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The Three Waves

Until now we have outlined theoretical and research literature on the relationship between education and media. Especially we have outlined the concept of *Bildung* in Chapter 1 and the four didactical digital media practices in Chapter 2. In this chapter we briefly outline our own research from 2006 to 2019 and then present our theory – the theory of the three waves – about how the education system and actors within this system, like teachers and students, seem to develop their responses to digital media. We start by presenting these responses on a general level, but we also discuss different variants of these general responses, depending on the basic educational understandings that different educational actors rely on (see Chapter 1 for these).

Our Studies of Actor Responses 2006–2019

From 2006–2011 we carried out studies in different upper secondary schools in Denmark in the form of interviews and observations and small surveys about how digital media and wireless networks influenced the interaction between students and teachers (Paulsen and Tække 2009, 2010, 2010b). The findings were discouraging; they showed that these media have created many problems in relation to distraction, conflicts between pupils and teachers and a high dropout rate. The definition of the situation reported in interviews with both teachers and students was that the students were in a state of addiction! Our observations showed that the teachers either met the new media with prohibition or unconcern. The result was either control, surveillance, circumvention, mistrust, *or* ignorance of the new situation and the teachers either did not use the new media and the students was not supported to learn to use them, or teachers used them in a very limited and/or questionable way. Based on our theoretical analysis of the situation and reviews of the research in educational use of digital media (see Chapter 2) we have subsequently launched three action-based research projects.

The Socio Media Education Experiment

Our first action-based research project on education and digital media ran from 2011 to 2014 and was called the *Socio Media Education* (SME) project. Here we followed an experimental class (that ran from 2011–2014) in a Danish upper secondary school. Together with all the teachers of this class we tried to develop new and better ways of teaching in – and responding to – the new medium environment (Paulsen and Tække 2013; 2016). This enabled us to go into more detail and outline more concretely how educators could respond if they did not try to *prohibit* or *ignore* digital media, but instead tried to develop strategies for *initiating reflexivity* and also *teaching through social media*. The theory of the three waves (that we explain in the next main section) was the result of the SME-project based on experiments, dialogue with teachers, design meetings. The results were documented using various online sources, not least 30,000 tweets from the class, but also interviews with teachers, school management, individual students and groups of students and observation in the classroom. The project was funded by the Region Midt (the administration level between government and municipality in Denmark).

IT for All

The second action-based research project we launched was situated at *Randers HF and VUC*¹ from 2012–2015. It was called the BIT project (standing for: IT for all). In this project we re-adjusted the teaching to meet the obstacles, possibilities and new perspectives opened up by the digital media environment, but we worked on creating benefits for *all* students, including those so-called “weaker students”. The project was partly also a response to the technical changes we have seen all over the school world with major investments in wireless networks and interactive boards, among other things like iPads and smaller levels of investment in developing didactics to the new situation and further education of the teachers. To this end, the BIT project worked on the latter, integrating digital media into teaching by encouraging the teachers to experiment with knowledge sharing and discussion to help them reshape their teaching and thus develop more beneficial responses to the new media environment (Paulsen and Tække 2015). The project was documented through observations, online

¹ HF is an upper secondary school for adults and VUC is a general school for adults, but the classes we empirically followed and were in dialogue with, were mainly populated by ‘almost young people’, most of them only one or a few years older than those in ‘normal’ upper secondary schools.

sources and interviews and was funded by the school and Region Midt (see above).

Digital Supported Teaching and Bildung

In the action-based research project called DUFA (digitally supported disciplines and common Bildung) 2017–2019, we worked with two upper secondary schools (Rødkilde Gymnasium and Silkeborg Gymnasium) where, in both schools, we had a group of six teachers covering different subject matter. The task of the teachers in this project was to design teaching courses where they used digital media to support their disciplines *and* common Bildung (the latter being the general aim of all Danish upper secondary schools (Gymnasiums) specified by law. In DUFA book 1 (published in 2018) we provided the teachers with a research and theoretical overview, fleshing out a framework within which the teachers could design their courses. In book 2, published in 2019, we analysed 10 exemplary courses from the project, pointing out difficulties, shortcomings and providing the reader with four different and mutual supplemental scenarios for the future of the school (Paulsen and Tække 2018; 2019) (see Chapter 4 in this book for these four ‘ways to go’). The project was documented using observations, online resources and interviews and was funded by the Danish Ministry of Education.

The Theory of the Three Waves

The theory of the three waves describes the general patterns of how schools seem to develop *responses* to the new digital media conditions compared to the media situation before the Internet. We propose that these responses imply a shift from *closed* classroom teaching (see Chapter 2) to teaching that takes the form of an *open* community between students, teachers and third parties. However, the shift does not happen at once. Rather, we suggest that it arises and develops through three *waves* containing different educational responses to the new situation. We have outlined our narrative theory in Figure 3.1. On the Y-axis we have *educationally relevant attention* and on the X-axis we have *time*. In our theory, we assume that before digital media there was a given level of educationally relevant attention. This assumption can be called into question insofar as attention towards the educationally relevant subject matter differed from student to student, class to class, time to time, etc. Yet, there is no doubt that what we can

generally observe in *the first wave* of digital media and wireless networks is a huge drop in educationally relevant attention (Mathiasen et al., 2014). Also, we know that activity irrelevant to the educational purposes (e.g. responding to private messages) can significantly harm grade, recollection of information and note taking (Kuznekoff et al., 2016).

In our research we have observed that the first general response by teachers and schools to the new media situation is primarily either to *ignore* the new obstacles and possibilities or to *prohibit* the use of digital media for educationally irrelevant purposes. Both strategies – ignoring and prohibiting – generally fail for several reasons (Paulsen and Tække 2009; 2010; 2010b; 2013). At the same time, the new possibilities for teaching are neither actualised nor invented. In the first wave, we consistently did not observe a realisation of new and improved teaching, but rather a destabilised teaching with students trying to multi-task between computer games, social media and the educational interaction.

The second wave occurs when schools, teachers and students begin to modify the new media situation and make use of new media to create new possibilities for better interaction between the students and the teachers. In this phase, teachers begin to use the new media to draw attention back to the classroom by using specially written, digitally-based interaction within the class and shared online documents where students collaborate, monitored and guided by the teacher. The result is an intensified educational interaction where the attention is re-captured and more and better possibilities for *participation* arise. For instance, it becomes possible for teachers to get answers from *all* their students *simultaneously* through the use of written interaction media like Twitter, instead of hearing one voice at a time. This – and similar uses – helps to get more students involved and engaged in the educational interaction (Paulsen and Tække 2013; 2015; 2016). Despite the positive impact of the second wave, it only consists of ‘more’ and ‘better’ interaction and does not radically alter the classroom setting or the educational form. Yet, *the third wave* – which is truly radical – is made possible by the digital media practices developed and facilitated during the second wave.

The third wave arises when people other than the students and teachers become integral parts of the educational interaction via the Internet. When this happens on a regular basis, it changes the educational form that has existed more or less since the printing press. Instead of a closed system of interaction between teachers and students, we now observe an open system of interaction in which other persons outside the classroom participate and contribute. Students now

regularly meet people with other perspectives, views and responses and the teacher becomes a 'mediator of otherness and alterity'. In this wave, the teacher builds networks for educational purposes outside the classroom. Students connect to groups, other school classes, individuals and databases, using the new medium environment as part of their education. They take part in the *convergence culture* (Jenkins 2008) carrying out *produsage* (Bruns 2008), learning to navigate and take part in the new emerging society and its forms of production, network, communication and culture. The upshot is that teaching shifts from being a *closed factory* to an *open activity*, inviting different actors to participate. Instead of transmitting knowledge to the students, the role of the teacher is now to connect students with relevant otherness and make knowledge production possible across borders and differences.

The three waves correspond to some degree to Anderson and Dron's (2011) distinction between *three generations of distance education*. According to Anderson and Dron, first a *cognitive and behavioural generation*, next a *social-constructive* and finally a *connectivistic generation* have appeared successively. Even if it is possible to say to some degree that the responses we have observed fit in with these generations, we would argue that our theory and the distinction between the three waves works on a more fundamental level than the *scientific differences* identified by Anderson and Dron. Hence, we would argue that teachers and schools move through the three waves regardless of theoretical inclinations (but as we will also show at the end of the chapter, that there are *different variants* depending on theoretical inclinations or what we call their

Figure 3.1 The three waves of responses to digital media in education.

basic educational understandings, cf. Chapter 1). In the first phase, all teachers and schools must find a middle way between extreme versions of prohibiting and ignoring. This leads to the second phase: the use of digital media for educational purposes and what we call the ‘intensified classroom’. Yet, this does not completely solve nor repeal the distractions of the first wave but only deals with it more adequately. Further, the digital skills, experiences and competences achieved through the second phase (and the new developed media practices) *enable and motivate* the class to enter the final and third wave, where people other than the students and their teachers are contacted with the aim of contributing to the educational process. As Dede points out, schools are designed like custodial institutions, but we could have: ‘In contrast, a “distributed” model of human and technical infrastructure encompassing a wider context of formal learning outside classrooms that includes parents, museum and library staff, community members and older peers as educators who collaborate with teachers in achieving equity and excellence’ (2016: 106). As in the SME-project, we realised that these alterations are more practical and fundamental than shifts in learning theory. What we propose is not only a model of shifting learning theories, not just a theory of distance learning pedagogy, but rather a general educational theory of how the practice of education *as such* alters in the era of digital media, also accounting for the non-digital elements of education.

The First Wave – The Penetrated Classroom

With digital media and wireless networks, the classroom has opened up. This produces both a new space and a new time. Students can access educational communication from almost everywhere and at any time. Teachers can contact and interact with their students while they are at home or elsewhere. People ‘from the whole world’ can contact students and teachers in a classroom. The upshot is that communication in and out of the schoolroom has increased massively and attention is drawn away from the content of the teaching. Also, the homework culture is undermined because media platforms like Facebook, Instagram and Snapchat undermine concentration. When observing an upper secondary school class, you become witness to students trying to multi-task: they are trying to pay attention to the teacher and the educational interaction while they are surfing on the net and chatting on social media. This

situation causes much frustration among the students, but still they cannot escape it:

Researcher What about computers and IT and things like that, how much do you use it?

Student 1 Very much, I think. I also think, well, it can be difficult to administer sometimes (...) I'm being pulled slightly apart (...) then you could also just sit and play a little while something is being examined on the blackboard.

Student 2 You become addicted; you really do. If you find a funny game on the web, or it's Monday, and you just want to know what the others have been up to on the weekend, or something.

Student 2 You become addicted to it, because you know that you can always get hold of people and things like that, if you are bored.

Student 1 Yes, you take out your computer and switch it on and then it is switched on the rest of the day, and then you switch it off when you go home. And so, I think maybe it would be a better idea if the teachers just went in and said; okay, well, you may now switch on your computers because now we have to do something. (...) When it is right there, it's just so easy just to open it and then ...²

We found the statements about addiction surprising. When we started to analyse the situation, we came to the conclusion that addiction was an incorrect diagnosis, since only about 4% of the population struggle with addiction problems (Turan 1993, Young 1999) and more than half of the students felt disturbed by digital media (Mathiasen et al., 2014). Looking into medium theory we concluded that the problem was one of ambivalence because the old norm-system did not help the teachers, students, school management or the parents in the new situations (Paulsen and Tække 2010b; 2009). The students cannot help using the digital media for computer games and social interaction, even though they know that they do not learn as much when trying to multi-task.

The teachers have grave doubts about the use of digital media:

² This is from a student interview from 2007 (Paulsen and Tække 2013), before we launched the SME project in another upper secondary school in Denmark.

Teacher 1 I may well see on the students' faces what it is they're doing. Some are taking notes, while others are sitting with a broad grin – they are certainly not taking notes. But it is enormously difficult, and you cannot simultaneously teach and tell the students that they must be attentive or switch off their computers. If you try to go down and see what they are doing, they are quick to switch over to something else. And I think personally that it is frustrating. And now we've got wireless networks. Before, you could ask them to take out the network connector, but now they can sit and communicate with each other ...³

The teachers experience social ambivalence and do not know what to do in the new situation provided by digital media. In our observations, we found two different strategies used by the teachers and the schools: prohibition or indifference (Paulsen and Tække 2010; 2010b). In our analysis, we concluded that the problem could be explained as three kinds of ambivalence:

1. *An ambivalence of action:* This occurs when students do not know if it's okay to play a computer game, read a news article or look something up on Wikipedia: When the teacher explains for the third time something they already understand, or when they are waiting to get help because they cannot proceed.
2. *An ambivalence of interaction:* This occurs when students can interact with others inside or outside the classroom during lessons: When they receive an urgent message from home, or when they want to ask someone for help or feedback.
3. *An ambivalence of responsibility:* This questions who is responsible for the other two ambivalences: Students told us that they thought the teachers should take responsibility, but when teachers actually banned digital media and imposed control, they did not like the decision. Some teachers also tried to make their management or the students' parents take responsibility. In this way, the responsibility circulated among the players without anyone really taking it upon themselves. Our conclusion was that the new media environment had undermined what could be regulated through the old norm system (see Chapters 1 and 2).

³ This is from a teacher interview from 2007 (see Tække and Paulsen 2013), before we launched the SME project in another upper secondary school in Denmark.

With the SME action-based research project, we tried to change this ambivalence by getting a school class, along with their teachers, to generate experiments and create new norms and didactics more adequate to the contemporary media environment. Since neither prohibition nor indifference is a particularly appropriate strategy to generate norms, we gave the teachers the double obstacle that they were neither allowed to prohibit nor to be indifferent to students' media use. In addition, they had to help students *reflect* on their media use and, in particular, to demonstrate that we cannot multi-task without very large attention and memory-related deficits (see Chapter 2). One cannot, for example, write and post a status update on Facebook and simultaneously listen carefully to a teacher's instructions. Moreover, the teachers themselves had to use social media, partly because international research shows that it offers many new opportunities for teaching (Chapter 2) and partly because it helps generate educational forms and norms that are more appropriate to the new media environment.

- (1) Teachers may neither prohibit nor ignore media use in the class but must initiate reflectivity.
- (2) Teachers must use social media to teach through.

Based on the teachers' and students' work following these guidelines (see Figure 3.2) they moved from the first wave to the second wave.

Figure 3.2 The SME second wave strategy model.

The Second Wave – The Intensified Classroom

The second wave arises when schools, teachers and students begin to make use of the possibilities of the new media to create a better interaction between students and teachers. In this second ‘movement of the Internet’, teachers begin to use the new media to draw attention back to the classroom.

As documented in Paulsen and Tække (2013), the teachers in the SME class temporarily succeeded in recapturing their students’ attention when they simultaneously had to tweet about films they saw and presentations they attended. This was a re-colonisation of the communicative space which also has the advantage that because Twitter functions both as an interaction media and as a (temporary) storing and retrieving medium, the students’ tweets after the lesson work as shared notes, for instance, about the film that they had discussed while they saw it.

Student 1 When we saw a film, then the teacher questioned us on Twitter and we had to answer. I think it was really good.

Researcher And why was it good?

Student 1 Because then you got it if it was something essential . . . something that you did not get.

Student 2 . . . instead of remembering it all after the film. It can be relatively difficult to remember a whole film afterwards.

Researcher Wasn’t it difficult?

Student 1 No, not really, you only lose a few seconds because it is running at the same time. What you lose is just how the picture was.⁴

As evident in the interview, the parallel written interaction works as a support in relation to generating educational attention and understanding in the process and as production of notes and memory that the students can draw on later. The fact that the student has to actively relate to the comments and questions from the teachers and other students triggers reflections and focus. At the same time, the student can ask questions if they find it hard to keep up with the plot. However, the students do not look down at their screen to follow other things on the web.

⁴ Student interview 2, 2/11 – 2011 (Paulsen and Tække 2013) translated into English by the authors.

This is also helped by the fact that the teacher is sitting with the students, motivating them to take part in this collective analytical work. Not everybody can manage to write while watching (this also applies to writing notes on paper), but in a writing interaction medium one still gets the benefit of what others have written both during and after the film (Paulsen and Tække 2013). We have documented similar effects in relation to oral presentations, for example, brainstorming about a novel before the analytical work. The method falls short when the teachers give presentations because they cannot (sufficiently) keep their attention on the students' attention while speaking. On the other hand, if the teacher feels that the students do pay attention to other things, Twitter is helpful.

I had some students today that did everything else than pay attention or were totally passive while we listened to a German song. Then I asked everybody to tweet all the German words that they picked up. That helped on the activity.⁵

Also, if all students are 'totally stoned', it is very effective to ask everybody to answer a question on Twitter. Using written interaction in this way, the educational community can *interpellate* students and thereby initialise involvement and maintain attention, activity, participation and work discipline. Also, according to both observations and interviews with teachers and students, more students are included in the educational interaction than if it just took place orally. Further, following our interviews, the quality is also better when written interaction is used and the students feel that the educational interaction better calls for attention when it also is on their screen. The use of written interaction demands practice; it is not easy to multiplex,⁶ express yourself in 140 characters (now 280 characters) and be precise in an academic sense, using hashtags (#), links and tags (@). According to teacher interviews, they could not perform educational interaction in other classes with the same quality and participation as they did in the SME class, which were taught using this media practice.

Two of the teachers in the class became known as *Twitter teachers* because of how much they used the platform in their teaching. These two teachers obtained

⁵ Teacher reflection 5:27 PM Mar 15, 2013 from the Google site (Paulsen and Tække 2013) translated into English by the authors. The Google site was one of the many ways we documented the SME-project. In this medium the teachers wrote field notes as a form of diary in regard to their SME teaching.

⁶ Multiplexing is the situation in which the attention is pointed towards one intentional object but in more than one medium at the same time, such as listing and writing notes. It is not the same as multi-tasking, where you try to point your attention towards different things at the same time (see Chapter 2).

a better trust relationship with the students. They also acquired a greater knowledge about the students and the relationships between them, thus helping the teachers to perform better classroom management.

After the students and teachers during the first year acquired the sufficient competences in written interaction, the teachers began to provide homework help for one hour, five evenings a week.

Researcher Do you think it's an advantage that you can get help when you are at home?

Student Yes, I do, because you know it is not always that your parents can help with all subjects. So yes, it is great that you can write to your teacher and not have to wait until the next day.⁷

According to a teacher interview, the teacher felt that, because the community was also mediated through written interaction, she had the opportunity to catch up with students that she felt she had not had contact with during the school day.

A last experiment to be mentioned here was the use of the medium on a trip to Copenhagen, where the students and teachers organised many of their visits around the town with Twitter. They coordinated their moving around, their questions to guides, their documentation from conversations with guides, answers to teacher's questions, pictures etc. and become one big social organism moving around, sometimes splitting up in the physical space, but staying together in the virtual Twitter space.

Another medium that was used from the second year was shared online documents (they used Google.docs). These online documents were available to students working together using the same document on different computers while the teacher was able to monitor the groups' work. If it was homework, the students could work from different geographical places. The teacher could help them directly in their document if they, for instance, were on the wrong track. If it was group work at school, the teacher could go and talk with groups who were not working or who were having difficulties. This opens up advanced forms of process feedback instead of feedback being received after the work is done and the students are occupied with new topics.

The SME-class also worked with wiki spaces for all their subjects; this was a lot of effort yet, we concluded this to be critical:

⁷ Student interview 17 14/3 2013 (Paulsen and Tække 2016) translated into English by the authors.

‘On the whole, the potential for creating, sharing, gathering, evaluating and improving knowledge in the class via their wiki has only been activated to a limited extent. Only in a very few cases have students become active wiki users who use the medium to build and process knowledge related to online knowledge. The main rule has been that some individual teachers have used the medium to store and gather knowledge, while other teachers have not used it at all. Nevertheless, a number of uses have been attempted, which collectively activate all the potentials of the medium.’

Paulsen and Tække 2013

Yet, maybe this was a bit unfair because we placed many hard obligations on the teachers who, at the same time, had to live up to what they called the *upper secondary school reality*, with many academic requirements and exams.

During the second wave, the students acquired better digital competencies in regard to all four digital media practices. According to the teachers, as mentioned, the difference compared to other classes became huge, meaning that the other classes could not initiate the same educational methods as the SME class. The students also developed skills and experience with using Twitter as a backchannel, transforming the class into a new form of public, constantly discussing the educational content the teaching, and the presentation of it. Also, more students gained a voice and joined the educational interaction. Further, we found out that multiplexing is a form of single-tasking through which the students focus on the educational object with the advantages of the digital media for interacting, storing and retrieving. Also, the border between school and home was surpassed with the virtual homework help that the teachers provided. This also gave rise to a more trusting relationship between teachers and students, based on the fact that teachers were no longer perceived as a threat who would prohibit media use or, for instance, confiscate smartphones etc. Also, the teachers now had more and better knowledge about their students, which resulted in better group work and cooperation.

As an overall observation, the re-stabilisation and restructuring of the educational interaction by means of the new media intensify attention on educational content and reduce social ambivalence and, to a high degree, the students’ self-distraction. The students are then supported, challenged and encouraged to acquire a culture that takes educational advantage of the new media environment. Yet, in the second wave, we also noticed more surveillance and control. Somehow, the class turned into a teaching machine leaving out the surrounding world. Also, as we will return to, the teacher’s attention was only on the class community, which permitted only small glimpses of the students as individuals, but not on the networks that thrived in the class.

The Third Wave – The Contact-Seeking Classroom

The third wave focused on the possibilities for interaction outside the classroom. In the SME class, Twitter was the primary medium for this purpose, but Facebook, Google+, Google Sites and Skype have also been used.

From the second year, the teachers had to work on cultivating the contact between the class and the surrounding world to establish dialogue with network relations. The re-stabilised educational community of the class should, in this way, achieve that the otherwise disturbing contact with the surrounding world would become an educational asset and hereby turn the situation for the better so the contact, instead of drawing attention away from the educational interaction, would qualify it. Moreover, our thesis was that this contact would enrich and inspire the information situation with angles and perspectives going beyond what the teacher could offer. Generally seen, this move would cultivate the class to take a more educational advantage of the contemporary media environment.⁸

One example was when the literature teacher initiated contact with the Danish poet Kasper Anthoni. The class read one of his collections of poems and through two sessions asked him questions on Twitter. According to the teacher, the students usually have little or no interest in poetry, but this contact really got them interested. Also, according to the students, the experience was ‘very motivating’ and ‘mind-blowing’.

Student 1 I think it was a totally different way to analyse poems. A much better way I think.

Student 2 Yes, when we have the author [on Twitter] we can question him if there is something we cannot understand in the poem and ask him what he meant and then he can come with a tweet about it.⁹

Student 1 It helps with the interpretation. If I ask him how he got the idea, then he says that he had a feeling, and then it is easier to interpret the poem. I think it was good.¹⁰

⁸ Following Jenkins (2013; 2008; 2006), we now see a participation culture characterised by shaping, sharing, re-framing, re-mixing and appropriation, and with Bruns’ (2008) produsage and inter-creativity.

⁹ Group interview 1, 31/10 2012 (Paulsen and Tække 2016) translated into English by the authors.

¹⁰ Group interview 5, 31/10 2012 (Paulsen and Tække 2016) translated into English by the authors.

The interaction with the poet is exemplary for the concept of the third wave. The teacher takes a back seat but still takes the responsibility, letting the students get to the source and letting it be the centre of their attention and reflection. The teacher has made the connection to and appointment with the poet, has helped the students to read the book and to find good questions and has divided them into groups for the sessions. These efforts were good investments because the students' motivation and involvement were triggered by direct contact with a real author through Twitter.

In another example, a teacher gave the class an assignment to contact local companies using predefined types of media that the teacher knew the companies used, such as Twitter and Facebook but also websites with embedded chat. This also had a very positive result in regard to motivation, involvement and the information situation. The students, including some who were not usually motivated, explained in interviews that it felt very relevant and authentic to communicate with local businesspeople and that it helped them to apply theory to their cases.

Another example is where other school classes were contacted (one in Denmark and one in Germany, both with very positive results). Again, we see that the students were very involved and motivated by communicating with others outside the class, here with other students of the same age. According to the teachers, more students were drawn into the schoolwork than usual. It felt more important to the students to contribute and the quality was higher than normal because they felt they were being observed by others of the same age and representing their own class. Both classes also acquired new angles on their subjects, and information from angles other than those represented by their own teacher. In relation to the German class, it also became important to write correctly and the students felt that the language written by the German students was a more real German than that used in books and spoken by their teacher.

Student I feel that I learn better by communication instead of reading a book. Also, the lingual, not just the grammatical. If you communicate with someone from Germany, then you learn better German than if you sit in the class talking German. That's the way it is.¹¹

¹¹ Student interview 13, 14/3 2013 (Paulsen and Tække 2016) translated into English by the authors.

Moreover, the students also felt that they themselves had something to contribute to the other classes.

Gradually, the students built up networks, for example the poet, and they could ask questions both when they were at home and in class. An example was when a student asked her sister who studied economics in Copenhagen:

Student 2 We were to do a presentation about the American presidential election and then the presenter said something I did not understand – and we had to use Twitter during the presentation so I wrote to my sister on Twitter about it. Then she answered and I could catch up and understand the presentation again.¹²

After the presentation, the student explained the difficult part of the presentation to the rest of the class. Again, we see new and useful knowledge come from the surroundings of the class through the new media.

The last example we want to mention here was an activity where some of the students and teachers from the class, according to an appointment, sat at home one evening watching a TV documentary about the financial crisis, using Twitter to interact about it. After some time, one of the students observed other Danes watching the documentary while on Twitter were using a global hashtag to interact about it.

Researcher So, you were discussing the documentary with the others from the class and then it was extended. What do you think of that?

Student You also got other people's opinion [...] and there were really many opinions and tweets and it was going on long after the programme ended. It was really exciting.

Researcher Was it good for the discussion that it was not just the class and your teachers?

Student Yes, I believe so. Because we maybe have a little bit the same opinion in the class, because we have the same teacher, and it is the same things we do. And then there were other people's opinions, people that are another place in their life, and have another perspective on society.¹³

¹² Group interview 6, autumn 2012 (Paulsen and Tække 2016) translated into English by the authors.

¹³ Student interview 9, 9/1-2 (Paulsen and Tække 2016) translated into English by the authors.

Here, an educationally relevant hole is knocked in the class' re-stabilised educational interaction and perspectives pour in from the outside. As we saw with the poet, the cultivated opening pushes the teacher into a new position. Not necessarily weakened, but more in line with the new media environment as organiser of otherness that helps the students understand the different opinions in society. We asked the student what it would be like if the SME class had not had the contact to the external world:

Student Yes then I believe, then it would be biased, the teacher's opinion would shine through very much. Now we get others' opinions, others' view on the things. This means that what the teacher says is not just right, but that you then also can find information about: can this really be true? Why does she say that? And such things. So, it makes us think in another way.¹⁴

In the third wave, we see that the students become more involved and motivated in relation to the schoolwork. Our interpretation is that this has to do with the fact that they are real and authentic cases. In contemporary culture we cannot expect that anybody, not even students, can muster real involvement and motivation if they have to work with pseudo cases or outdated texts. The world is full of real authentic cases and every mediated communication of mass media content is selected with high relevance criteria, also counting actuality. The fact that the students worked and interacted with real people in real situations with real consequences cannot be overestimated. Such setups with real people in real situations interpellate the students to the academic work and educational interaction. An old man talking from an old book about an old outdated case simply does not appeal to most students in Danish upper secondary schools. Also, the methods presented and documented by the SME project have shown that students feel that they represent themselves and their school class and want to make a good impression. This has to do with social identity and the personal history of self-presentation, which is important not least for young people. *You are what you tweet*. During the work with third wave methods, students are encouraged to form networks and are also supported to handle social codes on the web. This means that during their education, they actually learn something about the external world. Yet, this does not mean that they are not going to learn subjects like Ancient Greece or Rome or world literature history, but that the

¹⁴ Student interview 9, 9/1-2013 (Paulsen and Tække 2016) translated into English by the authors.

teacher must find setups that feed into the way young people can be attracted and interpellated in our present time. Lots of other school classes work with the same topics as lots of specialists and would love to answer questions about history and literature. In addition, there are lots of opportunities to go to virtual museums etc. We have also documented a strengthening of the educational community because the third wave methods cultivate cooperation with differentiated roles. Students now learn from people outside the classroom, with help from each other and their teachers.

The Upshot of the Three Waves

During the first wave, the old classroom is opened up by the access to the Internet that wireless networks and digital devices make possible. Students are distracted and teachers do not know what to do. Hence, the first wave undermines the old organisation of the classroom and traditional teaching methods. The Internet becomes a *challenge* to teaching. Initially, the teachers and schools react by either prohibiting or ignoring this new technology, giving rise to a huge drop in educational attention in the classroom. They enter the second wave when they succeed in drawing attention back to the educational interaction between teachers and students through the use of social media. In this phase, social media platforms are used to re-stabilise and intensify the educational situation. A new, strong echo room¹⁵ is produced by combining the old and the new. The third wave arises when teachers and students go a step further, succeeding in establishing educationally relevant interaction (through the Internet) with third parties outside the class (authors, researchers, foreigners, etc.). Only in this third phase does the Internet become a way of new *perspectives* that thoroughly alter the old educational setting. In this phase, the teachers become mediators of otherness and students learn not only from their teachers and textbooks, but also from *many* others. Here, we see resources from and cooperation with the whole world included in the teaching, in similar ways to current knowledge work described in research literature (Jenkins 2013, 2008, 2006; Bruns 2008).

Yet, it is also possible to understand the three waves, not so much as developmental stages, but as *important dimensions* that can and should be addressed educationally in the new emerging media ecology that includes digital media. Thus, students and teachers in classroom teaching can activate, foreground

¹⁵ See Chapter 2 for the *echo room* concept.

and choose to respond to (in different ways) to one of the three dimensions, depending on their specific situation and interests. Yet, our point is, that such responses are not simply chosen like ready-made products on the shelf in a supermarket; rather they must be *developed* through experimentation. Further, our point is, that such developments quasi-logically ‘move’ from wave one to wave three; yet in a way, one returns again and again to waves one and two; the third wave is therefore not understood “as a final destination” ruling out the two others. Rather, moving towards the third, again and again, tends to develop a complex teaching culture, in which all three dimensions are addressed, building up a style of teaching, in which students and teachers develop (more or less unique) ways of (1) protecting and dealing with their limited awareness in the new open media environment, (2) integrating new media to support the internal communication and activities in the class and (3) making contact through the internet with educationally relevant otherness outside the classroom; perhaps all at once, after a while of experimentation. Yet, as we also show and argue, in the final main section of this chapter, this general pattern can be formed very differently, transforming teaching into totally different spaces.

Finally, it must be added, that we have built this theory on our empirical findings from our studies of the Danish upper secondary school from 2006–2019, especially the SME experiment from 2011–2014, where teachers worked with the use of – and reflection on – digital media together with their students within the educational practice. What we have observed other places and read about (e.g., Mathiasen et al., 2014; Kuznekoff et al., 2016) mostly shows signs of the first wave. In other words, in the perspective of the theory of the three waves, the biggest attractor of the first wave is *distraction*, while the main attractor of the second wave is *concentration* but under the conditions of a technically reclosed classroom (the educational machine). In the third wave, the main attractor is *involvement* in the world, levelling out distraction and utilising genuine new learning and Bildung possibilities of digital media. The SME experiment shows us the contour of how things might develop if schools and teachers take a few steps further.

Obstacles in the SME-Experiment

What we have depicted from the SME in this chapter until now seems very positive when viewed from the perspective of the theory of the three waves but in the practical world there were many problems. The teachers had great difficulty producing new norms and didactics adequate to the SME-philosophy where

they were not allowed to prohibit or ignore media use and had to initiate reflexivity and use social media in their teaching. They also had problems with the technical dimension which meant that their own media literacy was more or less flawed. Some of the teachers (the Twitter teachers) took greater advantage of the new situation while others more or less gave up. A group of other teachers at the school even formed a counterculture and tried to put pressure on the Twitter teachers to slow down their efforts. A problem with the model of the three waves, or an extension of it, is that the X-axis, representing the time dimension in the practical world, was shown not only be linear but also to contain oscillations so that teachers and students constantly jumped between the different waves. Here our conclusion is that students cannot maintain 100 percent focus at all times and it takes time for the new norms and didactics to become developed and fully embedded in the school culture.

Even though the 'Twitter teachers' and the school management were very positive about the project there was a general exception to the philosophy of avoiding prohibition and indifference: in practice, in all three years, there was a ban on sharing assignments, which meant that this practice took place in closed networks between students. The teachers were well aware that the students had a closed Facebook group for the whole class and that assignments and results were shared, but they felt able to stop cheating by comparing assignments. But there were many closed Facebook groups and many network exchanges took place via messages between students within different class networks. The teachers could not prove that students had cheated – they could only reveal the weakest students who had directly copied and were unable to reformulate, reversing sentences, restructures, etc. What the teachers achieved was to prevent knowledge sharing among students, strengthen class networks and weaken community and authority. They did not teach in produsage, appropriation and remix and, in that regard to refer, applicate or paraphrase in a legitimate, academically sound, way. The students did not learn to search for the best assignments, to review them, learn from them and remix them correctly (Paulsen and Tække 2016; 2016d).

These problems follow the research put forward in Chapter 2 under the heading 'The debate' and by Marner and Örtengren (2013) in 'The struggle between the new and the old'. We see a struggle between the sacral and the profane, between old culture, habits and teaching forms and new digitally supported ways that are vulnerable in practice, but seem powerful, frightening and alienating because of the power and momentum the digital is gaining, not least because there is political pressure to use digitalisation to streamline and instrumentalise.

The Three Waves and Bildung

Even though we have documented good results in regard to Bildung in many of the SEM-experiments (Paulsen and Tække 2016b; 2017), there is no tight coupling between ‘digital Bildung’ and third-wave teaching. Third-wave teaching (as well as first- and second-wave teaching) can be carried out in different directions (i.e. as very different variants) depending on the basic educational values and understandings that societies, schools and teachers rely on. In Chapter 1 we distinguished between four such basic educational understandings. The first two, which we called the vulgar, common or mainstream outlook, are not in line with genuine and reflective kinds of Bildung. These imply respectively a teacher and a teaching that seeks to (a) control the output of teaching or (b) facilitate student’s self-development. Let us like in chapter one call the first the *engineer* teacher/teaching and the other the *gardener* teacher/teaching. In opposition to this we conceptualise genuine Bildung-orientated teaching as a combination of (a) one that seeks to challenge students to work critically with how they are in the world (their knowledge, attitude and existence); and (b) one that experiments creatively with developing new ways of being in the world (i.e., trying to create new ways of perceiving, acting and producing). In Chapter 1 we called a teacher/teaching relying on the first of these two reflective kinds of Bildung a *challenger* and the second, a *creator*. Yet, we also argued, that these could be understood as ‘two sides of one coin’, which is exactly what we are going to do here in Chapter 3. To simplify matters, in the following text we use the term challenger to understand a kind of teacher and teaching that relies on *both* views (i.e., both are *questioning* students’ way of being in the world and *through experiments* encourage students to *develop* new ways of being in the world).

Thus, we can compare how actors – identified respectively as *the engineer*, *the gardener* and *the challenger* – with different basic educational understandings are likely to respond differently to the three waves; giving rises to different variants of the general patterns we have described above (see Figure 3.3).

The three actors are reconstructed based on Bildung and educational theory (Beck et al., 2014; Biesta, 2017; Dewey, 1997; Hansen et al., 2019). Whether actual teachers can identify themselves with – and eo ipso act more or less in accordance with – one of the actor-types or a particular combination of them is another question, only possible to answer ex post the distinction being made. Yet it is our own experience that actual teachers easily can

Figure 3.3 Different variants of responses to digital media.

identify themselves with the actor types and discuss how much, when and why they act like engineers, gardeners or challengers – the three types we operate with here. This is similar to Habermas' approach in his magnum opus *The Theory of Communicative Action* (Habermas, 1992) where, based on different positions within sociology, he reconstructs the concepts systems and lifeworld. In a similar manner, we want to reconstruct three trans-epochal and trans-individual teacher-actor-types – each understanding teaching in a certain way and wanting something definite in relation to students. They are trans-epochal because they aspire to validity both before and after the arise of digital media. Thus, it should be possible to identify all three both before and after the coming of digital age (in educational theory but also in practice). This trans-epochal feature is crucial if we want to understand how the three actors begin to act, with the advent of social media. We hereby also assume that digital media, as such, has not been invented by teachers. They can only say yes or no and shape digitalisation of education differently. That they are trans-individual means that they can more or less identify with all three actor types, depending on context, time, situation, educational setting, subject matter, personal values, outlook and so on. Yet it is perhaps likely that many individuals and school traditions will identify mostly with only one of the three. Yet we acknowledge that, in reality, it might be muddier. Conceiving theory as a dramatisation of thought (Biesta, 2010; Deleuze and Guattari 1995; Dewey, 1997), the model with three kinds of teachers might exaggerate things but also make the real drama – how teachers are likely to shape digitalisation – much clearer.

The Engineer Variant

Let's start with the *engineers*. When digital media appeared – and opened up the classroom, as described above – the engineer's first response can be seen as a function of what the new digital media situation did to their closed classroom: it made it open and (to begin with) uncontrollable. At first, this new open room implied distraction, loss of control and loss of authority. The first response of engineer teachers was frustration: 'Shut down the Internet,' they cried. While students' attention was drawn away from teaching to other things, the functioning of the teaching machine declined. Media platforms like Facebook were apparently better able to catch students' attention than the teaching machines of the engineer teachers (Paulsen and Tække 2016).

Eventually, more and more engineers realised that it was impossible to shut down the Internet or make prohibition effective. This led to their second response: 'If you can't beat the new media, then join them.' The engineers began to use and incorporate digital learning behaviour systems to control activity in the classroom. Or more generally, they reconstructed their teaching machine using digital means, thus making it more powerful. However, they also took a further step, thus forming a third response. Using new digital technology, some engineer teachers and schools also started to use big data to control the whole life of their students (Paulsen and Tække 2019b). Before the advent of digital media, it was only possible for teachers to control the behaviour in their classroom, but it is now possible to monitor, control and affect students regardless of where they are.

Together, these three responses – frustration, incorporation of digital media for better control in the classroom and taking control of students' lives outside of the classroom – form the plotline of the engineer teachers. To begin with, control is taken away from them, but in the second and third responses, they regain control and become even more powerful. This plotline is produced by the engineer teachers themselves. First, they feel threatened, but they then develop a new kind of control, realising that this can be made even more efficient by the new media ecology. Yet this is only made possible by making alliances with new digital control systems, called for by the engineer teachers and developed by companies that realise this new market. Also, political systems, wanting more control, support the plotline.

An example of the engineer plotline appears in a study at an English school (Livingstone, 2014). The study was completed during the school year 2011–2012. The students were aged between 13 and 14 and it was a regular English school class in a suburb of London. According to the study, teachers at the school used a so-called 'school information management system'. According to the researchers, this created a control system in which the digital technology was made part of an instrumental learning culture. The teachers used the system to monitor, record and control students' learning behaviour, attention and performance. The technology thereby functioned as a panopticon, associated with sanctions. Among other things, the teachers recorded students who did not perform sufficient learning behaviour in relation to learning goals. Thus, teachers spent a lot of time entering data and executing output from the system. The data entered by the teachers into the system were also stored and made available to optimise the system and were used alongside other data, such as the socio-economic background of the students.

The Gardener Variant

The plotline of the *gardeners* is quite different. With the arrival of the Internet and digital media, the classroom has opened up, meaning that safety and protection is lost. Companies now have direct access to students' mental processes, 24 hours a day, both when students are in the classroom and when they are at home. Thus, actors with non-educational goals interrupt and influence the students with temptations and glamorous content, commercials, games, and so on – undermining the educationally framed self-developments that the gardeners pursue. The first response to all this by the gardener teachers is ambivalence. On the one hand, they want to protect the students by trying to shut down the Internet or prohibiting the use of smartphones and/or other new media during teaching hours. On the other hand, they also want to be nice and respect the students as being able to make their own choices. Thus, the gardener teachers oscillate between protecting the students (by trying to prohibit use of new media in school time) and ignoring the new situation (being too kind to prohibit media use). The result is ambivalence, frustration, and conflict.

Yet, after a while, realising that neither prohibition nor ignorance is adequate as a general strategy and by acknowledging that new media has learning potential, more and more gardener teachers switched to a second response. This is to use new media to draw attention back to teaching again and to facilitate students' self-development. This is realised in the form of digital learning games and the like but also through the use of smartphones, tablets, to support students' creative activities, (e.g. making small films and other things with new media). By doing this, the gardeners extend the good old analog palette of creative productions – poster and so on – with new multi-modal digital production possibilities. This also makes it possible for teachers to link their teaching to contemporary digital children and youth culture. Doing this, they move in the direction of a third response, where they begin to incorporate interest-driven digital online platforms, like Minecraft, to support the self-development of their students.

In Denmark, we have seen many examples of the gardener plotline (See Paulsen and Elf 2020; Paulsen and Tække 2015; 2019a). It has been a common argument that teachers and schools need to use the new media to meet the students where they are (on Facebook, Instagram, etc.). Using new digital media for learning can make teaching both more interesting for students and exploit new digital possibilities. Yet it has also been the case, as researchers have

documented, that new potentials of creativity, production, interaction, connectivity, and so on have not at all been actualised in reality (Paulsen and Elf, 2020). Technology naïve strategies, such as buying tablets for every student without developing new kinds of teaching with tablets, have been especially damaging (Paulsen and Tække, 2018). Also, digital media has not always in practice been as flexible as that postulated in theory. Yet all this can be seen as a kind of teething process. In a Swedish study (Marner, 2013), it is argued that digital media should neither be implemented as dominating nor as just an add-on; instead, it should be embedded as an integral part of the overall subject matter teaching (see also Chapter 2).

The Challenger Variant

Finally, the plotline of the *challengers* is different from both engineers and gardeners. On entering digital age and opening up their classrooms, the challengers saw that the attention of their students went to other things that were more appealing but with less educational value, making it harder to challenge the students with good old materials. The analogue material looked outdated, and community and dialogue within the class was undermined. The first response to the new media was mostly resignation and despair. To really challenge students and encourage them to think deeply and perhaps also develop new alternative ways of being the world seemed to be mission impossible in the digital age; many challengers might have thought that Ancient Greek art, master novels, classical music, difficult mathematical proofs, philosophy, and books such as *Das Kapital* appeared to be impossible to bring within the reach of most students' attention and interest. The frustrating thing for the challengers was that, more than ever, challenges to prevailing thought and practice were required, but at the same time these were unlikely to become meaningful to most students.

Yet, after a while challengers began to realise that new digital media also carried opportunities for working with participation and emancipation anew. Thus, the challengers' second response was to begin to incorporate digital interaction media to prompt experimental and polyphonic participation in the classroom. Through media platforms like Twitter, the challengers started to let more students' voices come to play, creating a more democratic infrastructure where different voices could be articulated (Paulsen and Tække 2018; Poshka 2014). Also, the challengers began to confront students using up-to-date digital materials, such as online discussions, digital films, websites and streaming

from political forums. But they also began to work critically with key digital problems, such as fake news, the power of algorithms, big data, and digital surveillance (Paulsen and Tække 2019a). All this led to the third response, where the challengers began to use the Internet to confront students with challenging otherness, unfamiliar persons (e.g., poets, politicians, researchers, people from other countries with other backgrounds and worldviews) but also tried to make new resonances, partnerships, networks and encounters through creative experiments in the new radically open media ecology. The teacher then becomes (more than ever possible in the closed classroom) a mediator of otherness and potentially genuine innovation. On an everyday basis, teachers can now confront students with educationally relevant others and different kinds of alterity in real online meetings. Teaching then shifts from being *about* the world/others to *being* with *others* and experimenting *with* the world. The students are challenged by greater plurality of perspectives and engaged in real encounters and involved in the real creative world.

It is no secret that our sympathy with the challenger plotline is high. As we see it, the digital age, despite all its problems and calamities, is a wonderland for critical challengers who want to confront their students with appropriate, relevant, and difficult otherness. Also, the new media makes it easier to confront and mix different expressions produced by the students, their teachers, and others with one another. Real polyphonic teaching can then be realised.

Combining Strategies – Media Reflection as an Example

Yet, it can be sensical to combine all three kinds of teachers/teaching. That we endorse the challenger, does not imply a total rejection of the other strategies. Let us therefore, based on our SME project, exemplify a combined strategy, one in which teachers work to support, facilitate and challenge the student to obtain improved media reflection.

One of the most important elements in the SME-experiment was the work with reflexivity. The teachers had to help students to develop a reflected use of media and they themselves had to develop a reflected and understanding way of being concerned with the students' use of media. This included helping the students to be attentive in relation to their attention. In all probability, this double task can only be maintained adequately through interaction between the students and the teacher. Neither the students nor the teacher has a

priori knowledge of the right way to handle this new complexity (see Chapter 2 in relation to multi-tasking). Depending on how good one's short-term memory and how strong one's will and situational involvement is in a learning activity, one can switch between different activities. Also, reading, writing and IT-skills have a strong effect on how good the single student is at switching back and forth between the teaching and other interactions such as gaming, surfing the net or reading the news. Each individual student must be aware of their own attention span and strengths and weaknesses; the teacher must help them understand and take action based on a reflected point of view. One's standard in the different school subjects also has influence on whether the student can afford this diversion of attention. This means that it can differ, not only from student to student, but also from subject to subject (e.g., from English to Maths). The work on attention and self-reflection in the first year of the SME-experiment was an important step for the students on their journey towards thinking for themselves and developing social responsibility. Together with educational interaction using the social platform Twitter it provided them with the skills required for their later contact in and out of the class. Here we are on the level of the engineer wanting to help the student with competencies not to try to multi-task, competencies to use, for instance, Twitter for educational interaction (but also wanting to facilitate student's own self-development of reflexivity, thus pertaining to the gardener plotline). The level of the challenger is reached when students are confronted by 'real practitioners from the surrounding world' who present their texts, methods, experiences and meanings. Thus, the challenging teacher becomes a guide who helps make the connections, provides relevant material to prepare the meeting and helps the student to reflect on how they have performed. Over time the students might learn how to interact within the new media environment and to take full responsibility for the whole arrangement and situation and its organisation. They might also – at least they are encouraged to – learn to think for themselves and make decisions in new social situations in a professional context. In the beginning guided by the teacher and in groups, but over time the students happen to be alone in such situations only guided by themselves. This means that the students are not only performing the language games developed in class between teachers and students with almost no other consequences than the marks and reactions from other students familiar with this form of surrogate learning. Rather, the students are in real situations with real consequences with real people.

Similarities and Differences

If we compare the three plotlines, some shared features can be detected. Before the arrival of the Internet, all three actors¹⁶ benefited from the closed classroom, despite their different ways of dealing with this educational architecture (see Chapter 2). In their different ways, they learned to master this room. However, engineer teaching was very different from gardener and challenger teaching. If we imagine students entering a school and a classroom (in, let's say, 1989) inhabited only by engineer teachers, it would probably have been a very different experience than if they had entered a school with only gardeners or challengers. Yet, in reality, it might be the case that many students in Western post-World War II societies experienced a mixture of all three.

What is important here, regardless of how big the differences were before, is that with the advent of the Internet, wireless networks, and digital media, all three types of actor were perplexed. This is because they all relied on the double-chamber system (see Chapter 2). Therefore, the first responses to the digital age were equally confused: Should we ignore new media, or should we prohibit them? Thus, they all responded initially to the open classroom with perplexity – oscillating between prohibition and ignoring strategies. On the other hand, it also shows that when the three kinds of actors really begin to act after a while, and thus form their plotlines, they also begin to distinguish themselves more and more from one another, perhaps so much that when it comes to the 'third response', there were greater differences among them than before the digital age. Nevertheless, it is also possible to *abstract* some common features. Thus, all actors – abstractly seen – start by being perplexed (in many different ways) by the new initial openness. This is their shared first response in all its infinite diversity. Then, after a while, they begin to incorporate and imbed digital media in the classroom teaching. This is their shared second response – which comes in many forms that continuously transform the reconfiguration of classroom teaching and its capacities (including closing the classroom once again). Finally – and still abstractly – they all begin to use digital media to make educational use of the outside world, by using the Internet and digital interaction media. This is their shared third response, which also comes in many different forms and transforms classroom teaching even further. These abstracted cross-plot-similarities point to a common way of responding to the new, despite their

¹⁶ *Actors*, the three constructs of ways to perform Bildung, is maybe best understood as attractors where we in the real world would find no pure (e.g. engineers) but definitely some teachers who is mainly like the engineer.

differences. It shows a general cultural pattern in which they all integrate digital media educationally. Yet, this pattern is continually rewritten, because each new response transforms the educational media ecology, meaning that, in reality, the three main response outlined are activated, modified, further developed, transformed, multiplied, combined and altered sequentially. When for instance external people are introduced into the classroom by the use of digital media and the internet (thus activating and modifying the third response), it might foster new problems of awareness (the analytically 'first' response) or new ways of using social media to carry internal communication in the class (the analytically 'second' response). Thus: the three responses can be seen as theoretical constructs that make it possible to analyse and abstract to some degree a general evolving pattern, with affinity to what Peirce called 'the first, second and third' in his thinking about signs. That being said, it may be that we are only describing the initial phase of a digital revolution; it cannot be excluded that the future might bring forward different and also more rejective responses which would transform this into a totally different pattern.

Conclusion

In this chapter we have outlined our research from 2006 up to the present day. We have focused mostly on the SME-experiment and presented our theory of the 'three waves'. We have examined this theory, explaining examples and drawing a picture of moving from distraction in the first wave to concentration in the second to connection outside the classroom in the third. We also have presented critical remarks to the praxis in the SME-class to show that the integration of digital media is neither an easy nor unproblematic task – rather a micro revolution challenging the sacral spirit of what is acknowledged as teaching. Finally, we have pointed out that even though a class runs through the three waves it is possible to do that without really aiming for *Bildung*, that is encouraging and challenging the students to work creatively and critically with their otherwise taken-for-granted ways of being in the world, perceiving, acting and creating. This means that digitalisation does not directly have a certain effect (or impact that positivist/deterministic research talks about) but instead opens/expands a new (im)possibility space that politicians/schools/teachers (and other actors) can respond to differently, modify and change by responding to the new situation, rather than viewing it in terms of causality, impact and determinism. In Chapter 4, we outline a connected model for digitally supported subject-matter teaching and *Bildung*.