of the allotment hut 3D models was not only a phantasmagorical simulacrum, but also a greater opportunity to form a realistic model of a finished product that could be put into context.

In relation to *knowledge*, the reconfigured design and visual arts course challenged the students to master themselves and the world on a higher and more up to date real-world level. The students now do something that mimics what professionals do outside school, to which teaching now transgress what was possible before. Knowledge ambitions thus might get further, as education can set the aim of teaching higher, when less time is given to the old manual work, while the new manual work with 3D brings the student to a higher level of

⁶ SketchUp is a 3D modelling computer program for a wide range of drawing applications such as architectural and interior design, landscape architecture, civil and mechanical engineering and film and video game design.

knowledge and a greater understanding of herself and the world. Students can now use more energy to get into the context and design more purposefully and adequately. This also includes encouragement to be more creative and innovative. When it comes to attitude and existence, the experiment does not seem to actualise new possibilities for challenging the students in those two Bildung dimensions. This may be due to a lack of third-wave teaching in the documented DUFA course (the students did not interact with people from the outside (people from the target group)).

The course about social media and political elections in social sciences also has brought a shift in both educational goals and aims. The means changed because the students in the experiment interacted virtually with politicians and met them in the new media environment. The aims changed because the students followed politics into the new media environment as a new topic with its own ontology (e.g. its own agenda-setting influence). The alternative would be to go to voters' meetings, analyse electoral advertisements and articles in newspapers. These are still important parts of politics studies along with reading electoral programs, etc., but they can no longer stand alone as social media has become an important political platform. The aim has thus shifted to include empirical work *in* the new media arena. Here, the Faustian aspect will be the loss of the physical electorate, which is not, however, a necessity. There is no doubt that the analysis of what is happening on social media and the new possibilities this has created (i.e. interviewing local politicians on social media) is now an important part of the teaching. In addition, in the future, the use of microtargeting and dark posts should also be included.

When we look at the process as potential Bildung engagements and focus on knowledge, the students are challenged to get a better understanding of the world, here in the form of election campaigns on social media, through the interactions between the students and the interviewed politicians and, most importantly, through interpretations and discussions of the findings in groups and in the class together with the teacher. Regarding attitude, students are challenged to develop a better understanding of how action is taken on social media. The results of the experiment showed that a lot of the students – self-confessedly – were initially very naïve about social media and political elections, but the course allowed them to become more critical. When it comes to existence, the process challenged the students to contact and interact with strangers (i.e., politicians) and also to develop their own critical voice in that situation and subsequently reflect on the incident. In the DUFA experiment this led some students to create a new and more independent attitude to politics.

The course about timelines in history worked by embedding digital timelines. This does not really change the aims of the subject matter, but it improves the means. With digital timelines the students are supported to get a better overview of historical time, but also to work more creatively to create an overview of long-lasting and extensive historical events and periods from the internet (e.g., pictures, text etc). In the experiment, this also included work with critical attitude and source criticism in relation to digital sources. Perhaps this can be interpreted as some kind of change in the aim of the subject, to some smaller degree similar to that in the design course. The students were challenged to be more aware of the ‘construction’ and contingency of historical overviews. This can be seen as a kind of incremental innovation that helps students to gain a better overview of the short and long lines of history. As a faustic aspect, it can be mentioned that timeline automation for overview may weaken our mental overview, in line with Plato’s argument that writing weakens our memory (see Chapter 1).

When we look at the course as Bildung engagements, it challenges the student’s *knowledge* in terms of understanding; they are now encouraged to ‘with better means’ acknowledge and create short and long lines in history which, in turn, provides a better basis for creating a critical *attitude* to history and maybe for understanding oneself in an historical context (existence).

The course in programming physics offered a change in terms of both means and aims. The point is that the upper secondary students are programming digital games, which are tested and used by students in an elementary school. The mathematics is transformed into knowledge of the equations of physics and then into a multimodal mathematical simulation in the program *Scratch*.⁷ This operationalisation of mathematics was not possible before. The product is a digital object. In addition, the various media for written interaction, as well as Padlet, etc. were used to scaffold the programming in Scratch. The students are challenged to become familiar with programming and obtain technical insights into how algorithms are adapted and work. The course raises mathematics from calculating something to implementing the calculation in a game where it is executed so that an object, for example, moves in a certain way. To be realised, the cause required a complex organisation with multiple teachers and consultants, virtual interaction, class hours and a confrontation with a user group. The faustic aspect may be that you become good at *using* mathematics, but do not necessarily

⁷ Scratch is a free programming language, developed by MIT, that makes it easy to create interactive stories, animations, games, music, and art and share your creations on the web.

obtain a deep understanding of mathematics as something important in itself. In interviews, it is suggested that, despite the many hours of the course, the students have not really learned anything new about mathematics. On the other hand, their mathematics skills might have become more robust and they might have learned to operationalise their knowledge. Including programming in mathematics and physics, including interaction with an online programming community associated with Scratch (third wave), transforms what science education in an upper secondary school can do. Students are introduced to programming and gain insight into a digitalised and algorithmic world, including remix culture, in an online programming community. The focus is on expression practice – to create and produce digital learning games.

The course challenges and supports both mastering, understanding and, especially, a creative science Bildung engagement. It challenges the students' knowledge, their ability to collaborate and relate to programming, science and primary school students (attitude) and also encourages unique and individual choices, considerations and expression (existence). By producing games for primary school students and through interaction with an online community, students are involved scientifically in the world. By including programming, subject matters in science are updated to a digital world. When we look at the course as Bildung engagements, it challenges the students to better master, understand and create digital media. This also encourages the students to form a reflected attitude to a world governed by algorithms, which could, however in the DUFA course, be more worked on more obviously by linking a social or humanistic subject to the process. Attitude and existence are perhaps traditionally weak in the sciences which, more than other fields are subject to a rationalist paradigm.

The course about social media in China in Chinese is an example of how digital media is revolutionising education. The fact that pupils in Denmark can interact with pupils in China is, if not revolutionary, a qualitative change compared to writing paper letters to each other. Students sit in the present, feel the mutual presence, want to make themselves understandable and get the language alive. The teaching resources have changed, both technically, organisationally and didactically, but the aim is still mastery of a foreign language and an understanding of China and its rich cultural heritage. The process can also be said to teach about the new media and the media situation in China and these are new aims. In this way, the process is similar to that in social science and politics. Social media is now widely used in China and is changing what China is. If the subject matter is to remain adequate, the media must enter the

curriculum not just as a tool, but as an integrated part of the subject – otherwise you will not learn about China and Chinese, as it is now. The course could have made more effort to provide a critical attitude with regard to digital media and surveillance in a dictatorship state. However, this can be included in the future. This course is a good example of why the third wave is important in teaching. As the world is now interconnected, the diversity it offers – or perhaps the knowledge and cultural respect we have developed for differences – cannot be recreated in a closed classroom. Perhaps before digital media, it was enough to read a book about China? It seems almost absurd now.

Looking at the course as *Bildung* engagements the students are encouraged to improve their knowledge of the Chinese language so that they became better at mastering it. Also, they are challenged to strengthening their understanding of the Chinese people and China as a country. However, as with the course about learning games, the current design does not seem to contribute much to the development of a critical attitude. From the outside, it seems more astonishing, since language subjects are precisely within the cultural field, but perhaps the teaching of languages is under such pressure that there was no surplus capacity to focus on technological surveillance and suppression. In addition, language can almost resemble mathematics when the assessment is not focusing on the foreign culture but on the code of language. That being said, the course has, of course, contributed to both attitude and existence since the students first imagined interacting with Chinese students and then did so. They have thus had to imagine and identify with cultural politeness and find their own voice in relation to this. The course also exemplifies how the use of social media and digital media in linguistic and cultural subjects can make a transformative difference, as teaching can change from simply being communication about (e.g., Chinese) to becoming communication with both Chinese (friendship class) and outside experts (professionals). Embedding interaction with Chinese students seems to bring students closer to a better understanding of Chinese culture as well as their own culture, society and everyday life. In addition, it allows the possibility of maintaining further voluntary contact with Chinese students. Both expression and impression practices appear to be strengthened. Interaction possibilities in teaching are increased and improved and more students can develop their own voices. It gives rise to new ways to organise community activities. The experiment both enhances the internal interaction in the class (second wave) and opens up more interaction with the outside world than was previously possible (third wave). Since the experiment takes place in Chinese, where the language skills being worked on are relatively elementary, the

internal interaction aims at mastering linguistic skills. However, the interaction with the outside world provides ample possibilities to support an understanding-orientated and creative Bildung engagement that addresses both attitude (e.g., being open and critical) and existence (e.g., gaining personal relationships and contacts around the world).

In general, the introduction of digital media into individual subjects paints a transformational picture of the way they are being taught, both in terms of means and aims. This is summarised in the following table:

Table 4.1 New aims and means in the single subject matters

	Mathematics and Physics	Social studies	History	Design and Visual Arts	Chinese
New aims	Programming, computer games and algorithms	Politics and social media	Search criticism in relation to Internet sources	Digital 3D design solutions	China and social media
New means	Online community, online group, programming language	Social media, online sharing documents, websites, online group	Digital timeline tool, digital remix of materials for overview	Digital drawing program	WeChat, and digital language tools

As shown in the table, all five examples involve both new specific aims – or perhaps, more precisely, new kinds of academic content – and are embedding new means. In relation to aims (or content), the courses mainly take up subjects that they have already been in touch with, but which are now emerging in new ways. For example, political elections in social studies, where the object (politics) has changed with the advent of social media. This means that we have a new aim within the subject matter which is to challenge the students to become wiser in relation to what social media means for political elections. This is an *update of the subject matter*. Similarly, digital means are being used to meet these new aims, which are, in most cases, closely related to the subject (e.g., a digital drawing program in design). This is unlike path 1, where we saw that the media could be used in almost any subject. Prevalent to the five examples is that digital media does not completely replace analogue media but instead *extends* a media chain so that the teaching involves both analogue *and* digital media in a way where the latter are embedded in an otherwise predominantly analogue teaching. We

would therefore say that they all provide examples of a digital renewal of the different subject matters, understood as a modification of the existing subjects rather than the emergence of completely new subjects.

Path 3: Digitalisation as a Bildung-Relevant, Epoch-Typical, Key Issue

The third path is to work with the digital in teaching as what Klafki (2005) calls an *epoch-typical key problem*. This is especially important in relation to challenging a student's reflexivity, so that the use of media does not happen blindly, but through critical understanding, dialogue and genuine participation. Only one of the DUFA experiments primarily pursued this path, but there are several courses that contain elements that go in a similar direction.

- Course on the Internet's structure, information search, source criticism and correction of misinformation, in English.

According to Klafki, students in school – seen from a critical Bildung perspective – should not only be adapting to an existing society but should also be able and willing to improve society. Therefore, if students are to work with information search and source criticism in teaching, it must be done in a way that encourages them to co-decide on the development and use of the Internet with special regard to information search and source criticism. Klafki's answer to how this can happen is the idea of an epoch-typical key problem.

Instead of the idea of canons as a substantial core, for what one should work with in school, Bildung, according to Klafki, should be understood as historically conveyed awareness of an epoch-typical key problem both in the present and in the supposed future; including the understanding that everyone is co-responsible. Back in the 1980's Klafki proposed five such problems: (1) the issue of peace, (2) the environment, (3) societal inequality, (4) the dangers and opportunities of new technical governance, information – and communication media, and (5) experiences of love, human sexuality and gender. Yet, this list is not fixed; in Klafki's view, the question of what the most important epoch-typical key problems are should always be open to discussion by schools, teachers and students.

The criterion for such key problems is that they are time-specific structural problems of societal and worldwide importance which, at the same time, relate to each individual in a central way. The course on information search and source criticism relates precisely to a worldwide problem with fake news, alternative truths, misinformation, echo chambers, etc. With the insurmountable complexity

of the Internet, searching for and finding relevant and valid information has become a problem for everyone. This, on the one hand, has given many a more reflected relationship with truth, since, we do not necessarily believe what is written in the newspaper or what has been said by the President of the United States. On the other hand, our best way to find truth might also include digital media, even though they offer much false information, as well as machine learning algorithms that, based on big data and profiling, allow us to receive different ‘truths’ about the same objects (see more about this in Chapter 5). According to Klafki, it must be possible to agree on the seriousness of such a problem, and to recognise that there are different answers to the problem, and that these answers may depend on interests and attitudes. By working with such a problem, it becomes possible to create teaching that is both relevant and interesting to the students and which deals with something that is world relevant.

Information retrieval and source criticism relate, in particular, to what Klafki calls ‘dangers and opportunities of new technical governance, information – and communication media.’ However, as Klafki also points out, the key problems are interrelated and therefore must not be worked on separately (so as not to miss the possibility of developing coherence in thinking). Information search and source criticism exemplify this, as the Internet offers various information on both the peace issue, the environmental issue, societal inequality and experiences with love, human sexuality and gender relations (e.g., different information about the state of the climate, or whether gender is determined by nature or society). Thus, information search and source criticism raises questions that relate to all the key issues.

All this puts huge demands on a single, defined course like the one in the DUFA project. Still, the process of searching information in English goes far along the paths Klafki points out. The first part of the course teaches how to google, URL understanding, the anatomy of search results and the structure of the Internet (www.), advanced search functions, all of this in combination with information search exercises. The next part is about consuming web content and looked at topics such as clickbait, alternative truth, going viral, fake news and source criticism. The big question was how to evaluate a website’s validity. Before the final part of the course, the students are presented with target group analysis and it ends with a dissemination section where group work is done on a dissemination project, organised as a competition to get the best possible engagement on one’s information product, which can be in the form of an Infographic or an Explainer that exposes and corrects untruths from existing websites.

The clear general aim of the process is to empower students to be both critical and competent in information search and source criticism. The course created some specific opportunities (or possibilities) for the students to improve their knowledge, achieve valuable experiences and act 'on it'.

According to Klafki (2005) not only must we work intellectually with the epochal problems, but also with their 'importance to us' and 'demands on us'. If you only deal with information search and source criticism intellectually, you will simply turn it into a 'school subject', which is something you talk about, but do not connect with life. Through projects, studies and practical processes, information search and source criticism must be sought out and discussed. As far as possible, the school should help students to gain experience and to share their solutions. By the end of the DUFA course, students not only acted by conducting and learning information search and source criticism, they also were capable of disseminating and then correcting misinformation on the internet.

However, such a course must not stand alone, since it will slip into the background and therefore not affect either the students' general being in the world or their study activity. Also, within the general epochal key issue of 'the dangers and opportunities of new technical governance, information – and communication media', information search and source criticism are central, but other issues are also compelling, such as those related to the field of machine learning algorithms, big data and profiling, as we see in the Anglo-American school world (Williamson 2017). It is important that the education system takes this trend very seriously because it discourages Bildung and is a relapse into behavioural pedagogy (see Chapter 5).

From the perspective of the three Bildung dimensions – knowledge, attitude and existence – students on the course are challenged to improve on search information and practice source criticism at such a high level that they can actually review the structure and logic of the web both in theory and in practice. When it comes to attitude and existence, the course encourages the students to develop a more critical attitude, and become existentially involved in the 'fight against misinformation' on the Internet.

Path 4: Third Wave Activities that Transform Classroom Teaching and Bildung

The fourth path is to develop what we have called third wave activities (i.e. activities that include digital mediated interaction by challenging others), thus helping to transform what is meant by classroom teaching. As we have pointed

out in the analyses, in the third wave activities there is a very large untapped Bildung potential. Some of the DUFA experiments contain actual third wave experiments and can therefore provide inspiration for further development along this path.

- The course on social media and political elections, in social studies. Interaction with subject relevant people (politicians) and professionals (expert in elections).
- The course on social media in China, in Chinese. Interaction with subject-relevant people (students in Chinese friendship class) and professionals (expert in China).

Increasing interaction in the classroom using digital media does not, in itself, lead to the development of a new style of teaching and Bildung that takes full advantage of the new interaction and representation possibilities between the class and the outside world. If the school wants to act more extensively and innovatively, it can create a new hybrid form of teaching, involving not only teachers and students, but also other actors, via the Internet. In this new form of teaching, the school must try to cultivate relationships whereby the teacher intervenes both in the educational community and in the individual student's learning network. This approach, which has been actualised to some extent in some of the DUFA courses and which is a potential extension of others, provides a classroom, which we call, the contact-seeking classroom. Only with this form of teaching can the closed echo-chamber classroom be broken and the focus on how pupils can be engaged and involved in the world through teaching be realised.

The contact-seeking classroom occurs when people other than students and teachers are integrated into the teaching via interaction on the Internet. When it happens on a daily basis, it changes the classroom that has existed since the school began in the media society that preceded the present. Instead of closed classroom teaching between teachers and students, we can now begin to observe an open interaction system. This gives the education system new perspectives on what teaching is and how teaching can proceed. Students can now meet people with other perspectives, viewpoints, experiences, knowledge, languages and reactions. The teacher and textbook become decentralised. From being the ultimate other through which students are to be formed, the teacher becomes a mediator of otherness. Students meet their contemporaries, with other views and perspectives, which they, with the teacher's help, critically relate to and process before, during and after the meeting itself. The increased engagement

that can be documented in the contact-seeking classroom (Chapter 3), we interpret as, among other things, a consequence of the authenticity that students experience in their schoolwork when it involves outside contact.

The course in social studies invites the students to involve themselves with the world by interacting with local politicians. In this we see an example of actualisation of the third wave. This knowledge and information gained from the outside eased the problem of the textbooks having almost nothing to say about the importance of social media in elections and in the political system. The students found it both interesting and instructive that they themselves had to study how the parties used social media. The contact with the politicians was an eye-opener for the students because they had not imagined that it was possible. To this end, it gave rise to reflections on the importance of social media, both in their own lives, and in relation to current political processes. Thus, the course encourages the students to relate to and participate in the democratic debate, which is done on a qualifying basis in teaching. Students are then challenged to critically make up their mind and understand that politicians can use social media to manipulate and acquire voters who may not agree with their values. This gives students the opportunity to consider how political culture and participation can be improved for the benefit of the public and not just to consider how a politician can optimise effective communication. Since politics and ideology are at the core of social science and since politics today is also largely carried out on social media, it is almost impossible to meet the subject matter's requirements without third-wave activities.

If we generalise from this course, third-wave teaching is a way for the schools to involve their students in the societal development. Borders change, the focal point of the media shifts, perspectives change, history is rewritten, new markets emerge, old species die out, pandemics spread in record time, ice melts, and how much has the water level risen today? The world is accelerated in dynamic and unsteadiness, and the schools should probably stand a little on the sidelines and observe and reflect. However, the school must have updated and nuanced information for its *Bildung* processes which address the epochal key issues of the time.

The course in Chinese also had third-wave activities, partly with an expert and partly with a friendship class. Again, we saw high level of commitment. In the SME-experiment there was also great success with friendship classes, which often form the lowest hanging fruit when it comes to third-wave activities. The classes have a slightly different curriculum and a teacher who explains things that are a bit different, for example, lives somewhere else may have different

socio-economic background, etc. They represent an otherness. The activity induces engagement and diligence beyond what one sees otherwise. Authentic third-wave candidates may also be practitioners (e.g., a politician), or experts (e.g., a university election expert), or someone who is just authentic in their role (e.g., a refugee), or condition (e.g. pregnant). Thus, there are many ways that each can provide educational input from the current world. During programming learning games, we saw other teachers associated with the course as professional experts who assisted with the academic processes; this is another category associated with third-wave teaching.

In general, from the experience of the SME-experiment, and the DUFA-project it is important to work thoroughly with the issues that belong to the first and second wave, both in relation to Bildung and in relation to media practices, before establishing contact out of the class. Thus, one must be able to organise (community practice), participate appropriately and professionally (participation practice), be confident in information search and source criticism (impression practice) and be able to express oneself in and handle the necessary media (expression practice). The knowledge, attitude and existential development must be matured for the contact in question so that the teacher believes that both the students and the person from the outside do not suffer harm.

To summarise the third wave-path based on Bildung engagements, we see improved opportunities for challenging students' knowledge in individual subjects, partly in terms of the adequate information that can be extracted in the contact and partly in terms of better mastering, understanding and creating of the world. Attitude is also challenged both in terms of mastery and understanding of otherness, as these are authentic situations that are prepared, executed and reflected upon, which also strengthen the creation of oneself and the world. The same goes for existence: through the interactions with real challenging, and different others, chances for better understanding of oneself and development of one's own voice are improved.

Conclusion

In this chapter we have elaborated on four different ways of designing and carrying out Bildung orientated teaching in the digital age.

The first path takes digitalisation into consideration on a general transdisciplinary level. With digital media it is possible to create and develop new transdisciplinary teaching practices, in which digital media are embedded

and integrated with analogue media, that can be applied in all subjects, in different variations. We point to the digital *mediacy* (see Brügger 2002) as consisting in a resolution of the distinction between original and copy played out in a new space-time that disrupts the current mode of society, including the education system. The perspective indicates that the new information and interaction situations calls for a restructuring and new norm-building adequate with the new media environment. Such attention to the new spatial and temporal possibilities could move the school as a whole (i.e., all subjects) towards a new mode with new criteria for what an assignment is and how it is produced. It requires changes to rules, practices and culture. However, there is no ready-made solution that can be implemented, which is why the school must start an experimental and innovative movement through which the new material basis for the social is generally developed in all subjects as a basic condition.

The second path follows the individual subjects, where the development deals with how the individual subjects re-configure both means and aims in the virtual space. There are major differences here, namely that all subjects can advantageously change means, but where only a few, as it seems now, will change aims. That is not to say that the qualitative leaps provided by the new means, for example, to make systematic searches of databases and use sensors and webcams all over the world, will eventually result in pushing the aims of all subjects. In the DUFA history subject, only an incremental change was seen that gives little advantage in historical overview. Subjects that can more easily simulate their teaching object digitally will be better able to change both means and aims. If the teaching object can be remediated digitally or, if it is simply born digitally, it should easily be transformed. Yet, it is not a goal in itself that teaching must change. It is only a requirement if the digitalisation of society (or something else) calls for it. When it comes to means, all subjects will be able to change, as they all rely on communication to a greater or lesser degree and therefore will be able to undergo shifts like those we looked at in 'the first path'. For instance, subjects such as sports and biology undergo changes with regard to means (everything that is included in the subjects can now be tracked, measured and calculated), while the aims, for the time being, seem almost the same. In visual art and design, we see a more profound change because the subject's object in the outside world has changed as has the object for assessment, from work with a ruler to the product's fit in the landscape and cultural context.

The third path dealt with epoch-typical key problems. It linked the media revolution with a fundamentally critical, democratic, humanistic and

emancipatory foundation. We exemplified one of the media practices from the DUFA model and illustrated how searching valid information is crucial to the human being in today's society. It is important for Bildung (knowledge, attitude and existence) that each epochal key issue is linked to the other epochal problems. In order to understand, for instance, the climate crisis, one must be able to search and thereby build valid knowledge that will enable the students to master and recreate themselves and the world. This path is important because it anchors the shifts in communication patterns in the world society (political, economic, military, in relation to gender, etc.), that is made possible by digital media, in a humanistic Bildung tradition. This can, through criticism as a societal feedback loop, prevent society from distancing itself from a society based on human rights, sustainable nature and peace (one can think of the UN goals in this context). In this way, the school must take responsibility and encourage the next generation to be able maintain that responsibility.

The fourth path is concerned with third-wave teaching. This points to the fact that the school can keep up to date with the rapid and dynamic developments in the school's environment. It is not useful to teach outdated content in an outdated way. Third-wave teaching solves both problems at once, with contact outside the classroom. This, in turn, is not easy, as our previous research shows that one must first work with first- and second-wave issues, and practice media skills. On the other hand, this form of teaching seems to engage and involve students both in school subjects and the world because of its intensity and being updated with media use and the organisational practices and social encounters with alterity and challenging otherness it entails.

If we try to put together the four paths, the school seems to be at a crossroads. The paths are not mutually exclusive but complementary. Turning to the first path, we generally see the school as a system that, in all subjects and in its foundations, must seek to find itself in a world where digital media offers new possibilities to structure teaching and schooling. Looking down path 2, we see the individual subjects that must find their reconfigured way into the digital world. They must keep themselves informed about the course created some specific opportunities (or possibilities) for the students to improve their knowledge, achieve valuable experiences and act 'on it'. Looking down the third path, we are reminded of our responsibility to work out what digitalisation itself means – as a main problem of our epoch – and to seek to influence this development based on a Bildung ambition. Looking down the fourth and final path, we see a mode where the other three roads can meet and begin a spiral. The school in general, each of the subjects and our responsibility for digitalisation as

an epochal key problem can be part of the process of teaching. The development of the school becomes an objective that is continually revised and developed using processes that reproduce and modify the school's mode through each and every school hour executed with the other three paths in mind in third-wave actions.