3. Theoretical Framework

Introduction

This chapter aims to contribute to the theoretical framework for critical datafication literacy that is being developed in my study by analysing what can be learnt from selected traditional educational approaches. The field of education and pedagogy provides countless well-established and theoretically grounded approaches that can provide valuable insights into ways to address the challenges of datafication through an educational lens. Traditionally, education aims to increase people's "development of critical thinking" (Barrow 2014, p. 258) and prepare young people to become future citizens who are able to "live and function in such a [democratic] society" and to "come to some understanding of it" (Wringe 2012, p. 5). It is exactly this broader societal perspective that is still often overlooked in existing data literacy approaches, yet that offers particularly relevant insights given the wide-reaching societal implications of new data technologies. The fact that in recent years, this picture has begun to shift, and more broad and critical data literacy approaches are emerging emphasises the necessity of such perspectives.

Education is often "seen alongside other social institutions as working to create and maintain a stable society" (Bartlett and Burton 2016, p. 28). This important role of education in our democratic societies is also emphasised by the inclusion of the right of individuals to "an educational program that respects their personality, talents, abilities, and cultural heritage" in various international agreements, including the 1948 Universal Declaration of Human Rights (Lauwerys et al. 2019, no page number). Importantly, education not only includes private or state-regulated schooling, but also many forms of "parallel or supplementary systems of education often designated as 'nonformal' and 'popular'" (ibid.). In light of the implications data systems have on the way our societies are "ordered, decisions are made, and citizens are monitored" (Hintz et al. 2019, p. 2f), it can thus be argued that fostering understanding and critical reflection on data systems should be an integral part of education.

What is Education (Not)?

Before outlining how the field of education was approached in this study, however, a brief introduction is necessary in order to answer the fundamental question of "What is education?". In the field of education and pedagogy, there are not only many terms connected to education that are all associated with different meanings, but also the concept of education itself is seen by most scholars as "an essentially contested concept" (Barrow 2014, p. 256). Because of its "inherently evaluative" nature, Barrow argues, education is "inevitably going to be differently interpreted according to the changing values of time and place" (2014, p. 256).

In my study, education is understood as oriented "towards the human being as subject" (Biesta 2012, p. 586), and, as already highlighted above, seen as a preparation for the future lives of pupils as members of their particular society" (Wringe 2012, p. 2). In this sense, education is differentiated from *training* (Biesta 2012, p. 586), a mere "passing of the *facts*" (Wringe 2012, p. 2), or "being '*clever*'" (Barrow 2014, p. 257). Education is further differentiated from *pedagogy*, which describes the "study of teaching methods" (Peel 2017, no page number). Despite some blurry uses of the term, pedagogy generally does not describe the ends of learning, but rather the "ways in which such goals may be achieved" (ibid.). Thus, this field can offer useful insights for implementing critical education about data into practice.

In contrast to training, learning or pedagogy, but also to terms such as qualification, socialisation or subjectification (see Biesta 2012, p. 584), education is usually understood as broader knowledge and understanding of the world. More specifically, education relates to "bringing up or developing the individual in way that we regard as desirable, but with particular reference to knowledge and the mind" (Barrow 2014, p. 257), while at the same time "always anticipat[ing] the freedom of those being educated" and not treating students simply as "material to be moulded or as objects to be trained" (Biesta 2012, p. 585). Importantly, education is less focused on a repertoire of skills and "knowledge how to", but rather aims for an understanding of "the reason why of things" and the "development of critical thinking" (Barrow 2014, p. 257f). This "deeper" perspective on education was in part shaped by Peters, a renowned scholar of education in the 1960s and 70s (e.g., 1966), who argued that education "involved a linking of concepts by the learner to gain a wider understanding of the world" (Bartlett and Burton 2016, p. 24). Such understanding of education is particularly relevant for my study, and it bears resemblance to the German "Bildung" which will be discussed in chapter 3.2.

Importantly, the understanding of education that my study follows is not one that necessarily aims to "reproduce in the next generation the society in which they currently work" (Wringe 2012, p. 2). Instead, learners should be encouraged to "'cope with', to make something of, the world in which they will lead their adult lives", either by aiming to "reform or change the current pattern of things" or by "stoically grinning and bearing what cannot yet be altered" (ibid.). Teachers thus "often aspire

to make the next generation in some way better than the last" and desire to "build a better – more virtuous, more powerful, juster, or in our own day simply more affluent – society" (ibid.). Therefore, Wringe argues, a teacher cannot teach "without reference to the wider social and political context" and thus cannot leave "social and political considerations to others" (ibid., p. 3). Although Wringe mostly seems to relate to formal education in a school context, these objectives can be easily transferred to other areas of education, and they clearly demonstrate the relevance of the education field as a theoretical framework for critical datafication literacy. With the increasing datafication of our societies, gaining understanding of one's society as well as being able to live and function in an informed manner *must* include some awareness and understanding of the data systems that already shape and govern so many areas of our lives. Moreover, the potential of education to lead to a "determination to reform or change the current pattern of things" (Wringe 2012, p. 2) provides valuable lessons for more empowering education about datafication.

In order to develop a more grounded theoretical framework for such critical datafication literacy in my study, I selected three educational approaches as most relevant: 1. *education about (digital) media*; 2. *the German concept of "Bildung"* (including "politische Bildung" / political literacy); and 3. *critical pedagogy* according to Paulo Freire. These educational approaches were selected on several grounds. Firstly, each of these constitute well-established, internationally recognised educational approaches with strong theoretical groundings. Secondly, these approaches follow a broad understanding of education similar to the one outlined at the beginning of this chapter. They aim to foster understanding of the (mediated) world we live in and empower learners to form their own opinions and critique this world instead of understanding education in the sense of 'training' or a mere passing of knowledge. Thirdly, each of the three fields has already been connected to education about data, which emphasises their relevance and how much can be learnt from these approaches for a theoretically grounded conceptualisation of critical datafication literacy.

However, the following subchapters do not provide a comprehensive review of the three fields of educational research. Considering how well-established these fields are, this alone would constitute an additional multiyear study. Instead, a small number of key texts for each field was carefully chosen and analysed. These texts are examined in regard to *key insights* that *help fill the gaps* in data literacy research by suggesting approaches to *educate about structural changes in our society* (rather than a focus on media content or digital skills) and to *foster critical thinking*. This includes a) canonical texts that represent recognised key conceptualisations of the respective educational approach; b) secondary literature that provides additional framing and understanding as well as suggestions for implementation; and c) a selection of relevant publications that have already adapted the respective educational approach to education about data. The texts are selected both from international and

from the German-language academic discourse. The reason for this is less my own German background, but rather the long and rich history of German research on education and the strong academic discourse in the field even today. Concepts such as "Bildung" or "politische Bildung" (political literacy) originate in Germany but are internationally recognised and offer important insights for the (critical) data literacy field (see chapter 3.2).

3.1 Education about (Digital) Media

The first field of education research, education about (digital) media, constitutes one of the key predecessors of data literacy with a long history. However, it is a highly diverse and contested field. In order to represent this diversity, a rough outline of historical and disciplinary developments in media education research will be presented. Embedded in this outline, three key texts that are particularly relevant for my study will be examined: a 'classic' approach to media literacy, an extended and broader perspective, and finally a concept that already draws connections to data literacy by suggesting that education about media should include education about (big) data.

3.1.1 Introduction – Terms, Concepts and Background of the Field

While many terms and concepts are employed in this field, for example media skills, media education, media pedagogy, or media criticism; the key relevant concept here is *(digital) media literacy*. While the term literacy traditionally referred to "alphabetisation and the ability to use language in reading and writing" (Pötzsch 2019, p. 222), a wider understanding of literacy developed in the 1990s (see below). One example is media literacy, which originates in pedagogical discourses and whose "theoretical traditions [can be traced] from the language theory of Noam Chomsky through Jürgen Habermas to Dieter Baacke" (Gapski et al. 2017a, p. 21, own translation). After initially following the intention to protect children from harmful content and negative consequences, more ideologically critical and radical approaches to media education started to emerge in the 1960s and 1970s (Niesyto 2018, p. 59). Later, media pedagogy understanding moved towards the ability to critically perceive and decode media messages, and the field was increasingly institutionalised in the 1980s and 1990s (Buckingham 2018, p. 47ff). In the 1990s, the emergence of new media led to increasing calls for new media competences (Gapski et al. 2017a, p. 18f). While media literacy was a somewhat vague concept from the beginning, many scholars argue that the concept always included both instrumental approaches and reflective and critical components, educating, for example, about the production contexts and political economy of media (Sander 2017, p. 130; Livingstone et al. 2021b, p. 222). This

is also evident in a well-known 'classic' approach to media literacy: the work of the German media pedagogy scholar Baacke.

3.1.2 Baacke: A 'Classic' Approach to Media Literacy

Baacke's understanding of media literacy (German: Medienkompetenz) is well-established in the German field of media pedagogy and is often referenced as one of the key early conceptualisations of the term (e.g., Gapski et al. 2017a; Moser 2018; Niesyto 2018). Baacke's concept is developed throughout a number of publications, but the key argument remains that media literacy should consist of four dimensions: 1) *media criticism* ("Medienkritik"), 2) *media knowledge* ("Medienkunde"), 3) *media usage* ("Mediennutzung"), and 4) *media design* ("Mediengestaltung") (Baacke 1997, p. 98f).

Table 1: The four dimensions of Medienkompetenz according to Baacke, 1997, p. 98f, own translation.

The four dimensions of Medienkompetenz by Baacke		
1) *Media criticism* ("Medienkritik")		
a) analytical	b) reflective	c) ethical
2) *Media knowledge* ("Medienkunde")		
a) informative	b) instrumental-qualifying	
3) *Media usage* ("Mediennutzung")		
a) receptive	b) interactive	
4) *Media design* ("Mediengestaltung")		
a) innovative	b) creative	

The first and most relevant dimension for my study, *media criticism* ("Medienkritik"), is further differentiated into an analytical, a reflective and an ethical layer. Baacke argues that media literate users should be able to a) *analytically* apprehend problematic societal processes (e.g., concentration trends); b) *reflectively* apply the analysed knowledge to their selves and their actions; and c) take an *ethical* perspective by understanding analytical thinking and "reflective referring back" as socially responsible (1997, p. 98, own translation). In addition to becoming aware of concentration trends, knowing that private channels are funded through advertising and reflecting on the effect this has on the channel's structures and content is mentioned as an example for this dimension of media criticism (Baacke 2001).

As a second dimension, Baacke suggests *knowledge* about today's media and media systems ("Medienkunde"), that should include an *informative* (e.g., "How do journalists work?", "How can I use a computer for my purposes?") as well as an "*instrumental-qualifying*" layer, meaning the ability to use new technologies, for example familiarising oneself with new software (ibid., p. 99). Baacke's third dimension, *media usage*, includes the *receptive* use of media (e.g., being able to use specific software) and the *interactive* use of media (responding while using media, e.g., teleshopping). Finally, the last dimension of *media design* can also be seen in a twofold manner, as this dimension aims for *innovative* media design: "changing a media system within its inherent logics", as well as *creative* media design: "emphasis of aesthetical variants, going beyond communicative routines" (ibid.).

Despite having been developed at the time of analogue media – when mass press and the wide popularity of television were current issues – Baacke's concept remains valuable and insightful also in times of digital media, the internet and big data (Moser 2018, p. 77f). Particularly its goals of economic critique and self-reflective action constitute valuable approaches in times of digital capitalism (ibid, p. 78). Moreover, although several of Baacke's dimensions seem to focus on abilities the individual media user ought to gain, the author emphasises that media literacy should not be restricted to a subjective-individualistic level, but should rather be implemented at a supra-individual, societal level and should foster a public discourse (1997, p. 99). These objectives are highly relevant for education about datafication. Furthermore, besides a somewhat instrumental nature – aiming for the practical skills to use media or create content – Baacke's concept also attaches great importance to media criticism. This is unusual as 'traditional' media literacy is often understood as practical and skills-based, and even when critical reflection is included, this reflection often only concerns critical readings of media *content*, rather than a consideration or critique of media *structures* (see e.g., Zorn 2015; see also below). This correlates with developments in the data literacy field, which is similarly predominantly of instrumental nature, and where critical perspectives are included, they often relate to digital content or data handling (see chapter 2.2).

It is this focus on fostering critical reflection of societal processes related to media, including a self-reflective and an ethical component, that makes Baacke's concept so very valuable for this theoretical framework. Moreover, also today's media scholars most often discuss this critical aspect when referring back to Baacke's media literacy. Niesyto, for example, argues that Baacke's dimension of media criticism is somewhat "transverse" to his other three dimensions (2018, p. 65). He further emphasises that Baacke vehemently disagreed with the normative control and youth protection objectives that had until then often been associated with media literacy, as they regarded children and youths as passive recipients of media content (ibid.). Similarly, Moser points out that media criticism is placed as the first of the four dimensions in Baacke's framework and argues that Baacke regarded critical media

education as a central task for media pedagogy (Moser 2018, p. 77). Thus, Baacke's 'classic' media literacy already provides meaningful insights for an extended theorisation of critical datafication literacy. This traditional media literacy approach has also been adapted to our digital times, for example by adding a fifth dimension that includes fostering media and internet policy competences (Oberle 2017, p. 190f). Dander even developed a model of "data critique" that builds on Baacke's model in combination with Ganguin and Hobbs, and aims for the ability to recognise, decode, analyse, critically reflect on and evaluate data and data practices as well as fostering citizen's agency and civic participation (2014, pp. 10–12, own translation).

3.1.3 Developments and Controversies in Media Literacy Concepts

Over the years, the field of media pedagogy and media literacy gained wider recognition. Although media scholars still criticise the lacking implementation of media education in school curricula, the field has nevertheless become more established and institutionalised (Gapski et al. 2017a). Yet, as already highlighted above, media literacy remains a contested concept with various different understandings. My review of the field further found that common points of disagreement between media literacy scholars bear significant resemblances to the differences in data literacy understandings that were identified in chapter 2.2. Some of these contested issues have already been mentioned in relation to Baacke's concept above. One key issue is that media literacy is located between the poles of, one the one hand, working towards reflection, responsibility, character development and potentially empowerment, and, on the other hand, the goal of technical or instrumental qualifications (Gapski et al. 2017a, p. 21f). Perhaps in part due to the terms' linguistic origins – literacy coming from reading and writing; competence often referring to skills, qualifications or abilities – there is an ongoing discussion about the extent to which media literacy should be understood in an instrumental and practical manner or should rather aim for understanding and critical reflection of media. Many scholars argue that the problematic challenges especially of digital media cannot be solved through practical abilities of using (digital) media alone (e.g., Gapski et al. 2017, p. 19; Sander 2017, p. 130f).

Moreover, traditional media literacy approaches usually focus on media texts – in other words, media content. Thus, even when media literacy concepts include a critical perspective, this often addresses only the content of media, encouraging questions about the intended message of a media text or potential alternative readings. While these are important critical considerations for media users, a broader perspective on underlying technologies and structures of media is necessary in order to understand current developments in the media landscape (Zorn 2015, p. 20). This issue is amplified when considering the challenges of digital media and the

internet, and the wide-reaching influence these technologies and their underlying structures have on today's citizens and our societies in general.

Another tension evident in many media literacy approaches, which Baacke also identified, is the recurring criticism of subjectification. Sometimes media literacy can be (mis)understood as shifting responsibility to the individual rather than working towards necessary social structural changes (Gapski 2019, pp. 26; 28). As already argued in regard to data literacy in chapter 2.2, this raises unreasonable expectations for individuals and leads to an unequal distribution of responsibility. While citizens require certain abilities and knowledge to participate in our digital societies and should ideally be able to critically reflect on current media developments, it should not be their responsibility alone to address challenges related to digital media and the datafication of our societies.

Considering these tensions, it is particularly media literacy concepts that a) are focussed on knowledge and critical reflection rather than practical skills; b) go beyond media content and also aim for understanding of media structures; and c) are careful not to merely shift responsibility to the individuals, that are particularly relevant for the critical datafication literacy framework developed in this study. One example for such media literacy approach is presented in Mihailidis' 2018 paper on "civic media literacies".

3.1.4 Mihailidis: Critically Reflecting Media Structures and Enabling Agency

In contrast to Baacke's more traditional approach, Mihailidis clearly distances his work from "media literacy's long-standing approach to critical inquiry through reasoned deconstruction and the creation of media texts" (2018, p. 1). While "not diminishing their [these frameworks'] impact" but rather building on these foundations, Mihailidis outlines five points of criticism in prior media literacy frameworks: their need for critical distance from media; transactional nature (prioritising skill attainment); focus on deficits; emphasis on creation or critique of content; and their prioritisation of individual responsibility (ibid., p. 4f). These points of criticism are in line with the tensions between different approaches to media literacy outlined above and highlight this concept's relevance for my study. As argued in prior chapters, when it comes to critically educating about datafication, critical distance is often impossible; practical skills are insufficient; a focus solely on deficits could lead to resignation; content is less relevant than understanding structures; and it is important to not place too much responsibility on individuals.

In going beyond these five points, Mihailidis suggests that media literacy "must be reimagined as intentionally civic" and reframed as "relevant to the social, political, and technological realities of contemporary life" (2018, p. 1). Relating to Boyte's work (2014), Mihailidis argues that there is a "gap 'between concern and capacity to act'" (2018, p. 7). This "agency gap" must be addressed so that people are able to

"translate their capacity to understand media with taking deliberate civic actions to improve, reform, or re-imagine media's role in our civic systems" (p. 8). It is these goals of civic participation and agency that highlight the novel nature of Mihailidis' literacy concept. In order to "reframe media literacy interventions towards civic intentionality", Mihailidis suggests that future media literacy initiatives should aim at

> enabling agentive action-taking, evoking a caring ethic, inspiring critical consciousness, developing persistent engagement, and creating conditions for emancipatory communication, where people are able to work together to respond to social problems that prevent progress from taking place. (ibid., p. 11)

Overall, Mihailidis' concept of civic media literacies provides a highly relevant approach to media education for this theoretical framework, pointing out key weak points of prior concepts that should be considered and suggesting ways to overcome the "agency gap" to better support citizens to take action. In some instances, the author even addresses issues related to datafication, arguing that "people are increasing[ly] subjected to algorithmic advertising, personalized information, and targeted content that is designed for the extraction of data" (2018, p. 6). Thus, he argues that instead of focusing on media content, media literacy initiatives should consider the "platform or modality relationships to information and communication" and the impact of "algorithms, platforms, and abundant information flows across a myriad of loosely affiliated networks" (ibid., p. 4f).

3.1.5 Digital Literacy

With the ever-growing importance of digital technologies in society, many new concepts have emerged that specifically focus on fostering citizens' literacy in relation to digital media. In the German academic context, many scholars called for changes in existing concepts of Medienkompetenz in order to include digital media (e.g., Helbig 2016). A number of new concepts emerged as well, using terms such as "Digitalkompetenz" (digital competence) or "Digitale Souveränität" (digital sovereignty) (Gapski et al. 2017a, p. 19). In the English-language academic discourse, "digital literacy" constitutes the most common term. However, defining digital literacy has "proven complicated" and it remains a "contested term" today (Pangrazio 2016, p. 163; Pangrazio et al. 2020, p. 445). To add to the confusion, there is "significant overlap between digital literacy, information literacy and other fields such as technological literacy" (Leaning 2017, p. 118f) and the distinction between media literacy and digital literacy can be blurry. Generally speaking, digital literacy can be understood as "the technical, cognitive, and sociological skills needed in order to perform tasks and

solve problems in digital environments" (Shade and Shepherd 2013, no page number).

Similar to the field of media literacy, the academic discourse around digital literacy started from an instrumental understanding but has seen increasing calls for more critical perspectives instead of an "overly technocratic and acritical framing" for several years (Hinrichsen and Coombs 2013, p. 1). Pötzsch provides a detailed review of recent work in the field of digital literacy (2019). Examples for critical perspectives include scholars who have connected digital literacy with Paulo Freire's critical pedagogy and its goals of critical consciousness, democratisation and civic participation (e.g., Hammer 2011; Garcia et al. 2015), or who approach digital literacy from the perspective of traditional humanities, fostering a critical "Bildung" in a Humboldtian understanding (Simanowski 2018). Both of these educational theories will be discussed in more detail in the next chapters.

Moreover, several scholars have suggested a distinct *critical digital literacy*. Such concepts often focus on the "critical consumption of digital forms", "the personal experiences of the individual", or "critical skills in specific digital contexts" (Pangrazio 2016, p. 164f). Thus, similar to the media and data literacy discourse, there is a predominance of objectives regarding technical skills, content creation or critique of content. However, some concepts also aim for a broader critical understanding of the implications of digital technologies and for fostering citizen involvement. For example, Shade and Chan's "digital privacy policy literacy" promotes understanding of digital policy processes, the political economy of digital technologies and technological infrastructures as well as supporting citizens' participation in "policy-making processes […] to formulate their right to privacy" (2020, pp. 327, 336). Furthermore, the critical digital literacy concepts by Pötzsch (2019) and Pangrazio (2016), discussed in detail in chapter 2.2, foster similarly broad and critical understanding.

3.1.6 Aßmann et al.: Big Data Practices as a Challenge for Media Education

Finally, some media literacy approaches have been identified that directly relate to the challenges of datafication and call to include into media literacy critical reflection of big data structures and the influence of datafication on our societies. A key text here is a position paper by a group of seven German media literacy scholars, who outline problematic issues related to datafication, highlight key areas to be addressed by media pedagogy (and argue why this is needed), and give suggestions on how to implement their calls into practice (Aßmann et al. 2016).

Aßmann et al. outline five key areas of responsibility that media pedagogy should address in relation to datafication: 1) making visible and understandable the invisible and complex technical, economic, social and ethical implications of datafication; 2) fostering citizens' agency regarding the use of their data and their involvement in decision-making on new data systems; 3) demanding diversity

and denouncing discrimination, for example through algorithms; 4) supporting citizens' self-determination and fostering public debate about datafication; and 5) fostering critical reflection and enabling productive and societally desirable forms of usage (2016, p. 4ff). While all five calls constitute novel approaches to media literacy – especially at the time of publication – particularly the fourth point provides a highly relevant insight for my study. The authors urgently call to support citizens' self-determination while at the same time emphasising that this cannot be individualised but is dependent on a civic framework for action that allows for self-determination. What such a framework for action could look like for citizens of datafied societies will be further discussed in chapter six.

In order to work towards these five areas of responsibility, the authors of the position paper call for interdisciplinary work (Aßmann et al. 2016, p. 6) as the complexity of datafied societies can only be addressed through the collaboration of media pedagogy with legal, political, technical, economical, and media and communication studies discourses. Moreover, a permanent and sustainable implementation of media pedagogy in school curricula and other educational institutions is needed. The authors make very clear that understanding the structural processes of datafication and its political implications constitutes a necessary prerequisite for participating in societal debates and enacting one's right to informational self-determination and must therefore be included in educational policies (ibid.). Overall, the authors of the position paper make several highly relevant arguments for the conceptualisation of critical datafication literacy. Although the paper was published in 2016, several of the authors' claims are still not yet sufficiently considered in today's (critical) data literacy approaches. In particular, the strong foci on making ethical issues transparent, empowering citizens, and on working towards more diverse and democratic data societies have significantly informed this study's theoretical framework.

Two co-authors of the position paper have further published their own suggestions on how to address media pedagogy in light of new data systems. Gapski argued that existing media literacy approaches focus too much on media texts and content, and that, considering the "media catastrophe" that digital society faces, media education needs to de-mystify big data, educate about opportunities, limitations and risks, and, importantly, go beyond an instrumental and individualised approach to media literacy (2015, p. 63). Similarly, Zorn clearly states that media pedagogy has the responsibility to study big data's implications on education, personal development, the protection of equal opportunities and the promotion of a self-determined life, as well as to develop educational concepts that approach these issues (2015, p. 20). In doing so, media pedagogy should collaborate with other fields and with practitioners but should avoid individualisation and resignation while fostering critical reflection of data structures and promoting data protection abilities.

In the same edited volume as these two texts, other contributions also make suggestions for an update of media literacy approaches to include concerns around datafication (Brüggen 2015; Grimm and Kimmel 2015; Koska 2015; Sieben 2015), or suggest a connection of the English-language discourse around data literacy to German media pedagogy (Dander and Aßmann 2015). Newer publications make similar arguments, suggesting that "algorithm literacy instruction" (Brodsky et al. 2020, p. 55) or "conceptual understanding of technology – of which data literacy is a constituent part" should be incorporated into media literacy (Knaus 2020, p. 13). Others call for a "media-grounded data literacy" (Claes and Philippette 2020, p. 26).

3.1.7 Conclusion

The theoretical framework that is being developed in my study contributes to these discourses, learning from established and theoretically grounded models such as media literacy and connecting them to current conceptualisations of (critical) data literacy. The analysis of selected key texts of the German- and English-speaking media and digital literacy discourse in this chapter already provided manifold relevant insights for the conceptualisation of critical datafication literacy. Novel insights for the framework development included the analysed literacy approaches' strong focus on *understanding* media structures and on *critical reflection* and a critique of (digital) media. Moreover, their goal of using education *for societal change* and increasing citizens' *agency*; their emphasis on *interdisciplinary* approaches; and their *warnings against individualisation* strongly informed my framework for critical datafication literacy.

3.2 The Concept of (Politische) Bildung

3.2.1 Humboldt: The Original Concept of Bildung

A second highly relevant approach to education for this study's theoretical framework is "Bildung", a German concept in educational theory. While sometimes used interchangeably with "education" in the German language and in translations of German texts, Bildung in fact constitutes a very specific understanding of education. For clarity, I use the original German term Bildung (and a small number of other specific original terms) to refer to the specific, narrow concepts they describe, similar to other scholars who use Bildung as a foreign word in their English-language texts (e.g., Lovlie and Standish 2002; Nordenbo 2002).

There are a number of scholars that have had great influence on the theoretical discourse around Bildung, such as Kant (1783 /1964), Herder (1774) and Klafki (1991). One particularly influential text, however, is a fragment written by Humboldt more

than two hundred years ago, that has coined today's understanding of the term Bildung and is still referenced frequently by today's scholars. In 1793 or 1794, Humboldt wrote his "Theory of Bildung" (printed among others in 1986) – a surprisingly concise and, from today's perspective, somewhat convoluted text considering its influential nature. In it, Humboldt argues that at their core, humans are interested in learning about and understanding the world around them; to "expand the sphere of [their] knowledge and [their] activity" and to seek to "grasp as much as possible and bind it as tightly as [they] can to [themselves]" (von Humboldt 2000, p. 58, translated by Horton-Krüger). Thus, the goal of humans is to connect their selves with the world. This objective is also described in the following quote, which is often viewed as the key sentence of Humboldt's text, and which summarises his theory of Bildung:

> It is the ultimate task of our existence to achieve as much substance as possible for the concept of humanity in our person, both during the span of our life and beyond it, through the traces we leave by means of our vital activity. This can be fulfilled only by the linking of the self to the world to achieve the most general, most animated, and most unrestrained interplay. (ibid.)

According to Humboldt, this substance and the linking of the self to the world – in other words, Bildung – does not require a "heightening of [one's] powers and the elevation of [one's] personality", but he rather states that "every business of life can exercise on our inner Bildung" (ibid., p. 60). No matter what one does in one's daily life, any business can "give the mind its own, fresh view of the world and through this its own, fresh self-determination" when approached with the right mindset (ibid.). Through "deep reflection and unceasing observation" of one's self, and by "proceeding step by step and finally surveying the whole, one can reach the point of explaining completely to oneself how human Bildung manages to progress evenly and endure" (ibid., p. 61).

In order to fully comprehend Humboldt's theory of Bildung and its influence on educational discourses, it is helpful – if not essential – to consult secondary literature. As mentioned above, Humboldt's text was written in 1793 (or 1794) as a "fragment".[1] Earlier, in a letter written in November 1793, Humboldt had "remarked on the absence of anything more than an embryonic theory of Bildung", for which his fragment develops a number of general principles (von Humboldt 2000, p. 57, translated by Horton-Krüger). Sander provides a concise English-language synopsis of Humboldt's 1793 text (2019). The author summarises the Humboldtian Bildung as the linking of the self to the world "in the sense of an interaction" (2019, p. 23). Thus, Bildung is not "a simple adaption of the individual to a predetermined order of the

1 Published under the title: "Theorie der Bildung des Menschen. Bruchstück" (Theory of the Bildung of humankind. Fragment).

world" but rather about *reciprocity* between the individual and the world around them (ibid.).

A key aspect of Humboldt's understanding of Bildung is his idea of individual's inner *forces*, or *strengths* – today we would rather speak of "potentials inherent in a person, which he or she can develop through experiences of the world" (Sander 2019, p. 23). According to Humboldt, humans by nature aspire to deal with objects outside of them in the world and thereby develop their "strengths". Thus, Bildung in Humboldt's understanding is not concerned with the passive acquisition of knowledge or attaining practical skills, but rather relates to the development of an individual's potential, which is revealed "not only in their inner experience, but also in their activity in the world" (ibid.). For this reason, Humboldt sees a close connection between the development of the individual and the development of the entire nation (Sander 2018, p. 100). The origin of Humboldt's understanding of Bildung lies in the pedagogical theory of neo-humanism, for which it constitutes an "ideal type" (Vogel 2008, p. 123). Humboldt's Bildung represents a dissociation from the rather unassuming concepts of the bourgeois lifestyle and upbringing in the German enlightenment and rather aims at decreasing social differences through general humanistic education, as Humboldt saw a deep commonality between all societal classes (ibid., p. 123; 125).

However, it should be clarified that Bildung is neither an exclusively German concept, nor was it 'invented' by Humboldt. Rather, the "topic of the educated mind" is central in "most educational theories and philosophies in various cultures, languages, and epochs" (Reichenbach 2014, p. 86). Nordenbo, for example, outlines how the ideas behind Bildung date back to ancient Greece (2002). Similarly, Sander argues that the concept of Bildung has been around since pre-Christianity, and he relates it to Socrates' philosophical practices such as the "productive effect of doubt" and the "importance of the art of using targeted questioning" in order to promote independent thinking and critical scrutiny (2019, p. 24). Nevertheless, German literature has been prolific in the discourse around Bildung (Reichenbach 2014, p. 86), and the modern conceptualisation of Bildung has been strongly influenced by Humboldt in particular (Sander 2019, p. 20). Moreover, Humboldt's influence expands beyond theoretical considerations, as he developed the basis for the humanistic grammar school as a new school form as well as a new model for universities based on the concepts of "freedom of research" and "unity of research and teaching", which are still widely followed in many parts of the world today (Sander 2018, p. 97ff).

3.2.2 Developments and Today's Understandings of Bildung

Despite Humboldt's relevance to today's discourses of Bildung, his ideas have been "disputed or declared as outdated time and again" (Sander 2019, p. 20). In the 1960s and 1970s, Bildung was increasingly replaced with terms borrowed from sociology

and psychology such as "socialisation" and "learning", prompting a heated debate, with more than 300 publications with the term Bildung in the title within ten years in German journals alone (Siljander 2014, p. 327). More marginalisation followed (ibid.) and the concept still remains contested today. Some call to "abandon the concept of Bildung" as it has "lost the possibility of functioning as a point of resistance and critical principle" (Masschelein and Ricken 2003, p. 139), whereas others argue that even today, Humboldt's ideas "represent an important point of reference for theories of education" (Sander 2019, p. 20), because "the concept of Bildung extends to areas of human activity that the candidates for equivalency fail to grasp" (Siljander 2014, p. 328). In the last two decades, there have been increasing attempts to link Bildung to current debates, such as new media (Bauer 2003, p. 135), and it has attracted interest in the English-speaking area and Scandinavia, where Bildung is now used as a foreign word (ibid.; Sander 2019, p. 20). The Scandinavian concept of "digital Bildung", for example, constitutes another relevant approach for this study's theoretical framework, referring to an "overall intercultural competence" that goes beyond aspects such as online etiquette but rather aims for "insight into ethical issues and participation in the digital and democratic society" (Gran et al. 2019, p. 24; Gran 2019, p. 104).

Despite its long history, defining Bildung can be somewhat "cumbersome" (Reichenbach 2014, p. 88). The term is often used in "a very broad and unspecific way", so that it "tends to lose its distinct quality (Bauer 2003, p. 135),[2] or even as a "container-word" (Lüders 2007, p. 186). Nevertheless, a number of modern definitions have outlined Bildung's specific nature and thus highlight the relevance of the concept for my study. For example, Pleines characterises Bildung as a state or process of mind, as "a permanent task", and "as human's self-fulfilment in freedom" (1989, pp. 12–38, translation by Reichenbach 2014, p. 87). Others have similarly highlighted Bildung's nature as a "spontaneous, emergent and never ending process" (Bauer 2003, p. 134) without "defined goals in a utilitarian sense", but continuing throughout life (Sander 2019, p. 19). Moreover, Bildung constitutes a "critical and emancipatory enterprise" (Masschelein and Ricken 2003, p. 140) that aims for maturity, the development of personality, the ability to make judgements, and reflective understanding of experiences of the world" (Sander 2019, p. 19). Finally, scholars outline that Bildung is a normative concept (Vogel 2008, p. 125; Siljander 2014, p. 329), but can also be seen as "non-affirmative" (Siljander 2014, p. 329).

Thus, despite being suggested over 200 years ago, the Humboldtian Bildung still provides numerous relevant insights for my study's conceptualisation of critical datafication literacy. Particularly Bildung's emancipatory nature and its goals of

2 This vagueness was also observed when preparing chapter 3.1, as the German media literacy discourse often uses the term "Medienbildung" (media Bildung) somewhat interchangeably with "Medienkompetenz" (media literacy) or "Medienpädagogik" (media pedagogy).

maturity or self-determination as well as the ability to reflectively understand one's experiences of the world and, based on this, to make judgements, are extremely valuable goals for citizens of increasingly datafied societies. Moreover, understanding education – or Bildung – about datafication as more than "mere" acquisition of knowledge but as a lifelong endeavour is a highly useful approach in light of continuously changing technology landscapes.

3.2.3 Politische Bildung – Origin, Developments and Key Text by Autorengruppe Fachdidaktik

What is Politische Bildung and Where Does It Originate?

A specific form of Bildung constitutes the concept "politische Bildung", another German 'specialty' that is usually translated as "political literacy", "citizenship education" or "civic education" (see below). In this chapter, I will use the original term "politische Bildung" in order to avoid mistranslations and confusion between the various English terms that describe the same concept. The history of politische Bildung has been traced back until before the French revolution (see Detjen 2013, pp. 13–208), and the concept constitutes an encompassing research field today (overviews of research can be found in Detjen 2013; Pohl 2016; Sander and Pohl 2022). The German scholar Lange provides a valuable concise English-language summary of the origin and key developments of politische Bildung (2008). The author links today's understanding of politische Bildung back to post-war Germany in 1945, when the National Socialist regime was toppled (ibid., p. 89). As the German population had very limited awareness of democratic processes and principles after Hitler, the Allies started a re-education programme, with the belief that the democratisation of Germany "could only succeed if its society was made up of citizens who had proficient grasp of democratic concepts" (ibid.). Although only a few re-education measures worked well and were sustainable, this early form of politische Bildung "gave vital momentum to the idea that democracy should not only be fostered as a form of government, but also as a way of life" (ibid.).

The early stage of politische Bildung was strongly influenced by the school of American pragmatism, particularly the philosophy of education following John Dewey, and the concept of civics, which "sought to democratize a public that was first and foremost obedient to authority" (Lange 2008, p. 89f). During these first phases of development, politische Bildung was "derived from the closely related fields of education and political science", only expanding into a "didactics of politische Bildung" in the 1960s (ibid., p. 90). The 1970s were then marked by a polarization of the field between critical rationalism, aiming to "help citizens make rational judgements", and critical theory, attempting to "teach citizens how to emancipate themselves from those who might seek to seize power" (ibid.). Both sides were drawn together by the so-called "Beutelsbacher Consensus", an important directive

for politische Bildung still today. It includes the prohibition against "overpowering" students, the imperative to represent controversy in the classroom, and the empowerment of learners to represent their interests politically (Autorengruppe Fachdidaktik 2016, p. 16). Today, politische Bildung is "firmly integrated in Germany's educational landscape" through a specific subject in school curriculums in every German state (Lange 2008, p. 93).

"What Is Good Politische Bildung?" – Key Text by Autorengruppe Fachdidaktik

The key text for this section was published by a group of eight established scholars and authors in the field of politische Bildung in Germany, who aim to support teachers with a guideline for 'good' politische Bildung (Autorengruppe Fachdidaktik 2016). They provide a concise and coherent definition of politische Bildung that describes the *core* of politische Bildung as regarded by this group of established authors in the field and outline the key notion of "Mündigkeit" (usually translated as responsibility or autonomy) in detail. These definitions constitute highly valuable starting points for understanding politische Bildung. Thus, the group of authors offer the following definition:

> Politische Bildung is based on human's "Mündigkeit" [responsibility / autonomy] and fosters the power of judgement of the democratically sovereign individual. It improves the ability to orient oneself in the social world. It develops the ability to evaluate and criticise societal phenomena. It promotes the competence to political participation and civic involvement. (Autorengruppe Fachdidaktik 2016, p. 7, own translation)

These few sentences clearly communicate the key idea of the concept. The core idea behind politische Bildung is the goal of Mündigkeit, which will be further discussed below. The goal of this educational approach – informed citizens who are able to navigate their social world in an autonomous and critical manner and participate politically – is reemphasised in the next paragraph, in which the authors highlight "the promotion of power of judgement and critical thinking as well as the enabling of participation" as the *core* of politische Bildung (ibid., p. 8, own translation).

As the point of departure and goal of politische Bildung is the Mündigkeit of citizens (see below), the "subjects of politische Bildung do not derive from its disciplines of reference" (Autorengruppe Fachdidaktik 2016, p. 8, own translation). Instead, the objects of learning change, as they are determined by current challenges to Mündigkeit and democratic self-determination. This flexibility in combination with its overarching democratic and social objectives make politische Bildung particularly relevant for informing my study's conceptualisation of critical datafication literacy. If politische Bildung aims to work towards an autonomous and informed citizenry, democratic self-determination and political participation, and to educate

about whatever challenges these values, then it seems self-evident that politische Bildung should educate about the societal challenges surrounding datafication.

Moreover, the authors highlight that 'the political' of politische Bildung is not directly related to political science but rather takes an interdisciplinary, or transdisciplinary approach (Autorengruppe Fachdidaktik 2016, p. 8). The authors argue that the political aspect of the concept relates to the "public creative force" of autonomous citizens and that it represents the "aspiration and the ability of learners to understand, evaluate, criticise and change the social world" (ibid., p. 8, own translation). The concept of politische Bildung is not only implemented in school and classroom settings, but has a broad area of application, including adult and further education, but also more informal educational settings.

Finally, it is crucial to consider the often-mentioned Mündigkeit in more detail. This notion derives from Immanuel Kant's ideas during the enlightenment (Autorengruppe Fachdidaktik 2016, p. 13). Thus, Mündigkeit can be seen as consisting of the individual's ability to sustain oneself in the society and as the goal of one's actions, as well as a goal of education and Bildung more generally. In the context of politische Bildung, this notion describes the "ability to grapple with society, politics and economy in an independent, informed and interest-based manner, to act self-determined and self-efficacious in these areas, and to justify one's actions transparently" (ibid., p. 15, own translation). In practice, these imperatives can be implemented by teaching about Mündigkeit, as well as by applying principles of Mündigkeit to one's teaching methods (ibid., p. 19). The authors emphasise that "teaching oriented towards Mündigkeit differentiates cause, concern and responsibility, courses for action and real potentials for influence" (ibid., p. 21, own translation). By including many references to the learners' daily lives and presenting them with alternative visions, politische Bildung aims to support the learners' Mündigkeit as they "develop the ability for critique, contradiction and resistance" (ibid., own translation). This makes Mündigkeit a highly relevant concept and a suitable goal also for critical datafication literacy, which, one could argue, aims to increase citizen's Mündigkeit in datafied societies.

Other authors in the field of politische Bildung similarly argue that an informed, responsible and "mündig" citizenry constitutes the goal of politische Bildung (e.g., Gesellschaft für Politikdidaktik und politische Jugend- und Erwachsenenbildung (GPJE) 2004, p. 9; Lange 2008, p. 91; Gapski et al. 2018, p. 44; Waldis 2020, p. 59). Politische Bildung's goals of Mündigkeit and enabling citizens to "live self-determined lives in an increasingly complex society" (Lange 2008, p. 91) highlight how much the conceptualisation and implementation of critical datafication literacy can learn from this established field of research and practice. In our datafied societies, it becomes increasingly difficult for citizens to orientate themselves; to make informed decisions, for example on which data technologies to use; and to engage in public matters, such as debates around datafication. Therefore, it can be argued that crit-

ical approaches to educating about datafication should learn from the established field of politische Bildung; but also that politische Bildung – given its flexibility in learning objects – should educate about the challenges to self-determination and Mündigkeit that come with the datafication of our societies. The following section briefly outlines a number of texts that take exactly this perspective.

3.2.4 (Politische) Bildung about Big Data

Bildung about Big Data

Both the more general concept of Bildung and the specific notion of politische Bildung have been adapted to the challenges that arise with new data technologies. Besides calls to "digitise" Bildung, which usually aim for using digital teaching methods or fostering learners' digital skills, a number of scholars have also emphasised the need to understand and critically reflect on the datafication of our societies through Bildung. Two relevant examples will be outlined briefly. The first is the "Frankfurt-Dreieck" ("Frankfurt-Triangle"), an education policy declaration by several authors on how to approach Bildung in times of digitisation, that constitutes a reaction to a prior "Dagstuhl-Erklärung" by different authors and aims to fill the gaps left by the first declaration (Brinda et al. 2019). The "Frankfurt-Triangle" mentions a number of relevant aspects related to data. The authors warn about risks of universal compatibility of data (ibid., p. 6); and argue that Bildung in times of digitisation should include a "technological-medial" perspective that aims at understanding underlying principles and structures of digital systems and their implications as they emphasise that data and algorithms are never neutral (ibid., p. 9f). Furthermore, they call for a "societal-cultural perspective" on Bildung, which analyses and reflects on interactions between individuals, society and digital systems, and considers questions of responsibility as well as risks around data traces and profile building (p. 11f).

Besides this general policy declaration, the 2018 report on "Bildung für und über Big Data" ("Bildung for and about big data"), part of the "ABIDA (Assessing Big Data)" project, makes a more in-depth connection of Bildung with topics of datafication (Gapski et al. 2018). This extensive 188-page research report presents theoretical and empirical findings as well as recommendations for action for a variety of audiences. This includes a clear call to incorporate issues around datafication into Bildung, offering suggestions on how to achieve this. The report not only highlights gaps in the education policy discourse in relation to big data (chapter 3.1.2 and 5.2.1), but also outlines key challenges of big data and how Bildung should address these (ibid., p. 11ff). For example, the individual and social implications of information and power asymmetries should be highlighted, the workings and decision-making processes of algorithms explained, and learners empowered to lead a self-determined and socially responsible life in a digitised world (ibid., p. 18f).

Based on this, the report presents concrete educational and learning goals for Bildung about big data (Gapski et al. 2018, p. 118f). These include a "reflexive evaluation of the social and socio-political implications of big data"; an understanding that data is never neutral and of the economic forces around big data; the realisation of one's options for action, including self-data protection; and, eventually, a "sovereign position and self-determined choice of options for action in data worlds" and an "awareness of the factual and possible future scope for action" (ibid., own translations). With these considerations and suggestions, the ABIDA report constitutes an original contribution for conceptualising how Bildung about datafication could look like.

Media Literacy as a 'Classic Goal' of Politische Bildung

Moreover, the concept of politische Bildung has been connected to challenges surrounding digital technologies. The most common perspective taken in this context is to see media literacy as a 'classic goal' of politische Bildung and extend this media literacy to include issues around datafication. A key text for this perspective is the edited volume "Media literacy: a challenge for politics, politische Bildung and media education" (original: "Medienkompetenz: Herausforderung für Politik, politische Bildung und Medienbildung", Gapski et al. 2017b). The editors argue that media literacy has been a key goal of politische Bildung even before digitisation and that dialogue between the fields should be intensified (Gapski et al. 2017a, pp. 22; 24). In digital times, they continue, this should not just include the active usage of media, but also the ability to comprehend and evaluate the technological and (attention-)economic conditions of the media system, including understanding of algorithms, filter bubbles and other data-related phenomena (ibid., p. 23). Thus, in their view, politische Bildung has the responsibility to establish a new discussion culture about the implications of digital technologies (ibid., p. 24).

Several other chapters in the edited volume confirm this perspective and provide further arguments. Herzig and Martin, for example, outline the structural commonalities and interdependences of media literacy and politische Bildung and argue that both ultimately work towards societal participation (2017, p. 126f). Especially in light of new challenges surrounding digital technologies, they argue that citizens need to be media literate in order to participate in society politically and culturally. Oberle's text in the edited volume further details how media literacy as a goal of politische Bildung should be addressed in today's digital societies: politische Bildung should foster critical reflection of new media and its (also political) uses and enable citizens to shape digital media's underlying conditions (2017, p. 191). Similarly, Manzel argues that media literacy is needed in order to reach Mündigkeit – the underlying goal of politische Bildung – in today's digitised societies, as well as to be able to use reason, make political evaluations and act politically (2017, p. 208). Thus, although the boundaries between disciplines are blurry and the responsibilities not always

clear, scholars of politische Bildung as well as of media literacy have already made evident the need to educate about structural aspects of big data and datafication.

Politische Bildung about Big Data

The texts outlined so far give a good idea of why politische Bildung should or even needs to educate about challenges related to the datafication of our societies. However, only few texts seem to exist that explicitly bring together the concept of politische Bildung and the goal of critically educating about big data. One possible explanation could be that the discipline of Critical Data Studies is not yet as pronounced in the German discourse as it is internationally. However, the research presented so far calls this suggestion into question, as many German publications distinctly relate to challenges of datafication and call for a critical perspective on these issues. Another reason could be the blurred boundaries between the fields, with media education often using the term Bildung (although not always in its original meaning); media literacy approaches aiming for civic involvement; and politische Bildung including media literacy as one of its key goals – and all these fields including some calls for critical reflection of datafication.

An additional, and perhaps the most likely explanation might be that the inclusion of issues related to datafication into approaches of politische Bildung is self-evident for many scholars and is therefore not directly addressed. As outlined above, concepts of politische Bildung clearly argue that the objects of learning of politische Bildung vary depending on the current challenges to citizens' Mündigkeit. It is possible that practitioners of politische Bildung already address topics of datafication of their own accord, and that at least some scholars include issues around datafication when they outline the tasks of politische Bildung in times of datafication, without necessarily mentioning data technologies directly. For example, scholars have highlighted politische Bildung's responsibility to "take up and simplify digital developments in relation to societal regulations and democratic decision-making" (Waldis 2020, own translation), and to identify possible implications and risks of digitisation "as a problem area of societal coexistence and put them to debate" (Sander 2017, p. 144, own translation). Others have highlighted specific challenges of digital technologies that should be considered by politische Bildung, such as subjection to algorithms, the power of Google and Facebook, and the need to protect democratic elections from manipulation (Goll 2018, pp. 217; 219).

3.2.5 Conclusion

Thus, scholars of politische Bildung are clearly (becoming) aware of issues around datafication and are beginning to consider them as a crucial component of politische Bildung in today's societies. Moreover, some English-language publications make suggestions for critical education about datafication that resemble the discourses

portrayed in this chapter, without necessarily using the terms Bildung or politische Bildung. For example, they aim to involve individuals continuously in "processes of self-improvement" and to work towards "full and complete participation in wider society" (Pangrazio and Sefton-Green 2020, p. 217), or they suggest that critical digital literacy approaches should learn from and be connected to political and civic education approaches (Polizzi 2020b). These examples as well as the publications and arguments presented throughout this chapter clearly highlight how productive a (politische) Bildung approach to education about datafication could be, and how much can be learnt from this field for the conceptualisation of critical datafication literacy in my study.

3.3 Critical Pedagogy according to Paulo Freire

3.3.1 The Field of Critical Pedagogy

The third relevant established educational approach examined in detail in this theoretical framework is the notion of "critical pedagogy". This "multi-voiced field and movement" defines education as an "inherently political practice that shapes how we think about and move within the social world" (Vossoughi and Gutiérrez 2016, pp. 140; 142). Critical pedagogy (CP) aims for "transforming relations of power which are oppressive and which lead to the oppression of people" (Aliakbari and Faraji 2011, p. 77). CP is most associated with the work of the Brazilian educator and activist Paulo Freire (ibid.), and particularly his seminal work "Pedagogy of the Oppressed", which galvanised theoretical, pedagogical and political traditions (Vossoughi and Gutiérrez 2016, p. 140). Freire's ideas, which will be analysed in detail below, were taken up by later scholars, who "laid the foundation for an educational model of communication characterized by favouring participation, empowerment, and consciousness-raising to generate individual and collective transformation" (Barbas 2019, p. 75).

Scholarship in critical pedagogy draws on "Hegelian-Marxist philosophy and the European tradition of Critical Theory" (Vossoughi and Gutiérrez 2016, p. 142). Particularly the principals of critical theory of the Frankfurt school, which pursue the idea of a "just society in which people have political, economic, and cultural control of their lives" can be seen as starting point and main source of critical pedagogy (Aliakbari and Faraji 2011, p. 77). Scholars of CP argue that teaching and learning are never neutral, and that schooling can never be understood "outside of its historical, social, political, and economic contexts" (Philip et al. 2013, p. 113). Besides offering powerful analyses of the relationship between education, oppression and power; CP articulates an alternative, suggesting that schools become "transformative spaces" where students and teachers together work towards developing a deepened awareness of the social conditions and their capacities to change them (Vossoughi and

Gutiérrez 2016, p. 142). This transformative understanding of education that aims for learners' critical consciousness has been applied in many different contexts, including feminist work in the 1960s and 1970s, the prominent Italian social theorist Antonio Gramsci, and Scandinavian Participatory Design (Markham 2019, p. 755). In recent years, CP seems to have "gained momentum" (Aliakbari and Faraji 2011, p. 77), and has even begun to be applied to approaches to data literacy (see 3.3.3).

3.3.2 Paulo Freire's Work on Critical Pedagogy

Life and Work of Paulo Freire

In order to comprehend Freire's approach to education, it is necessary to understand the very particular context in which it was created. Freire was a Brazilian educator who worked in the northeast region of Brazil in the 1960s, where the "illiteracy rate – percentage of adult people who could not read or write – reached 72.6%" (Tygel and Kirsch 2016, p. 109). Freire believed in "education as a way of liberating poor oppressed people", characterising the process of literacy education "both as technically learning how to read and to write, and as the emancipatory process of understanding and expressing oneself in the world" (ibid., p. 108f). He aimed to empower individuals to transform their social realities and believed that through "genuine education grounded in democratic praxis, even the most oppressed learners could lead self-determined lives and shape their own destiny (Mihailidis 2018, p. 10). This emancipatory perspective originated not only from intellectual analyses but rather was grounded in Freire's own experiences of poverty and class differences, which "led, invariably, to Freire's radical rejection of a class-based society" (Macedo 2014, p. 13).

After Freire's first large-scale application of his literacy method in 1963, he was invited by the president of Brazil to organise a "National Literacy Plan", aiming for "teaching more than 2 million people to read and write" (Tygel and Kirsch 2016, p. 110). Although these plans had to be cancelled due to a civil-military coup, which eventually led to Freire's arrest and exile, Freire nevertheless became "worldwide famous for his critical pedagogy", and in Latin America, the "history of education cannot be told without the name of Paulo Freire" (ibid., p. 109). His approach to support "critically conscious individuals – radically curious, politically aware, and empowered to intervene" (Mihailidis 2018, p. 10) is applied in educational contexts beyond merely teaching to read and write, and Freire's work continues to influence many educators all over the world (Tygel and Kirsch 2016, p. 108). While Freire's critical pedagogy provides highly relevant insights for a number of educational contexts – including critical education about datafication – its very specific context of origin, namely "teaching poor peasants how to read and write", should always be taken into account (ibid., p. 109).

Key Text – Pedagogy of the Oppressed

In his influential 1970 work "Pedagogy of the Oppressed", Freire criticises the way education is normally carried out (in his historical and geographical context) – with students as passive recipients of knowledge provided by the teacher. Freire speaks of the "'banking' model of education", in which "those who consider themselves knowledgeable" merely deposit knowledge onto "those whom they consider to know nothing" (2017, p. 45). Freire argues that this form of education supports oppression, explaining that the oppressed are "fearful of freedom" as they have "internalized the image of the oppressor" and have "adapted to the structure of domination in which they are immersed, and have become resigned to it" (ibid., p. 21). Despite the different context, this description of people's adaption or resignation bears strong resemblance to today's citizens' resignation towards data collection (see chapter 2.1).

In order to surmount this situation of oppression, Freire calls for a "pedagogy of the oppressed", a pedagogy which "must be forged *with*, not *for*, the oppressed (whether individuals or peoples)" (Freire 2017, p. 22, emphasis in original). The goal of this pedagogy is for the oppressed to view their "reality of oppression not as a closed world from which there is no exit, but as a limiting situation which they can transform" (ibid., p. 23). Therefore, it "makes oppression and its causes objects of reflection" by the oppressed and, so Freire argues, "from that reflection will come their necessary engagement in the struggle for their liberation" (ibid., p. 22). While the language of "oppression" and "the oppressed" originates from the very specific context of Freire's considerations, the goal of *working together with the learners* and to empower them to *reflect on societal structures that limit their freedom* as well as to view this reality as a situation that can be *transformed*, constitute highly relevant approaches to critical education about datafication.

According to Freire, when oppressed learners have unveiled the oppression around them and committed themselves to its transformation, the pedagogy of the oppressed turns into a "pedagogy of all people in the process of permanent liberation" (2017, p. 28). In such "liberating education", teachers must be "partners of the students" and regard them as "conscious beings", thereby resolving the "teacher-student contradiction" and replacing it with "dialogical relations" (ibid., p. 48; 52). Instead of "depositing" knowledge onto the students, teachers must pose "problems of human beings in their relations with the world" and aim for dialogue with the students (ibid., p. 52). Only such "problem-solving education" that overcomes the teacher-student contradiction can, according to Freire, "fulfill its function as the practice of freedom" (ibid., p. 53). These suggestions already highlight the value of CP for educating about the challenges of datafication, which affect – and potentially oppress (see chapter 2.1) – citizens in their daily lives. In the following, I will consider three interrelated key aspects of Freire's pedagogy in more detail: *dialogue, critical thinking*, and "*conscientização*".

Key Relevant Aspects of Freire's CP: Dialogue, Critical Thinking and "Conscientização"

Through *dialogue*, Freire aims to dissolve the traditional roles of teacher and students and turn students into "critical co-investigators" (2017, p. 54). The role of the teacher – or, "problem-posing educator" – is to present "the material to the students for their consideration" and to reconsider their own earlier considerations as the students express theirs (ibid.). Thus, through dialogue, both sides learn about each other's perspective, and realise that "their view of the world, manifested variously in their action, reflects their *situation* in the world" (ibid., p. 69, emphasis in original). With students being increasingly confronted with "problems relating to themselves in the world and with the world", Freire argues, they "will feel increasingly challenged and obliged to respond to that challenge" (ibid., p. 54). As they understand these challenges "not as a theoretical question" but in their wider context, the "resulting comprehension tends to be increasingly critical and thus constantly less alienated" (ibid.) This argument constitutes a highly relevant suggestion for educating about datafication: that to enter into dialogue and present real-world problems within their wider context could solve the difficulties people seem to have with imagining concrete negative consequences of data systems, as expressed for example by participants in my prior study (Sander 2020a).

Moreover, Freire contends that "only dialogue, which requires critical thinking, is also capable of generating critical thinking" (2017, p. 67). *Critical thinking* – which is at the same time goal and method of Freire's critical pedagogy – constitutes another highly relevant aspect of Freire's pedagogical approach for my study's conceptualisation of critical datafication literacy. The scholar emphasises that "true dialogue cannot exist unless the dialoguers engage in critical thinking", and he defines engaging students in "critical thinking and the quest for mutual humanization" as a key goal of his liberating pedagogy (ibid., p. 65; 48). Freire defines critical thinking as:

> Thinking which discerns an indivisible solidarity between the world and the people and admits of no dichotomy between them – thinking which perceives reality as process, as transformation, rather than as a static entity – thinking which does not separate itself from action, but constantly immerses itself in temporality without fear of the risks involved. (ibid., p. 65)

This quote highlights not only the parallels between CP and Bildung, which will be further detailed below, but also illustrates that for Freire, thinking and transformative actions are closely interwoven. This is confirmed by secondary literature that outlines that for Freire, thinking is "not an object lesson in test-taking, but a tool for self-determination and civic engagement" (Giroux 2010, p. 716). Similar to (politische) Bildung, Freire views pedagogy as a way to empower students towards "read-

ing the world critically" and "intervening in the larger social order as part of the responsibility of an informed citizenry" (ibid.). Freire's CP aims for learners to realise "their own power as critically engaged citizens" (ibid., p. 717), and to encourage them to "act as active agents" with a critical consciousness that "helps them evaluate the validity, fairness, and authority within their educational and living situations" (Aliakbari and Faraji 2011, p. 80). These goals of encouraging learners to think critically and become empowered citizens constitute highly relevant objectives for critical datafication literacy as well.

The notion of critical consciousness, or *conscientização*, constitutes the third particularly relevant aspect of Freire's critical pedagogy for my theoretical framework. Conscientização is a concept developed by Freire throughout his work. Simply put, Freire argues that dialogue and critical thinking help students develop a certain consciousness of themselves and their situation in the world (see e.g., 2017, p. 42f). This consciousness cannot be reached through propaganda or "implanted" by leadership, but it can only emerge through dialogue and critical thinking "by means of which people discover each other to be 'in a situation'" (ibid., p. 41; 82). Through this critical consciousness, an "authentic transformation of reality" takes place, in order "to humanize women and men" (ibid., p. 156). Despite Freire's very specific context, the concept of critical consciousness can easily be adapted to the issue of datafication. In today's societies, it is similarly necessary that people become aware of their situation in our datafied world – i.e., how datafication affects their lives and our societies – and to critically reflect this situation. Many scholars and activists further argue that people, rather than corporations, should own their data – similar to the way Freire emphasises that workers need to be the owners of their own labour (ibid.).

Parallels to Bildung and Digital and Data Literacy

Similar to Bildung, Freire's critical pedagogy understands education as "an ongoing activity" and views humans continuously "in the process of *becoming*—as unfinished, uncompleted beings in and with a likewise unfinished reality" (Freire 2017, p. 57, emphasis in original). In order to prepare students "for a self-managed life" (Aronowitz, 2009, p.ix), and to improve this unfinished reality and work towards a "more socially just world" (Giroux 2010, p. 717), Freire argues that critical pedagogy "must begin with the human-world relationship" (Freire 2017, p. 58). As outlined in the previous chapter, Bildung is similarly always concerned with this relationship, and similarly works towards empowered, independent citizens.

Apart from this, Freire highlights that critical pedagogy can help with people's *resignation* in light of seemingly overwhelming power structures by developing a "deepened consciousness of their situation" that allows them to apprehend their situation as "an historical reality susceptible of transformation" (2017, p. 58). Through such consciousness, resignation can be replaced with a drive for transformation and inquiry as learners feel more in control of their situation in the world (ibid.).

As outlined in chapter 2.1, resignation in light of powerful digital companies and a wish for more control over one's data are key challenges in datafied societies. Thus, critical datafication literacy can learn much from CP in terms of how to fight resignation with critical consciousness and empowerment. Moreover, Freire developed an "emancipatory theory of literacy" together with his colleague Donaldo Macedo (1987, p. 6). The authors view their critical literacy as "inherently a political project", aiming to develop "democratic public spheres" (ibid., p. 7; 2). Freire and Macedo's literacy aims to empower citizens and to give them "a voice in both shaping and governing their society", thus promoting "democratic and emancipatory change" (ibid., p. 2; 141). Further, they highlight that literacy should not be "approached as merely a technical skill to be acquired", but rather as a "necessary foundation for cultural action for freedom, a central aspect of what it means to be a self and socially constituted agent" (p. 7). Thus, this understanding of literacy not only shows resemblances to the concept of Bildung but also reemphasises the need for critical literacies that go beyond instrumental skills, strengthening the key argument of chapters 2.2 and 3.1.

Overall, Freire's understanding of education and literacy, while developed within a very specific historic and geographic context, offers many relevant insights and connection points to various education contexts, and has had considerable influence on the field of education in Latin America and beyond. Freire's work has been particularly popular in the Southern hemisphere and "most totalitarian states" (Macedo 2014, p. 12), but has also influenced many educators and academics in the Western world. Although Freire's acceptance in the West has been "more problematic" than in societies that are struggling with "colonialism and other forms of totalitarianism" (ibid., p. 15), and some scholars argue that his ideas are not yet appropriately appreciated or understood by Western academics and educators (ibid.; Shaull 2014), others consider his texts a 'classic' and argue that since the 1980s, there has been "no intellectual on the North American educational scene who has matched either his theoretical rigor or his moral courage" (Giroux 2010, p. 718).

Moreover, the cited scholars agree on the relevance of Freire's critical pedagogy for today's societies. They highlight that CP's emancipatory nature (Aliakbari and Faraji 2011, p. 77) and its focus on the "relationship between democracy and pedagogy" make Freire's work in fact "more relevant today than when [it was] first published" (Giroux 2010, p. 717). Besides Freire's specific context of education, the parallels of his situation to today's societies "should not be overlooked", particularly in relation to digital technologies, as "our advanced technological society is rapidly making objects of most of us and subtly programming us into conformity to the logic of its system" (Shaull 2014, p. 33f). Applying Freire's language to today's context, Shaull continues to state that "the young perceive that their right to say their own word has been stolen from them" and emphasises the importance of "the struggle to win

it back" (ibid.). It is this struggle of empowering citizens in increasingly datafied societies for which CP can offer highly valuable insights.

3.3.3 Applying Freire's Critical Pedagogy to Data Literacy Approaches

It seems that other scholars agree with CP's relevance for educating about digital and data technologies, as there are a number of digital and data literacy concepts that build on Freire's work. In fact, Špiranec, Kos and George's systematic critical review of 99 critical data literacy publications found that authors almost exclusively turn to Freire's CP as a pedagogic approach for critical data literacies (2019). The following section presents key relevant Freirean critical data literacies and analyses what can be learnt from these for the conceptualisation of critical datafication literacy.

Data Literacy Based on Freire – A Popular Approach

Many authors see particularly Freire's notion of a critical consciousness as fruitful for educating about digital and data technologies, arguing that such consciousness is needed for navigating today's complex digital societies (e.g., Hammer 2011; Garcia et al. 2015), or drawing their definition of 'critical' from Freire's work (Hautea et al. 2017). Others propose to connect Freire's critical consciousness to data activism approaches (e.g., Milan 2017), thus fostering "resource mobilization and critical conscious making" (Meng and DiSalvo 2018, p. 1). Freire's approach of empowering learners through literacy education has also been applied to big data's "empowerment problem", such as in D'Ignazio and Bhargava's "big data literacy" (2015, p. 5). Moreover, Philip et al. have argued that technology or knowledge about big data alone will not suffice to "address fundamental issues of equity and justice in society" but that "self-transformation, dialogue, and political struggle" in the sense of Freire's work are "more likely avenues for change" (2013, p. 112).

These few examples – out of an extensive corpus of Freirean-inspired approaches to educating about digital and data technologies – already highlight that CP offers many useful insights for critical data literacies. Two publications have been identified as particularly relevant for my theoretical framework as they examine parallels and points of connection between Freire's critical pedagogy and approaches of critical data literacy in detail.

Tygel and Kirsch: Contributions of Paulo Freire to Critical Data Literacy

Firstly, Tygel and Kirsch's "critical data literacy" was already presented in chapter 2.2. However, besides suggesting a new literacy concept, Tygel and Kirsch also provide an in-depth analysis of parallels between Freirean literacy and data literacy. The authors identify four stages of Freire's literacy method: An investigation, thematisation, problematisation, and systematisation stage, which they then apply to data

literacy (2016, p. 111f). As figure 2 shows, the four stages can be easily adapted to goals of data literacy. However, it should be noted that the authors follow an understanding of data literacy that predominantly focusses on *using* data, aiming for the skills to use and deal with data sets, as well as learning to critically view these data sets, question where they came from, what they represent and which potential biases they might include. Thus, the goals of data literacy depicted in figure 2 mostly focus on the (critical) use of data, and broader issues such as problematising the implications of datafication on people's lives and our society are not necessarily considered.

Figure 2: The four stages of Freire's critical pedagogy applied to data literacy (from Tygel and Kirsch 2016, p. 113).

Stage	Literacy	Data Literacy	Result
Investigation	Understanding of educand's context, and discovery of socially relevant themes in that reality		Survey of vocabulary universe: source for generative themes and thematic axes.
Thematisation	Coding and decoding of words and understanding of its social meaning	Coding of the themes into existing (or not) data, and decoding for understanding realities	Generative theme and thematic axis coded as images, film or data
Problematisation	Finding contradictions surrounding the decoded themes, and demystifying the realities	Discovering non-neutrality in data: which aspects are exposed by data, and which are hidden?	Critical view about the themes
Systematisation	Organization, interpreting, and presentation of the lived experience	Organizing and interpreting reality through data, and communicating discoveries	Communication products

Nevertheless, Tygel and Kirsch's adaption of the Freirean literacy approach to the field of data literacy provides relevant insights for this study's theoretical framework. Most relevant here is the third stage, in which the "non-neutrality" and lacking transparency of data is problematised and the authors call to "unveil what is behind the scenes" (2016, pp. 113; 116). Although the main focus still lies on data skills and learning to "use data with critical consciousness", this stage also includes broader, potentially societal, perspectives as the authors urge to problematise the non-neutrality of data "in a critical perspective of data literacy education" (ibid., p. 116). While the examples they provide mostly relate to the use of data sets, questions around the

non-neutrality and lacking transparency of data can easily be transferred to critical education about broader issues around datafication.

Moreover, again building on Freire, Tygel and Kirsch emphasise the "emancipatory character" of their suggested data literacy concept (2016, p. 113). They argue that their literacy concept can be "analysed in two dimensions: the technical abilities and the emancipation achieved through the literacy process" (ibid.). In this context, they observe that "there seems to be a natural tendency for this [technical] dimension to suppress the emancipatory one" (ibid.). The authors argue that given the high technical complexity of data manipulation and the many technical skills that individuals need to master, there might be a tendency for learners to "leave behind the critical reflection about the social meanings of data in the world, and therefore the emancipatory perspective may be put in background" (ibid., p. 113f). This is in line with the findings of chapter 2.2, which highlighted the strong focus on instrumental data literacy approaches in the literature – suggesting that this tendency exists not only with learners but also with scholars and practitioners of data literacy. Overall, Tygel and Kirsch's analysis of contributions of Paulo Freire to critical data literacy and their "Freirean inspired critical data literacy" clearly demonstrate how many parallels and connection points exist between Freire's CP and critical datafication literacy.

Markham: "Critical Pedagogy as a Response to Datafication"

The second key relevant text is Markham's adaption of CP to the challenges of datafication (2019). While also drawing parallels from Freire and CP to data literacy, Markham does not provide a fully developed theoretical conceptualisation of a "Freirean inspired data literacy" like Tygel and Kirsch's paper. Instead, Markham's article constitutes "more of a manifesto", which argues that "critical pedagogy, combined with a strong qualitative orientation, can challenge quantification, datafication, and computational logics" and which provides suggestions on how to implement such "critical data pedagogy" (2019, pp. 759; 754; 755). Markham, in contrast to Tygel and Kirsch, takes a broad and decidedly critical approach to data literacy, omitting data skills in her literacy approach and rather aiming for critical reflection of the growing datafication of our societies. Her article exemplifies her suggested "*critical pedagogy of the digitally oppressed*" by an ongoing research project and suggests ways to implement such pedagogy, which combines "the strengths of critical approaches and qualitative epistemologies" and aims for "understanding and critically analyzing data, datafication, and other aspects of the digital era" (ibid., p. 755, emphasis added; p. 754).

In her ongoing research project, Markham has been taking a CP approach and training youth in self-reflexive ethnographic analyses of their own social media experiences since 2012 (2019, p. 755). The author criticises the usual instrumental, skills-based approach to digital literacy and instead sees critical theory as the "foundation for anything we might call literacy" (beyond "knowing how to read

and write") (ibid., p. 757). Instead of letting her student participants read about critical theory, however, Markham encourages them to actively apply critical theory through watching or having an experience (ibid.). She further argues that students should not be convinced that "big data are bad or wrong" but should rather be supported "to learn for themselves that they are being tracked and calculated as data in ways they cannot see or don't notice" (ibid., p. 758). As a side benefit, Markham points out, her students "begin to pay attention to how this might serve others' interests more than their own", and they can "begin to see the flaw in the idea that we simply trade privacy for convenient access" (Markham 2019, p. 758). Moreover, Markham aims to "raise questions and cause a chain reaction whereby participants raise their own questions and ask their parents, siblings, friends, and colleagues to also raise questions" (ibid., p. 756). All of these approaches are very much in line with Freire's CP, and they offer novel insights on how to learn from CP for critical education about datafication.

The findings of Markham's ongoing research project further show that her participants are "highly reflexive and show clear signs of consciousness raising", with many using "a critical lens to analyze their social media use" (Markham 2019, p. 756). For some participants, this made them initially feel bad about themselves or even led them to believe that they "should stop using social media altogether", but "most of this self-negativity wore off" as participants realised the complexity of the situation (ibid.) – a similar finding as in my own prior study (Sander 2020a). These findings of increased critical reflection and a more in-depth understanding of datafication highlight the promising potential of applying Freire's CP to critical data literacy research.

3.3.4 Conclusion

Overall, this chapter demonstrated that despite its very different context of origin, much can be learnt from Freire's CP for the conceptualisation of critical datafication literacy, and there is good reason that this pedagogy has been adopted to data literacy so often in the past. The empowering, emancipatory nature of Freire's pedagogy constitutes a highly valuable approach in light of the new power imbalances and citizens' resignation that arise with the datafication of our societies. CP's focus on critical thinking further offers a much-needed counterbalance to the prevalence of instrumental approaches in data literacy scholarship and practice. Finally, CP's use of dialogue and real-world problems helps address the complexity of many topics related to datafication. However, the use of CP for digital and data literacy conceptualisations has also been criticised. Polizzi summarises key points of criticism, arguing that CP has "perpetuated the idea of social action as necessarily critical of dominant ideologies", and has encouraged citizens' critique of such dominant representations while "only sporadically emphasising the importance of understand-

ing media structures and the broader digital environment where information circulates" (2020b, p. 6). Such risks and limitations should be taken into consideration when taking Freire's critical pedagogy out of its original context and applying it to new contexts such as critical education about datafication.

3.4 Preliminary Framework for Critical Datafication Literacy

This chapter aims to bring the findings of the preceding theoretical chapters together and draw conclusions from them in order to develop a preliminary framework for critical datafication literacy. As already outlined in the introduction chapter, the overarching goal of this study was to develop an in-depth theoretical framework for critical education about datafication. This framework takes not only existing critical data literacy conceptualisations into consideration but also learns from established educational approaches as well as practitioners of critical data education. The first two steps of this framework development took place throughout the previous chapters. After reviewing, analysing and categorising existing (critical) data literacies in chapter 2.2, the chapters 3.1 to 3.3 examined key texts from the three selected established educational approaches (digital) media literacy, (politische) Bildung, and critical pedagogy in detail. Each approach was analysed with regard to what makes this educational approach unique and what can be learnt from this approach for critical datafication literacy.

After these most relevant aspects were identified, they were visualised in a thematic map, and patterns and parallels between the different educational approaches were investigated. These key points and patterns make up my study's theoretical findings and the theoretical core of the developed literacy framework. Thus, the previous chapters went beyond a mere review of the literature, but rather constituted a detailed analysis and transfer of the selected educational concepts to the field of critical data literacy. In doing so, my study aims to contribute to a "more complete theorisation" of critical data education that is urgently needed (Pangrazio and Sefton-Green 2020, p. 208).

3.4.1 The Terminology

As outlined throughout the last chapters, many different terms can be applied to the practice of educating about data technologies. While most English-language approaches use some variation of the term "literacy" even when aiming for critical perspectives, in the German language discourse, "literacy" is often associated with skills-based approaches. Here, reflective and critical approaches tend to use terms such as "*Bildung*" (education), "*Souveränität*" (sovereignty), or "*Mündigkeit*" (responsibility/autonomy). All these concepts provide new and useful insights to the

conceptualisation of critical datafication literacy, but particularly the German "*politische Bildung*" strongly influenced the development of this preliminary framework for critical datafication literacy. Politische Bildung aims to promote civic involvement by enabling citizens to orient themselves in the social world and to evaluate and criticise societal phenomena – thus ultimately striving for Mündigkeit (see e.g., Autorengruppe Fachdidaktik 2016). These goals provide useful guidance in defining the goals of critical datafication literacy, as they aim to empower individuals without simply shifting responsibility to citizens (see also below). Therefore, the concept of (politische) Bildung constitutes a strong influence for this preliminary framework.

However, also regarding the term literacy, the theoretical analyses of the previous chapters have provided new insights. As highlighted in chapter 2.2, the term *literacy has been criticised as problematic* because literacy has different meanings for each person, and different notions of power are embedded in different populations' implicit understandings of literacy (Pinney 2020, p. 229). Thus, particularly when working with vulnerable populations, the term literacy can be problematic (ibid.). Scholars have further highlighted that a single definition of critical data literacy may not be possible or even desirable (Fotopoulou 2020, p. 4), whereas others have criticised the "literacification of everything" in light of the emergence of many new literacy concepts (Hug 2019, p. 151). Moreover, as the term literacy is applied to "an ever-increasing variety of practices", some argue that its specific meaning has sometimes gotten lost and it has become "a metaphor for 'competence', 'proficiency' or 'being functional'" (Lankshear and Knobel 2011, p. 21).

Nevertheless, other scholars have argued that literacy as a concept remains useful despite these criticisms because it allows to account for sociocultural factors and it enables people to ask critical questions about power relations and inequality (Pinney 2020, p. 227). Pangrazio and Sefton-Green make a strong case for the *usefulness of data literacy as a term*, arguing that literacy always possesses a "learning or pedagogic dimension" and is "usually understood as a process", making the term a "useful modifier" as it aims to establish normative principles and enable individuals to participate in society (2020, p. 217). In fact, they argue that literacy has moved from being a technical process of learning (such as learning to read and write) to "a way of ensuring full and complete participation in wider society" (ibid.). Thus, they understand literacy as "a useful shorthand to explain how individuals are able to make sense of complex underlying patterns and to relate them to commonly shared and understood theoretical insights" (ibid., p. 213). It is this definition of literacy that informs the use of the term in my study. However, as Pangrazio and Sefton-Green further highlight, "data literacy requires a more complete theorisation if it is to stand as a meaningful response to datafication" (ibid., p. 217). As outlined above, the framework for critical datafication literacy being developed throughout my study aims to contribute to such in-depth theorisation.

Another terminological consideration concerns the *grammatical form of the term literacy*. As highlighted in chapter 2.2, some scholars have argued for the plural form of "literacies" when conceptualising critical data education. Reasons for this include an understanding of literacies "as always socially and culturally situated" (Pangrazio and Selwyn 2019, p. 426), or the wish to highlight the "multiplicity and interconnection of data literacy practices with other literacies" (Fotopoulou 2020, p. 4; see also Golden 2017).[3] Others have argued that different audiences need different literacies and that the use of the singular term may suggest a "homogeneous understanding of the learner and their needs" (Jansen 2021, p. 9). However, I made a conscious decision in my study to differentiate between the *theoretical concept* of critical datafication literacy and the *practical implementation* of this framework (see 3.4.4). Similar to educational concepts such as (politische) Bildung, I argue that the literacy developed in my study consists of specific *educational objectives*, which are then adapted to different *educational contexts* and *groups of learners*. The theoretical concept of critical datafication literacy can thus be seen as the connecting element between the countless educational settings in which critical education about datafication can be fostered – providing guidance on the educational objectives to follow and to adapt to each setting. For this reason, working with a singular literacy term is most appropriate for this framework.

The final terminological decision concerns the *term "data"* in critical data literacy conceptualisations. As highlighted before, I have developed an initial "critical big data literacy" concept prior to this research project (Sander 2020c). While this concept's objectives are still valid and are being refined and extended in this study, the term "big data" is less suitable now than it was in 2018, when I first started working on this initial conceptualisation. Today, the term is more prevalent in the economic sector than in critical research, and its use in the critical data studies research field seems to have been replaced by the term "datafication". As defined in the first chapter, datafication describes the transformation processes in society prompted by the increasing use of data technologies. Thus, this term suggests a reflection of the broader societal implications of digital technologies and is therefore more appropriate for a framework for critical education about datafication than "data" or "big data". For these reasons, I decided on selecting the term "*critical datafication literacy*" for the literacy concept that is being developed throughout my study.

3 A more in-depth discussion of the plural use of literacies is offered by the research field "New Literacies Studies" (e.g., Street 1997; Gee 2005; Lankshear and Knobel 2011). This field was also analysed as part of this research project, but an extensive discussion had to be omitted from the book due to space constraints. Nevertheless, insights from this field have informed my research.

3.4.2 The Goals

An initial guideline for potential goals of critical education about datafication was provided by my previous concept of critical big data literacy, which aimed at awareness, understanding and ability to critically reflect upon big data collection practices, data uses and the possible risks and implications that come with these practices, as well as the ability to implement this knowledge for a more informed internet usage (Sander 2020a; Sander 2020c). These goals have been refined, revised, extended, and theoretically underpinned by the findings of the theoretical analyses conducted throughout the previous chapters.

One key goal that has emerged is that critical datafication literacy should contribute to an ongoing process of learning, aiming at *reflective understanding* of datafication. Instead of focussing on the passing of specific knowledge, critical datafication literacy should rather empower citizens' *critical thinking*, aiming for reflective understanding, or "critical consciousness", of the datafied world around them, as well as enabling citizens to *imagine alternative data futures*. Besides this critical understanding, such literacy should aim to empower citizens to an informed societal and political participation and greater *agency*, ultimately aiming for *Mündigkeit* – the ability to grapple with society, politics and economy in an informed and self-determined manner – and thus fostering an empowered and informed citizenry in datafied societies. According to Milioni and Papa's user typology, critical datafication literacy would thus aim for an "*enlightened user*", who has the opportunity to turn into a "resisting" or "emancipated user" – if they choose to do so (2019, p. 6f).

What is important in this context is that while this preliminary understanding of critical datafication literacy aims for self-determination and empowerment of citizens, which might also include fostering people's abilities to protect their data, it recognises that it is crucial to *not merely shift responsibility to the individuals*. This can not only discourage citizens and may lead to resignation, but it is also a fallacy as not all areas of data collection and usage can be controlled by individuals' actions. It is therefore necessary to find a balance between encouraging people to protect their data, while not making them feel as if it is solely their responsibility to address the risks and challenges that come with the datafication of our societies.

3.4.3 The Content

The theoretical analyses of the previous chapters further identified several key findings in terms of the content of critical datafication literacy. Based on this, it can be said that critical datafication literacy – as defined in this preliminary framework – should educate about the *process of datafication* and its *implications* on individuals as well as wider political, societal and economic impacts. To provide a basis for this awareness and understanding, it is likely necessary to foster *understanding* of how

data is collected about citizens, and about the *non-neutrality* of data and algorithms. This should not be too technical or specific to one medium, but should rather aim at making complex principles comprehensible, using concrete examples, and connecting to wider societal or political issues.

Moreover, based on the approach of politische Bildung, there should be no set of specific topics for critical datafication literacy, but its *objects of learning should rather be determined by current challenges* to democratic self-determination deriving from data systems. In line with this, the focus should lie on understanding of the *(infra)structural changes* in society through datafication rather than on topics around the content of digital media. Finally, based on the literature analysed in the previous chapters, critical datafication literacy should include *constructive advice* to avoid resignation, for example fostering citizens' ability to protect their data – while considering the balance outlined above.

3.4.4 The Implementation

Finally, the theoretical findings of the previous chapters made some suggestions on how to practically implement critical datafication literacy. To start with the key finding here: Scholarship on critical data literacy highlighted that *no one-size-fits-all approach* to literacy is possible, and that different audiences require different approaches (see e.g., Carmi et al. 2020). This also suggests that no generic guidance for the implementation of a theoretical concept such as critical datafication literacy should be included in this framework, as the framework's goals and content should rather be adapted to each group of learners based on their abilities and needs as well as the specific educational context. However, some broader recommendations can be made based on the literature.

Several educational concepts analysed in the previous chapters highlighted that education about data should take place *with* the learners, aiming for dialogue and treating the learners as equals by supporting them in forming their own opinion rather than telling them what to think. This could, for example, be implemented by confronting learners with *real-world problems* (e.g., Freire 2017, p. 54) or using *interactive and participatory* approaches (e.g., Iliadis and Russo 2016; Agesilaou and Kyza 2021). Moreover, it was highlighted that critical education about datafication *does not need to take place through digital technologies*, but that many creative analogue alternatives exist as well (e.g., Pötzsch 2019). When using digital methods, they should be chosen with care, as they can come with a "hidden curriculum" (Mertala 2020). Finally, it was suggested to consider people's "*networks of literacy*" (Carmi et al. 2020), aiming for a "chain reaction" of critical thought, in which one person's awareness and critical understanding is fostered and this person can pass this critical thinking about datafication on to many others in their social networks (Markham 2019, p. 756).

Overall, the theoretical analyses of the previous chapters provided many insights for the development of this preliminary framework for critical datafication literacy. The two literature review chapters highlighted the need for more education about datafication and a stronger theoretical foundation for such literacy, but also revealed how much scholarship on critical approaches to data literacy already exists that this framework can build on. The following analyses of the three selected educational approaches then demonstrated not only how much the critical data literacy field can learn from these more established educational fields, but also that there are many parallels between these different educational notions. All three fields thus provided highly valuable and novel insights for the terminology, goals, content and implementation of critical datafication literacy. The preliminary framework that was developed based on these findings and was presented in this chapter will be further refined and substantiated through the empirical findings of this study, and the final framework for critical datafication literacy will be presented in chapter seven.