I.III Annotations for section 4.4: Learning from the Educators

I.III.I Section 4.4.2 – The Survey Sample – Finding the Sample

Detailed description and reflection on the process of reaching a diverse survey sample:
As outlined in the methods chapter, the population of interest for my study's qualitative online survey consisted of educators from Germany, the United Kingdom and other places in Europe, who are interested in teaching about digital technologies and datafication. As most relevant groups, I identified teachers, student teachers, teacher trainers, higher education lecturers, adult educators, media education centres, and trainers in civil society.

To reach this population, the most appropriate communication channel(s) for each educational profession in each of the three (supra)national contexts had to be identified. This selection was not only informed by my prior experience in the field of critical data literacy research, but also by several experts I contacted. These included, among others, researchers directly working with educators from different backgrounds, and current and former civil society activists in the field of critical data literacy. In discussion with these experts, the project partner Privacy International, and the project supervisors, a list of communication channels was assembled through which the survey would aim to reach a broad and diverse sample of educators from different fields (see appendix VII). Attention was paid to aiming at as much diversity as possible, yet ensuring consistency throughout the different contexts. In line with Clark et al. (2021, p. 186), the list included mailing lists, social media channels, and individual contacts who would be able to distribute the questionnaire even further, aiming to reach as many members of my target population – educators from different backgrounds interested in educating about datafication – as possible. Moreover, every contact was invited to share the survey information and link with other educators they know who might be interested in the survey's topic.

Clark et al. further highlight the typically low response rates for online surveys (2021, p. 186). This proved to be a limitation of my study as well, although I took considerable efforts to reach a big sample. As represented in appendix VII, a large number of educational organisations, groups, mailing lists and interested individuals

were contacted. However, a limitation of this sampling technique is that it is unknown how many and which people the survey invitation reached, as it is not always possible to determine whether an organisation or individual shared the information about the study within their organisation or mailing list. Yet, in some cases, I received confirmation. Therefore, it can be said with certainty that the survey link was circulated:

- In the members newsletter of the German society for media pedagogy scholars (GMK);
- In the mailing list by the British Media, Communication and Cultural Studies Association (MeCCSA);
- In the Weekly Digest mailing list by the European Communication Research and Education Association (ECREA);
- In a German newsletter for educators interested in learning more about digital educational technologies (UNBLACK THE BOX);
- By the social media channels of several educational organisations, such as The Media Education Association and the Association for Citizenship Teaching;
- Among several relevant German and European educational research projects;
- In a German teacher training centre;
- By several teachers in Germany and the UK;
- And by several higher education colleagues in different European countries, who shared the survey in their personal networks.

Already through these channels – particularly through the large mailing lists by different associations – it is likely that the survey information reached several thousand people. Additionally, the promotion via Twitter was successful, with many individuals as well as organisations retweeting the survey invitation, including the Association for Teacher Education in Europe, the British Media Education Association, an Irish educational research journal, a European association for media and learning, a German media pedagogy association, a popular German guide to teaching material (bildungsserver.de), a research institute and several researchers and media pedagogues. In total, the main English-language tweet reached 6,907 impressions and generated 49 link clicks, and the main German tweet reached 1,683 impressions with 26 link clicks.

Moreover, I sent several rounds of invitations in order to reach a sample that is as diverse and equally balanced as possible. In a first round of invitations, I contacted 46 groups and individuals via email, website contact forms and sometimes Twitter in the end of November 2021. A first examination of the collected data by the beginning of January 2022 showed that 38 people had completed the full questionnaire, but there was a predominance of German participants and those from formal education fields. I tried to address this imbalance, in a second round of invitations.

This included sending several reminders to those groups and individuals from a UK and EU background who had not responded yet, and sending invitations to 29 new contacts from British or European background, including many from the non-formal education sector. This helped to balance the sample and was complemented by a third round of invitations in the end of January 2022, with several reminders as well as invitations to four new groups and individuals, again aiming for a diverse and balanced sample. Through these steps, a diverse and fairly balanced sample was achieved (see also chapter 5.3.1).

I.III.II Section 4.4.3 – Developing the Questionnaire – Pilot Study

Detailed description of changes made to the questionnaire after the pilot study:
As outlined in the methods chapter, the survey pilot testers provided detailed and extensive feedback and constructive suggestions. Most comments related to small changes in wording, which were all implemented. There were several issues related to translation, mainly regarding the different German terms that can be used for "educator" and "teaching". In the German language, there are no common broad terms that summarise all kinds of teaching and being an educator. Instead, the German language tends to differentiate for example between teaching in schools ("unterrichten") and being a school teacher ("Lehrer/in") in contrast to teaching in university ("lehren") and being a lecturer ("Dozent/in" or "Lehrende"). It was thus difficult to find a wording that included all areas of education and I decided to use more than one term in some instances (e.g., by writing "unterrichten/lehren").

The pilot testers further recommended separating several of the open questions because they were asking about too many aspects in one question. In several places, the pilot testers suggested adding examples in order to clarify the question or the answer options, or they suggested smaller changes in question or answer option wording. These suggestions were implemented in all instances. For example, several answer options in question five were renamed: such as "non-formal education (e.g., media education centre)" instead of "media education". In question 17, the first statement "Interactive approaches work well and are popular with learners" was changed to "Interactive approaches are a great way to engage learners" (see appendix VIII). This captures my intended meaning similarly well without – as criticised by pilot testers – asking about two different things in one question. Moreover, more details on my research project were added to the landing page.

I.III.III Section 4.4.3 – Developing the Questionnaire – Final Questionnaire

Detailed information on the methodological considerations behind the questionnaire design:
Apart from recommendations from the methodological literature, the development of the questionnaire was strongly influenced by my study's previous theoretical and empirical findings. The survey aimed to investigate if these findings corresponded with educators' daily lived experience and thus aimed to examine the following questions:

a) To what extent are topics related to datafication already being covered and critical data education already fostered by educators?
b) Does the predominance of practical digital and data skills over critical reflection of the societal implications of datafication that I found in the theoretical literature as well as in many resources I analysed correspond with the topics that educators predominantly covered in their teaching?
c) How well-equipped do educators feel to teach about these different dimensions of critical data literacy?
d) Do educators know about the resources I analysed in my content analysis and if yes, what do they think of them?
e) Does the popularity of certain formats I found in my prior study (Sander 2020c) correspond with the formats educators prefer?
f) Do educators – based on their practical experience – agree with key findings on 'best-practice' approaches to educate about datafication that have emerged from my own and other scholars' research on critical data literacy?
g) And finally: What do educators need in order to better educate about datafication and what are their wishes for future critical data literacy resources?

After I created a first draft questionnaire, it was revised and condensed several times based on feedback from the project collaborator Privacy International as well as based on recommendations from methodological literature (see e.g., Reja et al. 2003; Braun et al. 2021; Clark et al. 2021). The final questionnaire used in my survey consisted of a landing page that provided information about the study; a short demographics section (1); a section on educators' experience with topics around digital technologies, (big) data and datafication (2); a section on educational resources about datafication, including a final open question asking for additional comments (3); and a last page that thanked for the participation in my study and asked participants if they were interested in testing and providing feedback for the resource developed with PI (for whole final questionnaire, see appendix VIII).

The landing page contained information on my research project and its goals, details on the survey and data handling as well as contact information for participants who had questions or wanted to express their interest in the study's find-

ings. As outlined in the methods chapter, this also included information necessary for *informed consent* (see e.g., Regmi et al. 2017, p. 642; Braun et al. 2021, p. 8f). Moreover, the landing page specified the study's target population and stated the estimated completion time for the questionnaire, giving a realistic estimation, as recommended in the literature (Clark et al. 2021, p. 187).

The first section on demographics then asked for a small number of basic personal details (age in groups; gender, providing sufficient options and including the option to self-describe; country of residence; and nationality) that would help to situate findings within these contexts. Moreover, one question asked about the area of education that participants worked in (multi-select question, providing nine options and an "other" field) and another invited them to describe their individual position or role in an open text field. These questions aimed at understanding in which educational contexts aspects of datafication might already be covered, but also discovering if the survey was successful in reaching diverse educators from different fields and countries, as had been intended.

The second section asked about the educators' experiences with teaching about topics such as digital technologies, (big) data systems and their implications on society. This section included five questions. The first two used a rating scale to examine how *well-equipped* and how *experienced* educators felt in teaching about different aspects of digital technologies and (big) data. Here, and in all other rating questions, a 5-point rating scale was used. This gave participants the opportunity to indicate if they felt neutrally about a certain option. A "N.A." option further allowed to indicate if a question was not applicable to participants. Adding a visual scale above the numbers and using the same 5-point scale for all rating questions further aimed at a user-friendly design.

For both questions (7 and 8), the broad thematical field of digital and data technologies was separated into four key topics: Digital technologies in general; data security; (big) data systems and algorithms; and the way digital media and (big) data affect society. These four topics were informed by findings that highlight the prevalence of concerns around digital technologies in general and data security questions in contrast to less known issues around algorithmic systems and the way these systems affect society (see literature review as well as Sander 2020). I was curious to see if the same prevalence could be found in educators' knowledge and experiences. In order to clarify each topic, pilot testers suggested to add example questions for each topic, which were displayed in smaller font below each topic. Both rating questions were placed on the same page for ease of use. Moreover, an explanatory sentence was added for each question based on pilot tester feedback, emphasising what was meant by "well-equipped" and "experienced".

Subsequently, three open questions (9–11) asked about more details on the educators' experience with teaching about digital and data technologies, such as the exact topics covered, the key skills and understanding aimed for, and inviting partic-

ipants to add further information on the context, methods, successes and challenges they encountered in teaching about these topics.

The third section focussed on educational resources about datafication. This section included four open and three rating questions and investigated how educators inform themselves on topics around digital technologies and data (12), how they find teaching material on these topics (and if there are any challenges) (13), and how satisfied they are with their access to information and teaching material about digital technologies and (big) data (14). In addition, educators were asked to rate the usefulness of 12 different design formats of educational resources from "not at all useful" to "extremely useful" (15). The selection of formats was made based on findings from my prior research and this study's analysis of online critical data literacy resources (see chapter 5.1). Examples were provided for formats that might be unclear. The rating question was followed-up by an open question (16) inviting participants to name examples of useful resources they have used and to provide more details on what makes a resource useful for them.

The next and penultimate question of the survey (17) was likely the most complex question to design. It asked participants to indicate to what extent they agree with ten statements about how best to educate about digital technologies and data systems. In order to develop these ten statements, I reviewed my prior empirical findings (Sander 2020c), findings from this study's literature review and theoretical framework, further theoretical literature on how best to implement critical data literacy as well as first findings from this study's content analysis of online critical data literacy resources. In a second step, I tried to condense all these findings into simple statements that reflected academic findings on critical data literacy as well as ongoing academic debates, for example on whether or not practical data skills are necessary for critical data literacy. I deliberately included controversial issues, such as the question of "individual responsibility" or "shocking learners", in these statements. The statements were revised, condensed and simplified several times to make them as concise and clear as possible. Key terms for each questions were underlined for further clarification and ease of reading. Feedback from pilot testers about this question was consistently very positive, indicating that efforts for simplification and clarification were successful.

Finally, as recommended in the literature, the questionnaire ended with a final open question, inviting participants to share final remarks and additional comments that may have not been covered by the questionnaire thus far. As Braun et al highlight, this can often generate "unanticipated and useful data" (2021, p. 8). In addition to this open invitation, several suggestions were made on what participants could comment on: for example, on what they would need to be better able to educate about digital technologies and data systems, whether there are any particular kinds of resources they need but can't find, or on their overall wishes for educational resources. Through these suggestions, I hoped to inspire and nudge participants to

elaborate more freely on their needs and wishes when it comes to critical data literacy resources.

After participants submitted their answers, the survey ended with a final thank-you-page, which also invited the participants to contact me via email if they were interested in testing and providing feedback on a new educational resource that was being developed with Privacy International as part of this project. In order to ensure anonymity in the collected data, I asked the educators to email me rather than collecting their email addresses through the survey. This likely led to fewer (8) responses from potential testers, but anonymity was ensured.