HOW TEACHERS UNDERSTAND THEIR RESPONSIBILITIES IN RELATION TO CHATGPT USE IN PUBLIC SCHOOLS

A MASTER'S THESIS

BY

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Abstract:

ChatGPT's impact on schools and the search for adequate responses to this ongoing transformation of educational contexts leads to real-world problem for society and for educators. In response to the current lack of insights into teachers' experiences of ChatGPT-use in public schools and how they make sense of their responsibilities, this thesis investigated how teachers understand their responsibilities in relation to ChatGPT-use in public schools and what this implies for the conception of responsibility in relation to ChatGPT. Guided by the methodology of an IPA-based appropriation study, I conducted five interviews with ChatGPT-using teachers. I identified three superordinate experiential themes: a lack of time and capacity to fulfil all the perceived responsibilities; the ambivalent impact of ChatGPT-use on the educational goal to enable pupils to build their own path; and divides among teachers for approaching ChatGPT's involvement within public schools. Against these backdrops, the study revealed ongoing hermeneutic efforts of teachers to appropriate ChatGPT and its ambivalent effects on teaching and learning practices. The interpretation of the findings showed how senses of responsibilities emerge from the interrelations between teachers, ChatGPT-use and its presence, and their socio-cultural lifeworld. This disclosed that the participants' hermeneutic processes and the development of related dispositions depend on factors like shifting social relations, the conditions for collaboration, the recognition of personal and systemic limitations, and political recognition and support. I concluded by discussing possibilities to address the societal challenges associated with the development of responsible relations to AI technologies like ChatGPT through further research.

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1. Introduction

Since the release of ChatGPT (OpenAI 2023), millions of users have been able to generate plausible-sounding texts (Arkoudas 2023/2024). This possibility affects text-based activities in public schools and leads to controversies about potentials and perils associated with novel applications for pupils and teachers (Baidoo-Anu & Ansah 2023; Kasneci et al. 2023; Opera et al. 2023). If endorsed by responsible authorities, teachers, as the main responsible agents in classrooms, are now entrusted with the challenge to understand how generative AI technologies like ChatGPT can be used responsibly. This thesis aims at contributing to this societal challenge by exploring how teachers understand their responsibilities in relation to ChatGPT-use in public schools.

1.1. Calls for Responsibility

Because education sectors are heterogeneous in terms of legal frameworks, curricula, culture, funding, amongst others, I set a geographical focus on public schools in Germany and the federal state of North Rhine-Westphalia (henceforth: NRW). In the *Action Plan AI* (Federal Ministry of Education and Research 2023) – which's introduction is titled "AI policy after the ChatGPT moment" (p. 2) – the application of AI in education is encouraged if used responsibly. On the federal level, the Ministry of Education NRW (2023) explicitly demands public schools to engage with text-generating AI systems in the classroom based on the anticipation of an increasing prevalence of AI applications in pupils' lifeworlds. The policy refers to the legal obligation for an educational engagement with relevant technologies to foster responsible and safe use. A ban of generative AI and a prohibition to use it for teaching is discarded as not viable. In contrast, an open, reflective and participatory attitude in schools and during lessons is encouraged. By this, teachers become charged with introducing pupils to the use of AI during lessons and offering them a protected space to experience how AI text generators work and what potentials and risks come with them. This illustrates political demands and incentives for teachers to engage with ChatGPT in public schools in a responsible way.

Responsible ChatGPT-use is also a societal demand. The most comprehensive German survey (Vodafone Foundation 2023) in which 5000 citizens and 500 parents participated found that 67 % believe that AI will negatively influence pupils' learning process and 70 % are concerned that the

application of AI might impede the pupils' ability to judge while only 17 % evaluating this question positively. This skeptical view grounds on concerns for decreases of creativity (53 %), the 'unlearning' of unsupported learning (43 %), development of dependence on ChatGPT (38 %), the unclear origin of information (38 %), a decrease of social interactions (32 %), lack of data protection (10 %), additional screen-time (8 %). In response, the participants demanded the government to regulate the use of AI in schools, while 77 % of the participants charged teachers with the task of fostering children's digital competences. Interestingly, a survey amongst pupils deviates from the perspective of adults (Vodafone Foundation 2024). Here, 73% see the use of AI more as an opportunity and 67% expect AI-use to change teaching. 79% believe that AI expertise is important for achieving professional goals. Socio-economically weaker groups tend to be more pessimistic and to attach less importance to AI-usage. Only 24% report clear rules for use, 38% claim that AI is not yet an issue at their school and a further 38% say that instructions vary and depend on the teacher. Furthermore, children want to learn about meaningful use for education (47%) and recognize a critical approach to information (64%) and responsible use (61%) are important abilities.

1.2. State of Research

ChatGPT involvement in educational contexts has proliferated research on the potential impacts of AI in education (Selwyn et al. 2021; Holmes & Tuomi 2022; Nemorin et al. 2022). It is anticipated that ChatGPT-use can transform educational practices in form of novel practices which is portrayed as involving both potential benefits and risks (Baidoo-Anu & Ansah 2023; Grassini 2023; Kasneci et al. 2023). Consequently, most of the literature has a prescriptive focus aiming at the realization of advantages and avoidance of disadvantages through responsible handling and guidance (Al Badarin et al. 2023; Crawford et al. 2023; Dwivedi et al. 2023, Mhlanga 2023). This echoes philosophical discussions regarding ChatGPT's ethical implications (Stahl & Eke 2023; Liesenfeld et al. 2023) or its potential effects on cognitive development (Cassinandri 2024).

The anticipated impacts of AI on education also stimulated research about related capabilities for teachers (Seufert et al. 2021; Markauskaite et al. 2023). Of particular relevance are the conceptual frameworks published by the Joint Research Centre of the European Commission (henceforth: EC) for *digital competences* defined as "the confident, critical and responsible use of, and engagement with, digital technologies" (Vuorikari et al. 2022, p. 4; for the educator version: Redecker & Punie

2017; for ethical guidelines for educators: EC 2022) because they inform and guide national policy making about the challenge of developing teaching competences (for the German context: Conference of Ministers of Education and Cultural Affairs 2021, p. 23).

Yet, AI technologies also stimulate philosophical debates regarding the meaning of responsibility. The capacity of machines to be causally responsible for morally salient events to some degree independent from human designers and users leads to philosophical controversies on what responsibility in contexts of AI-use means (Tigard 2021; Himmelreich & Köhler 2022) and how human agents can be held responsible for AI-involving practices (Matthias 2004; Santoni de Sio & Mecacci 2021). While responsibility in the context of technological transformations is a multifaceted concept (Van de Poel & Sand 2018), there is particular uncertainty on how to apply it in the context of AI-use (Löhr 2023).

In face of abundant discourses on conceptual and prescriptive issues, the state of descriptive research on ChatGPT-use in German public schools is rather fragmented (Helm & Große 2024). Research so far tends to focus on rather specific applications like reading comprehension (Dijkstra et al. 2022) or language acquisition (Annamalai et al. 2023). There is some experimental research on the performance of human assessors to distinguish AI-generated text from student-written text resulting in false positives and indicating potentially unfair treatments of students (Farazouli et al. 2023; Fleckenstein et al. 2024). With respect to qualitative research on teacher's experiences, there are some indications that ChatGPT-use requires the development of competence due to initial reluctance (Jeon & Lee 2023; Kaplan-Rakowski et al. 2023; Kohnke et al. 2023). There are, however, to my best knowledge, no qualitative investigations on teachers' experiences of ChatGPT in public schools and their views about respective responsibilities.

1.3. Research Problems

There is a tension between the numerous prescriptive demands towards teachers and a shortage of descriptive insights into their perspectives. My research project must therefore address the following problems:

1. The difficulty of investigating teachers' experiences of ChatGPT-use in public schools, that is, to encourage authentic expressions of their situated experiences, to empirically capture them, and to interpret them in an accountable way.

2. The lack of information on how teachers make sense of their responsibility to ChatGPT-use in public schools;

3. The problem of approaching the topic of 'responsibility' in the given context, since there are disagreements on the concept of responsibility and ChatGPT-use can influence the understanding and scope of responsibility.

1.4. Approach

In response to these problems, this thesis builds on Olya Kudina's *Appropriation Approach* (2019/2024) which provides a philosophical methodology for inquiring how technologies can change value understandings based on empirically grounded analysis of how humans' *appropriate* technologies, that is, how humans engage in moral hermeneutic processes of value-related sense making[1] directed towards and shaped by specific socio-cultural environments and concrete technologies (Kudina 2019, p. 87). The approach represents a further development of postphenomenology, a philosophical movement that defends the view that technologies-in-use are not merely to be understood as neutral instruments but influence as mediators our moral perceptions and actions in relation to our lifeworld (Ihde 1990; Verbeek 2011). To understand human-technology-world relations, postphenomenologists conduct phenomenological experiments:

> "A phenomenological analysis (or description, as it is technically called) is more than mere analysis. It is a probing for what is genuinely discoverable and potentially there, but not often seen. Phenomenology is the door to the possible, a possible that can be experienced and verified through the procedures that are, in fact, the stuff of experimental phenomenology." (Ihde 2012, p. 13)

Thus, by choice of the appropriation approach, I subscribe to the postphenomenological project of experimentally vindicating the possibility that ChatGPT-use influences teachers' sense-making about their responsibilities in and around classrooms in order to describe how teachers' understandings become influenced by ChatGPT-use within the socio-cultural context of public schools.

To probe these ideas, an empirical and verifiable procedure is required (Kudina 2024, p. 7). Appropriation studies are therefore based on *Interpretative Phenomenological Analysis* (henceforth: IPA; Smith et al. 2009; Kudina 2019, chapter 5). IPA provides a qualitative

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[1] For the purpose of this thesis, I will use the verbs 'understanding' and 'sense making' and 'meaning making' interchangeably.

psychological methodology to research how a specific group of humans make sense about a particular lived experience in concrete settings. Kudina builds on IPA to conduct interviews and analyze them according to emerging themes of existential significance for relating them to a particular technology. This aims at capturing the (re-)articulation of value meanings in specific contexts while accounting for the process of interpretation in a verifiable and comprehensible way (Ibid., p. 83).

I want to explore how ChatGPT-use within public schools can influence the course of teachers' hermeneutic processes. For this, I will follow the lemniscate principle (Figure 1) as an analytical lever which can explicate the dynamic co-constitution of mediated sense making (Kudina 2024, chapter 5): The lemniscate represents recurring interpretation processes in which humans (H) makes sense about their socio-cultural world (W) through technologies (T). While conceiving technologies as mediators, the process-orientation of the lemniscate principle accounts equally for humans' hermeneutic efforts as well as the significance of specific socio-cultural contexts. It enables a postphenomenological description of how the three complements of the lemniscate all in their own ways transform and become transformed by each other.
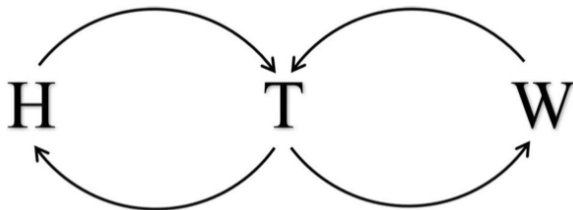
Figure 1. The lemniscate principle

The appropriation approach conceives values as non-reducible to static entities, which are independent from those who represent them (Barad 2007; Swiestra et al. 2009; Coeckelbergh 2012; Introna 2014; Kudina 2019; Boenink & Kudina 2021). Drawing from Dewey's pragmatism, appropriation studies are interested in the human potential to adapt and reinvent value meanings through reflection and practice and in relation to changing environments (Dewey 1976; Kudina 2024, p. 33-36). This implies to recognize different levels of what we mean by 'values': While values conventionally are treated as abstract or "thin" concepts that enable explicit deliberation and negotiation, there are also "thick" forms of values or valuing embedded in specific local, socio-cultural contexts which guide or reflect – often tacitly – our perceptions, actions and understandings

(Walzer 1994; Kudina 2024, p. 37). This perspective emphasizes the relevance of hermeneutic efforts for "finding and/or giving meaning" (Boenink & Kudina 2020) to values within daily practices as a complement worth considering for discourses on values and evaluations at a more abstract level (Ibid., p. 42 and 133).

Based on these considerations, I chose IPA-based appropriation methodology to inquire 'bottom-up' how participating teachers understand their responsibilities *in relation to* ChatGPT-use in public schools and to reflect on what this implies for understanding responsibilities in relation to technologies like ChatGPT. My research does not build on an elaborated *a priori* conceptualization of responsibility. This, in my view, would undermine the research objective to capture and analyze how teachers *themselves* come to understand of their responsibilities in the given context. For this, I need to engage in conversations with teachers about ChatGPT-use in public schools to study how an understanding of ChatGPT and a sense of responsibility emerges from the data. Moreover, I need to capture and interpret the ways in which the involvement of ChatGPT in public schools may influence this process. To operationalize this, I build on the following working hypothesis:

> Responsibility involves dispositions for responding and acting according to values in relation to others and to technologies. Understanding responsibilities, accordingly, involves that humans develop dispositions for perceiving value-related issues and to respond to them through reflection and action.

The working hypothesis serves to relate my interpretation of the participating teachers' understandings to relevant theoretical and/or normative considerations. Based on this analysis, I will discuss what can be learnt from the insights of this study about the societal challenge of developing responsible relation to AI technologies such as ChatGPT.

1.5. Research Questions

Based on this analysis, my main research question is:

How do teachers understand their responsibilities in relation to ChatGPT-use in public schools and what does this imply for our understanding of responsibilities in relation to ChatGPT-use?

My sub-questions are:

How can teachers' understandings of responsibilities for ChatGPT-use in public schools be conceived and studied and why is the chosen approach suitable for this research project?

How do the participating teachers make sense of their responsibilities in relation to ChatGPT-use in public schools?

How does ChatGPT-use mediate the participants' understanding of their responsibilities? What are implications for our understanding of the development of teachers' responsibilities in relation to ChatGPT-use in educational contexts?

1.6. Outline

Chapter 2 will explain the fittingness of the chosen approach for the research project in more detail. I will outline how Kudina develops postphenomenology and moral mediation theory to not only account for the mediating nature of human perceptions and actions, including value-related ones, but also within our processes of understanding. I will explain how the lemniscate principle enables to analyze how human value meaning-making can become co-constituted by technology-use and specific socio-cultural lifeworlds. Then, I explain how her adaptation of the IPA method and her practice-based to values as lived realties enable to ground such analysis on a robust empirical investigation.

In chapter 3, I will present the findings of the IPA-based appropriation study conducted. After the discussion of research design and its limitations, I will show how five young teachers who work in Cologne public schools make sense of their experience of ChatGPT-use in their responsible domain. Based on both the IPA and the appropriation approach, I identified three themes of existential relevance to all the participants: (a) the experience of lack of time and capacity; (b) the ambition to enable all their pupils to develop towards independence; and (c) the desire for collaboration. Against this backdrop, I will interpret selected excepts to show how they make sense of ChatGPT-use in public schools as their responsible domain.

In Chapter 4 returns to the research question based on the empirical findings and the theoretical framework. For this, I will first interpret the findings through the lemniscate principle. This will show how the participating teachers process of making sense about their responsibilities becomes mediated through ChatGPT-use. Then I will return to the working hypothesis and evaluate to what extent it can account for the interpretation of the emergent understandings of the participants. In doing so, I will propose revisions of the working hypothesis to further develop our understanding of how humans understand their responsibilities in relation to ChatGPT-use in practical contexts.

2. Theoretical Framework

This chapter aims to explain the chosen theoretical framework and to justify its suitability for my research project. For this, following sub-questions are addressed: (1) How can the influence of technologies on human existence and its value-related significance be conceived? (2) How can our processes of understanding this value-related significance of technology-use be conceived? (3) How can these processes be analyzed? (4) How can the influence of technology-use on human processes of responsibility-related understandings in a concrete environment be studied?

2.1. Postphenomenology and Moral Mediation

For exploring the processes of identifying and interpretating values in technological practices, a conceptualization of influence of technology-use on human values is required. With respect to the first question, Kudina's approach builds on the postphenomenological perspective which studies the role of technologies in human perceptions and actions (Ihde 1990; Rosenberger & Verbeek 2015; Verbeek 2015) including value-related ones (Verbeek 2011). Don Ihde (1990) founded the postphenomenological movement by emphasizing the mediating role of technologies in human relations to reality. He proposed an analytical framework of four human-technology-world permutations: embodiment (while see my environment through it, glasses become transparent and part of my visuals); hermeneutic (when navigating via a map, the real world is interpreted through the map); alterity (if I want to access my savings, I have to interact with an ATM); and background (technologies that remain unperceived while functioning and become present if not like heating systems). Technologies thus mediate, according to postphenomenology, the ways in which humans perceive and act. The key insight of Ihde's philosophy of human-technology-world relations for engaging with ChatGPT-use in education lies in his view of how human development and technology-use and making constitute each other (Ihde & Malafouris 2019): We not only create material artefacts but are also shaped by our creations – technologies become a condition of our existence. In contrast to both the classical accounts of technological existence (Heidegger 1977/2014; Ellul 1980/2014) and instrumentalist views (Peterson & Spahn 2011; Pitt 2014) technologies-in-use are neither deterministic nor utopian nor neutral but "multistable" (Ihde 1990, p. 144). Multistability, broadly, refers to the insight that technologies can be used in different ways but not in any number of ways: The ways in which technologies are used and become meaningful to us can vary due to intended and unintended goals for the use, but also due to personal, cultural,

and material or environmental parameters (Rosenberger 2020; de Boer 2021). This implies that the significance of technologies within the relations between humans and world cannot be reduced to a merely instrumental role. Technology-use shape the ways in which we perceive our environments and how we can or cannot interact with it.

Verbeek (2011) further developed postphenomenology by arguing that if technologies shape our perceptions and actions, this also extends to ethically salient perceptions and actions. He illustrates this radical proposal through the example of obstetric ultrasound (Verbeek 2008, p. 17): This technology affords to represent the fetus in the womb through a screen as independent from its mother. This technological mediation makes moral considerations and choices present which would not be possible without the mediation: it may reveal, for instance, disabilities of the fetus that could necessitate questions about an abortion. The main insight here relates to how this mediation shapes the conditions for ethical deliberations and choices. Verbeek explains the non-neutrality of multistable technologies in terms of ambivalence. Technologies-in-use are not neutral instruments which merely are used by medics and parents to do their ethical contemplations. But it would be too reductive to say that technological mediation itself determines the parents' decision, for instance, in case of detection of severe disability. Seeing their child could also establish a connection between the parents and the visible unborn person. Thus, technologies-in-use are neither neutral nor by themselves good or bad but ambivalent. Moreover, ultrasound co-constitutes normative perceptions and agency: Fetus, mother, father, and the medical staff face normative choices due to the presence of ultrasound. Their roles – like the unborn appearing separated from the mother – and perceived options for normative decisions and actions emerge from the associations between humans and technology. In a world where technological mediation becomes ubiquitous, we cannot separate ourselves from this modality of existence (Albareda 2023). The possibility to use obstetric ultrasound requires parents to make normative choices – and even if they don't, this is also normatively salient because it can prompt questions of whether they should have (see preface in Verbeek 2011). In this sense, our capacities to perceive and act, including how we perceive ourselves as moral or political subjects and how we enact these roles is co-constituted through technologies – in many cases prior or without being aware of it (Verbeek 2011; 2014).

2.2. Understanding Moral Mediation

Through the moral mediation framework, the research can access the intimate relationship between technology-use and value-involving practices. However, the research also needs to address how humans and technology-use 'co-develop' over time and how they can understand the value-related dimension of this process in relation to their environment. Here, Kudina identifies and accommodates for critical shortcomings of the mediation approach:

> "If we seriously consider the human-technology-world co-constitution, then, while interpreting the world through technologies, technologies coshape the prior awareness and understanding of people. Technology enables different or new perceptions that join our bodily and cultural awareness to form a basis for further interpretive processes. For this reason, a person is not the same person and the world is not the same world when they find themselves in a technologically mediated situation. Postphenomenology incorporates technologies in the interpretation process as mediators. However, by not explicating how the mediated world gets embedded in the perceptions of people and how people can then act on them, human-technology-world relations continue to be linear, leaving the human and the world sides of the interpretation process as passive counterparts." (Kudina 2024, p. 112)

She identifies two related issues: a problematic linearity of the human-technology-world relation and consequently the subordinate treatment of the influence of humans and the sociocultural world in postphenomenological analyses. The linearity-issue can be illustrated, for instance, with respect to the schematization of embodiment relation for me wearing my glasses: (I-glasses) → world. The brackets around me and the glasses mean, as described above, that while I see the world through them, they become transparent and the condition of my visual perception. Whereas this permutation is illustrative for these aspects, it reduces the complexity of the mediation process. The problem is not the reduction as such, it is meant to function as simplified model, but what it reduces: the temporal dimension of mediation and co-constitution. The permutation (I-glasses) → world represents the embodiment mediation not as a process but as a static snapshot (cf. Kudina 2019, p. 101). This static model represents human-technology-world relations as 'flat' or 'unidimensional', meaning that there is no explanation of how the world relates back to human users.

Postphenomenology provides a fruitful basis for addressing the non-neutral role of technologies through analysis of the interdependencies between technology-use and normative reflection and action. But the priorization of in-depth analyses of concrete human-technology-world relations and the designs of artefacts also comes with costs: the subordination of the developmental or processual

level; regarding the ways in which users develop or co-constitute themselves in relation to the usage or presence of technologies; and the collective dimension of co-constitution, meaning the socio-cultural conditions for the processes in which we form ourselves through technologies. Assuming the significance of these conditions for the present study – teaching involves social, cultural, and especially developmental dimensions – it becomes plain that my research project must expand the postphenomenological approach. To conceive how teachers understand their responsibilities for ChatGPT-use, it is imperative to grasp not only how ChatGPT-use through teachers implies certain normative issues. I must also address how the developing co-constitution and teachers' normative beliefs on a personal but also socio-cultural level interfere with each other and thereby move and get moved by moral, pedagogical and didactic values.

Kudina's work is suitable for that job because she developed a philosophical framework for studying how technologies mediate values while maintaining proximity to postphenomenology and its dedication to an empirically informed bottom-up approach (p. 25). For that, she focusses on disclosing the dynamics that underly the processes of humans appropriating technologies as an expansion of Verbeek's (2011, p. 99) 'linear' account of user appropriation:

> "[... the concept of appropriation] represents a sense-making activity that involves the interaction of (at least) three actors: people, with their existing knowledge and beliefs; technologies, representing a phenomenon that requires the attribution of meaning and its integration into the existing frameworks of understanding; and the world, as an active context against which the human–technology encounter occurs. [...] appropriation proceeds both projectively and practically to constitute a single mode of appropriation. Based on projective appropriation, one may choose to review the practical use or refrain from using a technology in question altogether. In this broad sense, technological appropriation never fails. This leads to the second conclusion, following the definition of appropriation above. Namely, the three dynamic and interrelated elements of the appropriation process prevent it from being a static, once-and-for-all event." (Kudina 2019, p. 87)

Kudina conceives the appropriation as a relational hermeneutic process that involves the postphenomenological triumvirate of human-technology-world. The process is relational because it involves simultaneously practical and projective activities which are inseparably co-constituted through both socio-cultural and normative affordances of our varying environments and technological mediation (de Boer 2021). It is hermeneutic because it requires us continuously to make sense about these phenomena. We cannot help ourselves but to fill, often subconsciously, the interpretative space that always emerges from our intentional directness towards the dynamic and interdepend processes which occur in lifeworld: shifting relationships with other people and

animals, transformations of organic and material, but also fluctuating moods, opinions, or political developments. In an age of ubiquitous technologies, this directness mostly runs through specific technologies which shape our relations to the world including our sense-making about other specific technologies. The constant changes in our lifeworld and our situation within it necessitate human interpretative activities to establish and update our understandings if confronted with different situations. Again, we cannot escape this situation due to our constantly changing situation: even if one arrives at a stable appropriation, it is always possible that alterations of the different sources of the appropriation urge revision and adaptation. Also, appropriation is inevitable because when a person does not engage with a technology, this still implies technological sense making by which the technology was found, for instance, to be uninteresting or daunting (Kudina 2019, p. 87).

Kudina (2019, p. 85) outlines two types of user agency as conditions of appropriation. Starting with the practical ones, she describes the concrete material interaction between human bodies and technological artefacts and applications – implicitly reminding us that users may not have equal abilities to access technologies – and the development of know-how through interaction as sources to make sense about a technology. This implies that to study teachers' appropriation of ChatGPT, the research project requires to involve concrete ways of access, use and their development. Also, she emphasizes the projective or proactive agency of users which involves conceptual thoughts, meaning making and revision, and comparing. This selection is suitable, in my view, to involve a collective dimension because such actions can involve interactions with fellow users and non-users. This is most clear when we compare our ways of application, understandings, and their development with others. The concepts of proactive and practical agency, therefore, are fruitful to address the conditions for how teachers' appropriate ChatGPT-use.

2.3. Analyzing Human Understandings of Technologies

The appropriation framework provides a conceptual toolkit for analyzing the technology-related processes of understanding by drawing from Gadamer's hermeneutic philosophy. Kudina (2019, p. 91) adopts concepts from Gadamer which are decicive for this study: The concept of the *hermeneutic circle* explicates the dynamic and temporal nature of interpretation. Our ongoing processes of understanding are based on past interpretations while being simultaneously directed to the future. For this, we rely both on "our own past" – our experiences, remembered insights, know-how, or pre-judgements – but also on "that other past" which denotes the historical context

in which we act which together constitute our "effective history" when we engage with the future (Ibid.). This refers to the concepts of a *horizon* and a *fusion of horizons*. The former denotes that human existence is always bound to a specific temporal and spatial perspective. These frameworks are continuously expanded (and potentially narrowed) through hermeneutic situations in which we encounter a new horizon that questions our past horizon. If we are confronted with events that challenges our past horizon, we need to adapt. While we are guided by the projections due to our effective history, we need to expand this horizon. This requires a fusion of the horizons. We cannot just replace our previous horizon but are bound to a circular hermeneutic process in which we gradually expand our understandings.

Kudina draws from Gadamer to modify the linear model of human-technology-world relations. For that, she embeds the circular dynamic of hermeneutic processes within the postphenomenological scheme which results into a lemniscate figure:

> "I suggest considering the hermeneutic lemniscate as a structure that enables the process of appropriation. The continuity and fluidity of the lemniscate would represent the human, the technological and the world as the active co-shaping parts in the process of interpretation. The lemniscate refines Gadamer's hermeneutic circle account by foregrounding the active role of technologies in the process of interpretation and appropriation. On the other hand, the continuity and fluidity of the lemniscate also clarify Verbeek's co-shaping idea, explaining why the interpretative structures of human understanding are never static and how the technologically mediated world returns to people." (Kudina 2019, p. 105)

Technologies in modern societies increasingly mediate our perceptions and actions and therefore become an inseparable and active component of our interpretations. Since value meanings are always involved in our proactive agency, following Gadamer's hermeneutic account, it follows that technologies are conceived as mediating value-related interpretations (Ibid.). The lemniscate model illustrates the structure of appropriation as technologically mediated meaning making and revision. It represents appropriation processes in which human (H), a technology (T), and the socio-cultural world (W) all actively shape the interpretative structures of human understanding. The lemniscate figure thus represents human-technology-world relations as dynamic and iterative processes.

With this refinement of the linear model of human-technology-relations and the concept of co-constitution of human agency, in my understanding, Kudina answers calls for a process-oriented approach to moral mediation (cf. Introna 2014; Langsdorf 2015; Coeckelbergh 2022). This may

help to overcome confusions and corresponding criticisms about the claims regarding the active role of technological artefacts. Verbeek is frequently accused of erroneously claiming that technological artefacts *themselves* possess moral agency (cf. Brey 2014; Arzroomchilar & Novotny 2018; Fritz et al. 2020). Especially in the context of AI technologies, this could be misunderstood as the proposition that technologies such as ChatGPT can be considered as moral agents (for discussion: Fossa 2018). To claim that human (moral) agency is inseparably related to technologies is not to say that they have (moral) agency *on pair* with human (moral) agents (Aydin 2015; Swanepoel 2021). A process-oriented view on mediation allows us to reject this proposition while defending the indeed active role of AI technologies in human perceptions, actions and understandings. A process-oriented view which focusses on 'becoming' rather than 'being' or 'entities' can avoid this problem by explicating the dynamicity of technological mediation (Barker 2012, p. 11).

2.4. Capturing the Emergence of Value Meanings in Practice

Kudina's reference to Gadamer's hermeneutic account also links to the IPA methodology (Smith et al. 2009, p. 32-36). The theoretical framework of IPA builds on the view that human persons are sense-making beings: "They do things in the world, they reflect on what they do, and those actions have meaningful, existential consequences." (Ibid., p. 54) This indicates why the method is suitable to investigate teachers' understandings of their responsibility in practice because it allows, through conversations with teachers, to encourage and interpret how meaning making emerges from their reflections about their actions in relation to ChatGPT within public schools. Kudina adopts the IPA method for the purpose of complementing philosophical analysis with an empirical foundation which enables the appropriation approach to study meaning making about technologies against "themes of existential import" (Kudina 2024, p. 83).

For addressing teachers' production of value meanings, I build on Kudina's conceptualization of values as "lived realities" (Kudina 2019, p. 60). This conceptualization is based on Dewey's pragmatic view that values are "ends-in-view" or "endless ends" (Kudina 2019, p. 60). Building on the affinities between postphenomenology and pragmatism, she argues that Dewey can contribute the element of values to the "environmental interrelational model of human experiences and practices with their material and social embedding" (Ibid., p. 56). This enables the mediation approach to accommodate and address the concept of value in relation to technology-use (Kudina

2024, p. 29). This practice-based conception of values as an inseparable element of human experience provides my appropriation study with a suitable target for investigation: the lived experiences of teachers. According to Kudina's notion of living values and according to the lemniscate model of sense-making, teachers enact and manifest values with and through ChatGPT-use in permanent interaction with the socio-cultural environment of public schools.

The connection of my approach to responsibility-related meaning making grounds on the idea, already mentioned in the introduction (1.4.), that understanding responsibilities in relation ChatGPT implies hermeneutic work as "activities of finding and/or giving meaning" (Boenink & Kudina 2020, p. 455). I employ, accordingly, an IPA-based appropriation study in which I interview teachers to empirically study the ways in which find or give value meaning in relation to ChatGPT in their responsible domain of public schools. Yet, following the authors (Ibid., p. 461), I will not directly ask about their responsibility because this is likely to encourage discussion on an abstract level. Rather, I intend to explore how value meanings emerge from teachers' reflections on ChatGPT-related practices in public schools in order to understand whether and how teachers *themselves* understand their responsibilities. I thus align the empirical study and the interpretation on teachers' responsibility-related value meaning making and revision through reflections about teaching actions. This implies a focus on meanings of responsibilities, in the plural, emerging from situated practices on the local micro-level of lived experience rather than the abstract value of responsibility on the macro-level. The IPA-based appropriation approach is suitable to address this research interest since it allows to ground the philosophical analysis on an empirical investigation of meaning making, including responsibility-related value meanings, in relation to concrete technologies in specific environments.

2.5. Preliminary Conclusion

The theoretical framework enables the research by framing the exploration of teachers' responsibility for ChatGPT-use in terms of processes of appropriations. Its grounding on postphenomenology and the moral mediation approach allows to approach the value-related dimension of the involvement of ChatGPT in the relations between teachers and their specific socio-cultural environment. The advancement of the concept of appropriation allows for conceiving the dynamic and iterative processes in which humans make sense about their relations to technologies. The lemniscate principle allows to explicate and analysis the mediating role of

technology-use in processes of understanding while equally paying attention to the active role of humans and their specific socio-cultural world. Kudina's pragmatic approach to responsibilities as value meaning identification supports to analyze related hermeneutic processes. Moreover, it provides a robust methodology for anchoring philosophical interpretation on an empirical investigation to address how teachers themselves understand their responsibilities in relation to ChatGPT-use in public schools.

3. IPA-based Appropriation Study

3.1. Research Design and Limitations

In this chapter, I outline my research design, exploring how teachers understand their responsibility regarding ChatGPT-use in public schools. Following Kudina (2019; 2024) and Smith et al. (2009), I performed an IPA-based appropriation study to address the following questions: What does good teaching mean for the participants? How do they experience ChatGPT-use in public schools? How and why do they use ChatGPT for teaching? Against which backgrounds become meaningful for them? How do they give/find value meanings in relation to ChatGPT-use and to their role within the environment of public schools?

For this, I conducted five interviews with teachers in which I encouraged reflections about ChatGPT-related practices within their professional lifeworld following the IPA methodology (Smith et al. 2009). I thereby aimed at identifying "topics of existential import" for the participants and to relate them to their experiences and views about ChatGPT in public schools (Kudina 2024, p. 83). With respect to the methodological requirements for understanding common themes within the experiences of socio-technical phenomena (Kudina 2019, p. 185; Smith et al. 2009, p. 62-67), it is important to ensure that the participants are situated in a similar social, cultural and material environment. I picked my sample based on the following inclusion criteria: (1) Previous usage of ChatGPT in school contexts; (2) No more than five years of working experience; (3) Currently working in the same type of public school in Cologne. The first is relevant as my study focusses on ChatGPT-related practices. The second insured the homogeneity of the sample. My rationale was that young teachers are just about to figure out and revise their sense of professional responsibility or their role in the collegium. The third criterion ensured that the participants' experiences can be interpreted against a comparable context. All participants navigate the same

legal framework provided by the ministry of education in NRW, encounter a similar cultural context, and that they face similar challenges, e.g., with regard to their audience and workload. Opting for gender parity, the sample consist of three male and two female participants. The subject combinations covered are Math/Spanish; English/Philosophy; History/Philosophy; German/Philosophy; Biology/Social Sciences; two of the participants also teach Computer Science.

After receiving ethics approval from the BMS faculty Ethics Committee, I recruited interview participants by sending e-mails to schools, personal acquisition in schools and utilizing my personal network combined with a snowball approach. I informed the participants about the purpose and scope of the study, their role within the research and encouraged them to ask questions (Appendix, 7.4.). Three interviews were held in person, two online, according to the participants' preference. At the beginning of the meeting, remaining questions were clarified, I reminded the participants about their right to withdraw from the interview, and obtained informed consent (Appendix, 7.5.). To familiarize myself with the approach, I performed a 'test-phase' in which I conducted five test-interviews to adept the interview guide and my technique. Based on this, I conducted four interviews included in the study. In one case, after interviewing *Patrick* in the test-phase, I decided to conduct a second interview with him to include his perspective. To avoid repetition and ensure comparability to the other four interviews, I only used the material from those passages of the first interview, which were identical to the final interview guide. For the remaining questions, we conducted a second interview. The evolution of the interview guides and a detailed breakdown of *Patrick's* interviews are provided in the appendix (7.3.).

My research interest concerns processes of sense-making with regard to ChatGPT, a technology that became part of society and public schools. The study thus can relate to actual use-experiences in real-world settings. However, while ChatGPT has crossed the "threshold to society" (Kudina & Verbeek 2019, p. 298), it is still in the waiting room when it comes to individual and societal understanding. Thus, I prepared to encounter different forms of usage and related experiences. This required me to not presuppose certain practices and remain sensitive to different degrees of practical and projective agency (Kudina 2019, p. 87). Therefore, when designing my interview guide (Appendix, 7.3.), I included questions targeting different use-experiences and developments of usage. To explore the emergence of value meanings, I started the interviews by asking the participants about their motivation to become teachers, what 'good teaching' means to them, and

how they put this into practice. I also addressed the socio-cultural context and instructional frameworks by including questions or prompts about their experiences with children, colleagues, parents, and school administration as well as the about the technical equipment and characteristics of their pupils' lifeworld. I did not ask the participants directly about their responsibility regarding ChatGPT-use in schools to allow them to express their own views. To remain close to reflection about actually experienced practices and views of the participants, I aimed to encourage a disclosure of the connection between their "lived experience" (Reid, Flowers & Larkin 2005) with ChatGPT-use to stimulate the making and revision of value meanings as their "lived realities" (Boenink & Kudina 2020, p. 456).

For the transcription, analysis, and the creation of a master table, I followed the methodological instructions provided by Kudina (2019/2024) and Smith et al. (2009). After conducting and recording the interviews, I transcribed the audio material in MS word. I divided the transcripts into different sections and gave them a code and timestamp to navigate through the texts in the subsequent processes. During that process I synonymized the names of participants –indicated by italics: *Sandra* – and removed self-references and information which made them identifiable. I attempted to remain as close as possible to the spoken language and noted both short pauses, insertions, sentence breaks ("...") and long pauses [Pause]. I also noted sounds such as "ehm" or "mhm" or laughing [laughs] or a special intonation of <u>certain</u> words.

Especially since this study concerns language-related AI technology, it is necessary to account for the use of such applications within the research. I transcribed all of the test interviews and two of the included interviews manually as recommended by Kudina (2019, p.122). Then, I used the Amberscript transcription service for the remaining three interviews which still required comprehensive revision and editing according to my transcription standards. I conducted the interviews in my mother tongue German and used DeepL for translations because it enabled me to choose from a selection of possible synonyms which is far more extensive than my active vocabulary in English. That been said, it is impossible to preclude that the translated presentation of the excerpts involves both algorithmic and my language biases which can distort the expression of the participants. I tried to mitigate that risk through dedicated proofreading by myself and others who are fluent in both languages.

My analytic process can be separated into four phases: *First*, I took initial notes on each interview separately using the analytic apparatus for exploratory notes in the form of descriptive, linguistic and conceptual comments (Ibid., p. 123; Smith et al. 2009, p. 67-78). I color-coded the comments and added the navigation code. *Secondly*, I conducted a first thematic analysis for each interview. I thereby returned to the audio recordings to capture the emerging themes within the flows of the interviews. I collected the themes in a Word document and revisited the corresponding passage in the transcript to correlate audio and text and to note the corresponding code. I clustered the themes manually, by printing the documents and cutting the emerging themes into snippets. This enabled me to 'reshuffle' the themes on the table to detect patterns. This was an iterative process in which I listened to and read through the interview's multiple times. I repeated this process for each interview while again revisiting the corresponding passages and sometimes adding or modifying the themes on the snippets by hand. *Thirdly*, for the creation of the master table and the identification of the super-ordinate themes I draw from the analytic levers proposed by IPA (Ibid., p. 79-81; Appendix 7.2.). I wrote the themes of the individual interviews on small papers and color-coded them to group and regroup them according to the IPA analytic levers. I continuously revisited the transcripts and recordings to ensure proximity to the flow of the conversations. Then, I selected the super-ordinate themes. To be categorized as superordinate, a theme had to emerge in at least three interviews or be particularly relevant for answering the research questions. This process resulted in multiple candidate super-ordinate themes, more than the scope of this work can address. Thus, I decided to focus on three super-ordinate themes which involve experiences which were relevant for all participants. Moreover, in line with the focus on the perspectives of teachers, the chosen themes gravitate on the use of ChatGPT specifically by teachers. *Lastly*, I documented and explained the resulting themes and corresponding excerpts in the master table (Figure 4; Appendix 7.1.).

A23	**Philipp:** (56:14)	Struggles to find words/with the question.
	Ehm.	
	How would you characterize your personal progress? How did this feeling of stability and routine come about?	Describes his development in terms of trail and error.
	[Pause: 4 seconds]	Implicit: Absence of guidance?
	Martin:	[participant greets another person]
	Boah, it's really hard to describe.	
	Ehm.	Active speech.
	I think it was actually through ...	
	[Moin]	Refers to his experience of different use cases and in particular to the experience of handling dissatisfaction with the outputs. Describes the acceptance of limitations of what he can do with ChatGPT and how he can steer it ins his direction.
	I believe it's actually through trial and error, to see what ...	
	Well, to see in different use cases: "How does ChatGPT react?" ChatGPT has already written solutions for me that I simply ... I just said: "Okay, he won't get it any better, I'll let it go now." Often the creative products are like that. That's ... It just didn't meet my standards. He simply didn't improve the mistakes, even though I said: "Improve exactly this mistake!"	
		Uses "he"/"der" rather than "it"/"es" for ChatGPT.
	He didn't do it. And then I thought to myself: "Ok, maybe it's me or maybe it's the prompts or maybe it's the limits of this AI."	Seems to suggest that figuring out the limitations raised his expertise.
	It was really learning by doing. Lots and lots of chatting with ChatGPT.	States that his developments build primarily on "lots and lots of chatting".
	And also, as I said, this Twitter classroom - now it's at Bluesky.	Practices as main source of know-how and communicative approach and reflection.
	Ehm.	
	Every now and then, tutorials for prompting were posted there.	
	Mostly in English then until it was reasonably good in German	Adding inspiration from the teachers-twitter community occasionally.
	[unintelligible: 2 seconds]	
	Ehm.	States that he finds the use and interaction with ChatGPT fairly intuitive.
	Yes, right. But I actually find it fairly intuitive anyway.	Given that he described his progress in terms of intuitiveness, this seems somewhat relativizing.

Figure 2. A coded and annotated excerpt from the interview with *Martin*

Figure 3. Clustering themes.

Figure 4. Identifying superordinate themes.

#	Theme	Analysis	English	German
1	Saving and consuming teachers' time: "I often reach my limits of time and capacity"	1. ChatGPT's ambivalent effects on teachers' time and capacities (I1-5) a. Experience of lack of time and capacity to enact perceived responsibilities i. Being teacher involves many obligations (I1-5) 1. In class teaching (I1-5) 2. communication to parents (I1,2,3) 3. conferences (I1,23,4,5) 4. break supervisions (I2,5) 5. permanent problem solving (I1-5) 6. very, very much pedagogical work (I1-5) 7. inclusion of children with special needs (I1,2,3,5) 8. Value of innovative teaching through stimulation of pupils' interest (I1-5) 9. Digital media and ChatGPT as innovative (I1-5) ii. Experience of unfeasibility responding to all perceived responsibilities 1. So many pupils (I1-5) 2. Not enough rest (I2,4,5) 3. Dissatisfaction with own performance (I2,3,4,5) 4. Experience of lack of time and capacity (I1-5)	<u>I2 the lack of time and capacity to constantly realise good teaching as a systemic problem:</u> *Sandra:* Well, I do find it interesting, but in normal everyday life the workload is simply so high and my capacity to absorb knowledge is limited […] you have so, so many pupils and classes, and that's so exhausting, and then it's sometimes difficult to learn new things or engage with lesson preparation. It's just ... the way the school system is set up, it's just not possible. So, I wish I could do much better at innovative teaching, but I often come up against my limits in terms of time and resources ... it's just not possible. **Philipp:** When you say: "That's not how the school system is set up." [...] Can you take me with you into your experience of being a fulltime teacher? *Sandra:* [...] I'm usually at school from 8:00 to 15:00 and have ... ehm ... actually, I don't usually have a break, because there are also break supervisions, et cetera ... I'm happy when I eat something [laughs] ... or there's always a problem to sort out. There's a lot of organizational stuff going on.. on the side ... there's also very, very much pedagogical work	 *Sandra:* Also, ich finde es schon interessant, aber so im normalen Alltag ist einfach der Workload so hoch und auch meine Kapazität, Wissen aufzunehmen, nicht mehr so vorhanden […] also, man hat so, so viel mehr SchülerInnen und Klassen, und das ist so anstrengend, und dann ist es manchmal schwierig, noch neue Sachen zu lernen oder sich viel mit Unterrichtsvorbereitung auseinanderzusetzen. Das ist einfach ... so wie das Schulsystem aufgebaut ist, einfach nicht drin. Also ich wünschte, ich könnte viel besser innovativen Unterricht machen, aber ich stoße oft an meine Grenzen von Zeit und Ressourcen ... dass es einfach nicht so gehen. **Philipp:** Wenn du sagst „So ist das Schulsystem nicht aufgestellt." […] kannst du mich da nochmal in die Erfahrungswelt als Lehrerin in Vollzeit mitnehmen? *Sandra:* […] ich bin in der Regel von 8:00 bis 15:00 Uhr in der Schule und hab ... ehm ... eigentlich in der Regel keine Pause, weil eben auch Pausen-Aufsichten mit reinkommen, et cetera ... ich bin froh, wenn ich mal was esse [lacht] ... oder es gibt immer irgendein Problem zu klären. Es ist super viel Organisatorisches, das noch nebenbei läuft ... an unserer Schule

Figure 5. Excerpt from the master table.

3.2. IPA findings

The interviews disclosed and stimulated sense making about ChatGPT-use in public schools. Within the reflections on the meaning of good teaching, ChatGPT-use, and its bearing on the socio-cultural context of schools, opinions, values, hopes and concerns emerged and coalesced, hinting at the conditions under which young teachers appropriate ChatGPT. This section connects some of the complex ongoing processes of understanding teachers' responsibilities in the face of ChatGPT-use against the backdrop of three identified super-ordinate themes of existential importance to all participants:

(1) Saving and consuming teachers' time: "I often reach my limits of time and capacity"

(2) Ambivalent effects on student independence: "To bridge gaps in competence sometimes"

(3) Division among teachers and isolated approaches: "There needs to be more exchange"

3.2.1. Saving and consuming teachers' time: "I often reach my limits of time and capacity"

Across topics and participants, this one theme was stressed in all interviews: All five participants experience a tension between a deep fulfillment and commitment towards their profession and a latent sense of personal overload due to a lack of time and capacity. The significance of these limitations for dealing with ChatGPT-use in public schools became apparent in the following excerpt from *Sandra*. When I asked her whether she could imagine making ChatGPT a subject of her lessons in the future, i.e. engaging with pupils in class about how (not) to use it, she replied:

1	***Sandra:*** Well, I do find it interesting, but in normal everyday life the workload is simply so
2	high and my capacity to absorb knowledge is limited […] you have so, so many pupils and
3	classes, and that's so exhausting, and then it's sometimes difficult to learn new things or engage
4	with lesson preparation. It's just ... the way the school system is set up, it's just not possible.
5	So, I wish I could do much better at innovative teaching, but I often come up against my limits
6	in terms of time and resources ... it's just not possible.
	Philipp: When you say: "That's not how the school system is set up." [...] Can you take me with you into your experience of being a fulltime teacher?

7	*Sandra*: [...] I'm usually at school from 8:00 to 15:00 and have ... ehm ... actually, I don't
8	usually have a break, because there are also break supervisions, et cetera ... I'm happy when I
9	eat something [laughs] ... or there's always a problem to sort out. There's a lot of organizational
10	stuff going on.. on the side ... there's also very, very much pedagogical work at our school ...
11	Conversations with parents ... and then you're glad when you're at home and can switch off a
12	bit, and then I actually think it's a pity... So, for example, my lessons ... I'm never double-
13	staffed, even though I have pupils with special needs. [...] if are not so burdened then you'd
14	have time after school to think of nice things to do in class. Because I do that ... I always focus
15	on one course, one class in which I can do it, because otherwise there's not enough capacity. I
16	think you would have to teach fewer lessons to guarantee that.

Sandra describes that although she finds an engagement with ChatGPT in class interesting, she lacks the time and capacity for it (1-2). Finding themselves in a conflict between a sense of ambition and experiences of limitations, is something all participants report. It is crucial to understand the conflict between *Sandra's* sense of ambition and experiences of limitations, in which she, like all interviewed teachers in their own way, finds herself. *Sandra* conveys her daily work routine as an uninterrupted flow of obligations: Personal learning (2); supervising large numbers of pupils; lesson preparation (4); break time supervision (14); problem solving and pedagogical work (8-9); and parent work (10); care for and inclusion of children with special needs (11-12). The fact that all five teachers struggle with time constraints is evident, among other things, because they all describe that they regularly work unpaid extra hours.

The insertion about the break supervision (7-8) illustrates the perception of constant demands when she remarks that she is happy when she thinks about eating. It is important to contextualize this remark, because engaging with pupils apart from the lessons is not annoying extra work for *Sandra*. Rather, she wants to be a person where the children know: "Okay, they can always come to me, no matter what!" an attitude that is also based on the insight that her pupils "[…] they don't always have the best family circumstances and cannot approach everyone […]". For all participants, good teaching involves the development of personal relationships with pupils and is associated with values such as care, approachability, trust and empathy. This reveals a pronounced sense of responsibility of 'being there' which is enacted within lesson breaks, the sorting-out of problems, or through "very, very much pedagogical work" (8-9).

As with the other participants, *Sandra* feels also responsible for the learning outcomes of their students during the lessons, when she reflects on her ambition to "do much better at innovative teaching" (5) or "to think of nice things to do in class" (13). She thereby renders the abstract notion

of 'good teaching' more concrete by pointing to the relevance of lesson preparation and by attributing progressive and aesthetic values like "innovative" and "nice" to it. The latter, as it becomes apparent throughout the conversation, paraphrases both to the ambition of offering the pupils a nice time in class and the related requirement of gaining and maintaining their attention which is instrumentally valuable for learning. The former adds to this and refers to ChatGPT, as she remarks elsewhere, "[…] because ChatGPT also fosters interest. That's positive, because working with digital media ... is also always a motivating factor for pupils […]." Sandra thereby gives an impression of her sense of didactical responsibility which manifests especially in activities of lesson preparation and is complemented by perceived responsibility for self-development to achieve "better" and more "innovate" teaching by involving digital technologies to stimulate interest.

The richness of *Sandra's* sense of responsibility turns into a troubling experience of not being able to perform practices which are meaningful to her. When she describes to feel glad to be able to take time off at home, this becomes tangible (10-11). Her dissatisfaction with the gap between feeling responsible for pupils and being continually demanded by pupils (and others) to enact these responsibilities, on the one hand, and the limits of her capacity and time budget on the other, becomes apparent when she describes her desire to "switch off" at home as "a pity" (11). This utterance of regret reflects the experience of deep dissatisfaction with her inability to live up to your own sense of responsibility. However, she performs a turnaround on two occasions (4-6 and 14-15) by referring from the experience of the limits of time budget and resources to a systemic and thus political problem about the allocation of resources. This way, she reinterprets the source of her experienced shortcomings from herself to "the school system" (4). A clear example for this, also mentioned by *Patrick* and *Martin,* is missing allocation of support for the inclusion of children with special needs in her class (1-12). This plausibly requires capacities that are lacking elsewhere. In this way, the description of time and capacity shortages functions both as self-relief and as criticism of the way the school system is "set up".

This systemic overload poses risks to teachers' physical and mental health which is relevant for understanding the conditions under which ChatGPT is encountered and the ways in which ChatGPT can become meaningful to teachers. *Nino* offers an insight into his experience when I asked him about his views on the workload of teachers:

1	*Nino:* That is always the thing ... these hours that teachers work ... this high workload or this
2	risk of burnout is also a result of that. You can't see that from the outside. The public is not so
3	aware of it. There is a lot of criticism. So, the teachers' unions have been dealing with this for
4	a long time and want to reduce the high workload and cut hours [...]. There's a lot of talk
5	about ... ehm ... to introduce everyday assistants who can take over many administrative tasks
6	from teachers […].
	Philipp: How does this … stress feel for you?
7	*Nino:* [Sighs] Well... stress usually doesn't feel good. So, there is also positive stress. Positive
8	stress is something that can motivate you and also, so to speak, again and again ... ehm ... ...to
9	keep going. But unfortunately, there is also negative stress, and I notice it particularly when I
10	come home at the end of the day and just lie paralyzed on the couch for two hours. Well, I've
11	heard from many colleagues that they feel very [...] empty or even emotionless and exhausted
12	and tired and could... so never really being able to fully recover. And that's something I also
13	notice when I come home after a long day of lessons ... eh ... and then I'm exhausted, I just
14	fall onto the couch and I'm really not able to actively do things anymore, I can just passively
15	let myself be entertained by something. Eh ... and then you usually must go back to work in
16	the evening and sit down again to prepare something for the next day or something. So that's
17	the thing for me... that's when I notice stress... or when it's... ehm ... it's about having to do
18	things ... ehm ... to deliver ...

Beginning here with the second part, *Nino* expresses his experience of (negative) stress, which he recognizes when he returns home after a day at school and lies paralyzed on the couch for two hours (10-11). Referring to the experience of colleagues, he describes states of emptiness, emotionlessness, exhaustion and the feeling of not being able to recover (11-13). In fact, numerous empirical studies support his point (e.g., Hansen et al. 2020; Kreitschmann 2022). *Nino* vividly describes the immediate effects of some working days: how he lies passively on the couch and can only let himself be passively entertained (11 and 14-16). These impressions indicate how a persistent overload can lead to serious detriments for mental and physical well-being. According to *Nino*, this danger is further exacerbated by the fact that he usually must return to his desk in the evening to prepare for the next teaching day. In this sequence of load-paralysis-load, teachers run the risk of "never fully recovering" (16-19). Like *Sandra*, *Nino* identifies a political dimension of his working conditions (1-3). He problematizes the insufficient societal recognition when he states that "the public is not so aware of it". He further refers to the political representation by teachers' unions, which are perceived as ineffective at improving his situation. It is this experiential context of systemic overload and a sense of hopelessness for significant political expansion of resources and reductions of working hours in which hopes for an introduction of "everyday assistants" (5)

make sense as compensators for systemic deficits. The application of technological resources is perceived as a way to alleviate systemic time scarcity and to cope with teaching responsibilities towards pupils. When I asked *Rea* why the time factor is significant for her, she said:

1	***Rea:*** Because it's often lacking ... [laughs] ... especially for lesson preparation. I have two
2	correction subjects, so I often have a lot of corrections on my desk that need to be done [...] if
3	something suffers, its somehow the preparation of lessons ... and ... ehm ... that's why it's
4	somehow important to save time, because I mean ... correct faster ... I can't correct things on
5	paper any faster. I now also do vocabulary tests online so that they are automatically
6	corrected.

Rea explains that if she lacks time, for example because she has a lot of corrections to do with her subjects' Mathematics and Spanish, then there is a shortage of time and capacity for lesson preparation let alone to prepare "nice things", as *Sandra* put it. Neglecting lesson preparation can impair pupils' developments if teachers do not have time to adapt lessons to their respective needs and levels of ability. In view of the systemic lack of time, there is a risk of triage in teachers' tasks that puts pupils at disadvantage. To avoid this, ways for teachers to save time and capacity are critical. To use digital applications, such as automated vocabulary tests in Spanish (5), means the possibility to devote more time to activities like lesson preparation or to recover. Against this backdrop, the impossibility to speed up teaching activities 'on paper', it becomes understandable why *Nino* stated: "As a teacher, of course, I always hope that it [ChatGPT] will make my daily work easier in many ways … especially with English as a correction heavy subject." Given that time-intensive corrections were a recurring theme it is somewhat surprising that only *Martin* uses ChatGPT for this task. A related application of ChatGPT, which all five teachers made use of, consist in the creation of so-called evaluation horizons. This refers to a subtask within the preparation of exams in which the teacher lists what skills and knowledge she expects from the pupils to create a backdrop for grading. *Rea* describes the value of involving ChatGPT in her workflow:

1	***Rea:*** I also use it a lot in Spanish for my evaluation horizons. [laughs] So, when I then... I copy
2	the newspaper article that I use for this into it and say: "Please summarize it here in bullet
3	points!" Ehm ... then my horizon of expectations is ... finished super quickly. Of course, I always
4	check it again ... so I don't rely on it a hundred percent ... but that simply saves me the time of
5	having to find formulations myself. If you then check the content again, then... then it works... so
6	it's much quicker than writing it yourself...

Rea describes here how ChatGPT can be used to save time. In her depiction, this is not only expressed literally multiple times (3-5) but also through the fact that she breaks the process down into three steps: Copy paste, prompt, done. This way, her description omits almost completely ChatGPTs share while she remarks on the necessity to supervise the output by which she points to a shift of her time from task-item like "finding formulations" or "writing" to "checking" (1-2). This exemplifies how ChatGPT can become meaningful as an instrument which renders time-consuming activities "much quicker" (5-6). Against the backdrop of constant time pressure and experienced impossibility of doing justice to all pedagogical and didactical responsibilities, it becomes understandable why this ChatGPT-use becomes valuable to Rea and motivates her to "use it a lot" (1). The excerpt also indicates that the involvement of ChatGPT provokes new forms of responsibilities for teachers, when *Rea* emphasizes that she "always" proofreads and does not rely entirely on ChatGPT (3-4). To further understand this perceived requirement, I asked her to provide a more detailed account of her interactions with ChatGPT:

1	***Rea:*** Yes, so with the evaluation horizon... I copy the text in ... and say... for the first task ... is
2	always a summary ... and that's why I then write ... well, that's the text in Spanish. Then I say:
3	"Write me the summary in bullet points in German." And then I look at what kind of bullet
4	points come out ... [laughs]. Most of the time ... so often, it's really quite good. Sometimes I
5	think to myself: "Hm ... one or two aspects that I'd like to take into account when ..." I've
6	already read the text before ... that I noticed is missing ... then I'll add it. But apart from that, I...
7	I almost take it over from the... I copy everything over into my expectation horizon. Sometimes
8	I make the wording a little shorter ... if it's too... formulated too extensively ... or I say again
9	beforehand ... before I copy it ... like this: "Shorter bullet points!" [laughs] And ehm ... right
10	then, I'm actually almost done with it. Then I move on to the second task. [laughs]

Rea's practice of preparing lessons with ChatGPT consists of a series of interactions between herself and the chatbot. She first copies a pre-selected Spanish text into the dialogue field of ChatGPTs interface and then prompts the system to generate bullet points in German (1-3). Then she assesses the outcome (3-4). Between these two task-items, ChatGPT processes her input and generates a translated list of bullet points. ChatGPT's contribution remains implicit in *Rea's* description which points to ChatGPT's processing speed and the fact that this processing remains behind the screen and thus is omitted within the account of her conscious experience. She focusses on the assessment of the output and the affordance to further modify the generated text (3-6). She expresses general satisfaction with the performance of ChatGPT (4). Nevertheless, there is a perceived need to adapt and correct the generated bullet points (5-9). This might be necessary due

to formal aspects, e.g., when ChatGPT "formulated too extensively" (8). Here it is perceived as relevant to prompt ChatGPT "beforehand" to formulate more concisely (8-9). Besides formal aspects, the supervision of generated content in relation to the expectations towards pupils is underlined. If aspects are missing, she has to add them (6). Involving ChatGPT in this task can also result in too demanding bullet points, as *Sandra* noticed: "Sometimes ... it's very detailed, which is basically a good thing, but I don't necessarily expect that from my students in the exam." She further remarks that "[…] ChatGPT summarizes everything, so to speak, and I don't find some points so important. I then remove them." Occasions for such modifications stem from the teachers' pre-understandings of the text (5-6) as well as assessments of the output to identify, for instance, a too excessive scope (8), which in turn relies on assumptions on pupils' performance. These practices of reshaping ChatGPT's output are an important addition to the perceived responsibilities for fact-checking. This illustrates how ChatGPT's text generation capabilities can be embedded in teaching activities. It also points to the importance of becoming conscious about ChatGPT's limitations:

1	*Martin:* […] what I really miss with ChatGPT […] is ultimately the concrete situation ... so
2	the whole thing [...] when I'm standing in class and have to teach the whole thing as a
3	lesson. […] I think what ChatGPT is missing, so to speak, are my pupils ... with their very
4	special needs ... in order to refine the lessons, in order to meet all these needs ... they are so
5	complex and so concrete and so interdependent […]

Martin pinpoints one crucial contribution of teachers to ChatGPT-based practices. To meet pupils' needs and to plan and perform lessons accordingly (4), teachers must both reflect and adapt to the needs of pupils and the experiences of concrete situations (3). Respective perceptions and actions cannot be transferred to ChatGPT in form of prompts but require critical supervision and complementation. ChatGPT "misses" real-world experiences (1 and 3) and thus the concrete situation of pupils (3) in all their complexity and interdependence (4-5). ChatGPT has only access to real-world through teachers prompts and feedback and thus lacks connection to the "whole thing" (2). It is the responsibility of teachers to contribute this concreteness – and to ensure that generated materials do not ignore or contradict these aspects. As *Martin* pinpoints: "The thing is, it's often no less work than actually doing it yourself […]." In this sense, it can be problematic if too much time is saved by ChatGPT, or teachers have too much time pressure or lack capacity – for instance when teachers feel tired and empty when they have to return to their desks in the evening as *Nino* illustrated above. As the recent excerpts by *Rea* and *Martin* have indicated, using

ChatGPT for teaching involves a complex interweaving of human and technical shares. Developing responsible practices involves becoming vigilant to the limitations of ChatGPT which requires effort and capacity. In other words, ChatGPT not only saves time but can also cost time. This is illustrated by *Sandra* when she recalls her perception of the ChatGPT-use in the teachers' room:

1	***Sandra:*** [...] and the instruction we then received from the head of the Oberstufe was: "Yes, if
2	you suspect that it was written with ChatGPT, then you could invite the pupil again and ask
3	them three or four questions about the work and then find out whether it was written with an
4	AI or not." Which ultimately means more work for us, of course. [...] So for me it is ... or
5	was ... or is it still all a bit new and fuzzy and somehow ... the ... still outweighs the ... well,
6	what do you mean by negative ... but the critical things rather than the positives. Because I
7	don't think the system is so ... it's also new and everything still must be conceptualized ... the
8	exams and so on ... schools are simply still very old-fashioned in Germany.

First, she refers to her perception of instruction for dealing with situations in which ChatGPT-use by pupils is suspected. In her school, teachers received the recommendation to invite pupils to an interrogation (1-3). This means additional workload for *Sandra* which indicates the flip side of ChatGPT's perceived meaningfulness as a timesaver – it can also be understood as additional load (4). *Rea* adds to this when she commented on the experience of correcting text which she suspected as ChatGPT-generated: "Yes, well, I felt a bit fooled at that moment when I was correcting, because .... I don't have to read texts from the... from the computer. So ... my time is really too valuable for that." This illustrates the ambivalent impact on teachers time and capacity: ChatGPT can simultaneously save and demand time. Moreover, *Sandra's* impression that "critical things" or "negative" ones rather "outweighs" the positives (5-6) indicate how the temporal condition for attributing meaning to ChatGPT influences its valuation. *Sandra* also remarks that proficient usage requires efforts and thus time when she describes the experience of ChatGPT as "fuzzy" (5, not yet "conceptualized", and points twice how "new" (5 and 7) ChatGPTs presence in schools feel to her. Depending on the initial level of digital competence, the development of ChatGPT-related know-how can plausibly imply substantial investments of time and capacity. This importantly is also true for realizing and practicing responsibilities in the form of supervision and other complementary practices which require reflective and practical efforts. The hint to the "very old-fashioned" school system (7-8) conveys the shared estimation that the adaptation to ChatGPT in the context of the perceived state of the school system means a long way to go.

3.2.2. Ambivalent effects on pupils' independence: "To bridge gaps in competence sometimes"

The second theme emerged around an overarching objective of teaching: the guidance of pupils towards independence. All participants are committed to provide pupils with the opportunity to grow in different ways, for instance, depending on different abilities or personal backgrounds. This process requires mutual engagement from learners and educators. As *Patrick* metaphorically describes: "As a teacher, I do <u>not</u> have the opportunity to somehow ... eh ... to give them the complete principles, but I can lay individual cobblestones where they then eventually build the path through their own experience and their lifeworld." To accompanying pupils' development towards independence – cobblestone by cobblestone – is experienced as an interesting, joyful and rewarding journey:

1	***Nino:*** I really like the work because you contribute to... ehm ... children and young people ...
2	ehm ... to educate ... firstly ... of course ... but you're also a development companion ... I always
3	like that a lot, so that gives me a lot in return ... Helping children and young people to discover
4	the world for themselves and [...] to become independent, autonomous citizens ... within this
5	society and ... ehm ... especially now specifically with the content of my subjects ... I find the
6	combination very, very interesting ... so the work gives ... gives me a lot of enjoyment ...

The appeal of teaching, according to *Nino*, revolves about the interplay between being an educator, someone who tries to influence their path, and a companion (2-4), as someone who "[…] hands over the rudder […]" to pupils and "[…] takes the fear to make mistakes or simply to engage with something ... not just because you have to, but because you somehow manage to arouse or generate interest in what you want to convey […]". While the former is about influencing learners – e.g., through the provision of information, instructions for learning activities, thought-provoking inputs, praise and sanctions – the withdrawal of guidance is necessary to leave room for pupils to stimulate their independence. *Nino* values the experience of this twofold process as deeply rewarding and enjoyable practice (3 and 6). However, being a good teacher is not only motivating and fulfilling but also challenging:

1	***Martin****:* [...] And I think the challenging thing about it, so to speak, is that you must transform
2	or reduce complex subject content a lot to ... to ... transmit it. Which requires engaging with it
3	so deeply that you can fillet it and package it into bite-sized pieces. And that, I think, is the
4	professional requirement and then it is simply cool to work with kids. It's fun. You have a
5	really great sense of self-efficacy, yes.

Martin also experiences his engagement with kids as fun and as giving him a sense of contributing to something meaningful (4-5). The implied challenge, however, is to substantially reduce the complexity of content for allowing learners to interact with it. For this didactical responsibility, a deep engagement with the subject matter is necessary to transform it in a way that sufficiently connects to pupils' pre-understandings and respective levels of independence. This implies not only profound expertise in "filleting" and "packaging" (3) but also continuous endeavors to understand the pupils' hunger and their ability to digest the content. According to *Martin*, teachers should avoid confronting pupils with activities and exams "[…] which [are] completely foreign to them. So, they don't know where these tasks come from, don't know how to prepare for them and what, above all, the point of everything is." For this, teachers must understand and frequently reassess what specific needs they can address in relation to their subjects and learning objectives. *Patrick* pinpoints the relevance and scope of this challenge of understanding the specific needs:

1	*Patrick*: Yes, first of all to know what ... ehm ... what is the background of my pupils anyway.
2	Where do they come from? What languages do they speak? Which ... eh ... particular
3	educational needs do they have? Ehm ... Do they have any other special needs? Firstly, this also
4	helps me to plan my lessons well, because I can then respond to these different needs as well as
5	possible, and [...] to pick up as many as possible.

Patrick here illustrates a different dimension which influences his assessment of pupils' needs in public schools. He indicates twice (1 and 3) the priority of understanding demands for support. Observation and interactive exploration are thereby depicted as vital for good teaching because only on this basis teachers can target the developmental space just above the previous levels of ability and interest without over- or under-challenging students. This reaffirms the severity of the experienced lack of time and capacity for lesson preparation because the assessment of pupils' development is effortful task. *Patrick* makes this explicit by referring to the background, the language proficiency, particular educational needs and special needs (2-4). Working at public schools involve engagement with heterogenous demands. For teachers, who are usually responsible for multiple classes of 25 to 30 pupils, this implies a challenge which is hard to meet in practice. When *Patrick* qualifies the prospects of his efforts with phrases like "as well as possible" or "to pick up as many as possible" (4-5), this indicates that teachers always run the risk of leaving pupils behind due to practical necessity to provide a class, a collective of heterogenous children, with common exercises and lectures. This implies issues about educational fairness and equal chances of opportunity when teachers need to triage responsibilities.

Against this backdrop, it becomes understandable why three of the five teachers use ChatGPT for personalizing lesson materials. This practice consists in preparing different versions of the same text according to different levels of language and/or subject-related competences. *Rea* explains how she uses ChatGPT for preparing reading comprehension for a Spanish class:

1	***Rea:*** […ChatGPT can] generate texts and you can even say what language level it should
2	have ... so you can ... write down ... Level B2 or Level B1 ... depending on how advanced my
3	course is ... and then he does it in simpler language ... or a bit more complicated ... and ... that ...
4	ehm ... somehow it hadn't occurred to me before to type it in, and ... ehm ... when I saw it, it
5	was like: "Oh great!" So instead of spending hours on... ... clicking through lots of pages to
6	somehow find a suitable informative text with which we can practice reading comprehension,
7	I'll just let one be written in the subject area ... at the level I need ... ehm ... in the word length ...
8	(laughs) ... in the number of words I need. Ehm ... that's a real time-saver for sure!

Rea here describes how she can use ChatGPT for generating texts in different levels of language competence. It is the combination of different capabilities of ChatGPT that not only afford its application for personalization but effectively becoming the lesson-preparator based on *Rea's* commands and supervision. ChatGPT's capability as a cross-lingual model which is pretrained on datasets which include both German and Spanish language (Conneau & Lample 2019) allows *Rea* to use ChatGPT for translating and switching fluently between Spanish and German. Its design based on the transformer architecture and attention mechanisms (Vaswani et al. 2017) allows the model to focus on different parts of the inserted text, for instance "B1" or "B2" (2), while the fact that ChatGPT can perform a range of different tasks based on the processing of the semantic context (Brown et al. 2020) allows her to let ChatGPT generate a suitable text for Spanish reading comprehension exercise (6-7) according to range of lesson-relevant parameters, such as subject area, the number of words, and the level of difficulty (8-9). In *Rea's* experience, however, and that of the other teachers, these design preconditions as well as the complex and energy-intense processes remain hidden or at least abstract while interacting with ChatGPT. Their experience is, so to speak, *on the screen* and the process of making sense about ChatGPTs fittingness for the given teaching task remains on this phenomenological level. This sheds an additional light on her experience of the speed with which ChatGPT works, since the ways in which ChatGPT generates the different version of the texts withdraws largely from her experience. This raises questions about the conditions of critical assessment of the process and the outcome, thematized in *Patrick's* reflection about ChatGPT-based personalization:

1	*Patrick:* It's certainly a support for me first and foremost. Ehm... I ... eh ... don't use the results
2	without reflection. There's usually a bit of crap in there. You must take a look ... ehm ... that
3	there ... eh ... the nuances are right. On the one hand, you definitely must improve it. The ...
4	ehm ... exhausting work in which you must ... you must get creative yourself by somehow
5	reading through newspaper articles to get the input, then somehow linking and putting it
6	together and then creating a worksheet at the end. Ehm... there's no need for that and you can
7	focus more on ... ehm ... the smaller adjustments, which in turn make a worksheet ... ehm ...
8	that is even better adapted for my students in the end ... ehm ... yes.
	Philipp: Why is it so important to personalize ... to adept?
9	*Patrick:* Hmm... yes, teaching ideally ... unfortunately you can't do that ... always must adapt
10	lessons to the ... ehm ... addressees. Ehm ... because teaching simply fails if you don't... engage
11	with the pupils you have […] it can happen quite quickly, for example, that you create
12	worksheets that are not at all useful for these pupils. Ehm... then various things can happen.
13	You lose them ... ehm ... or they lose interest in the lesson itself. Eh ... the learning success is
14	lower or in the end it can ultimately lead to more frequent disruptions.

The second paragraph considers the perils of non-differentiated lessons. Crucial is the contrast between the ideal of always adapting lessons to the specific needs of pupils and his immediate insertion of the impossibility to realize this constantly (11-12). In this case, exemplified by a worksheet which turns out as not useful to (some) pupils (14), he depicts a failure of teaching efforts for the respective pupils (12): inability to follow his lesson, loss of interest, lower learning success, and frequent disruptions which may affect other pupils (15-16). What makes ChatGPT thus meaningful for *Patrick* and the other teachers it that it renders a very time-consuming and intricate practice feasible. This, again, indicates the relevance of paying attention to the interpretive context which forms the backdrop for the specific ways in which users make sense of the moral dimension of emerging technologies. Given the scarcity of time and capacity, as well as the fundamental problem of giving pupils in heterogenous class compounds equal chances for gradual development, it becomes understandable that using a technology that substantially reduces the efforts for personalization is deemed valuable. *Patrick*, *Rea*, and *Martin* understand ChatGPT-use for personalization as means to enable better teaching and a fairer treatment of the different pupils in their classes.

Patrick also emphasizes the need for critical thoughts about ChatGPTs performance and its role within the teaching practices (1-3). This affirms the relevance of time and capacity as conditions for responsible usage. He describes the role of ChatGPT as a "support" (1) and as a possibility to

outsource the "exhaustive work" in which "you must get creative yourself" (4). This exemplifies what kind of activities can be assigned to ChatGPT: language-related creative tasks. As *Rea's* excerpt showed, this fact tends to become obscured in the conscious experience of working with ChatGPT. This may complicate the perception and reflection of the influence of ChatGPT on one's own actions. The critical engagement with ChatGPT is therefore largely bound to a phenomenological level like an assessment of the generated output or a monitoring of the effects on pupils' development.

This connects to another significant dimension of ChatGPT and the responsibility of teachers to guide pupils towards independence. To understand this, *Martin* employed an interesting metaphor when he referred to text simplifications through ChatGPT:

1	*Martin:* So ... hm to bridge gaps in competence sometimes, to use it as a kind of scaffold … text
2	simplification ... so if a pupil has the feeling: "Wow, that text doesn't work for me at all." "Ok,
3	let's have ChatGPT rewrite it."

Martin compares ChatGPT to a bridge which makes it possible to overcome gaps in competence. If a specific text is too complicated or unapproachable for (some) pupils, ChatGPT affords to overcome this gap by reformulating it in a more accessible way. This metaphor of a competence bridge is not only apt to capture that ChatGPT affords to outsource creative language-related tasks, but it also points to an important tension regarding ChatGPT bridging competence and the development of pupils towards independence. *Martin* makes this explicit when I asked him, at another point in our conversation, to explain why he considers pupils' practice to submit ChatGPT generated text as their own work as 'nonsense':

4	*Martin:* So, they haven't developed their competencies with it [...] but they skip everything in
5	this whole learning process and that might help them in the short term, as I said, because they
6	can make a ... possibly a pretty good contribution when the homework is discussed with each
7	other ... ehm ... but they have no learning progress ... no real ... no lasting progress.

In the context of the previous quote, *Martin* replies highlight the ambivalence of the possibility to use ChatGPT to perform text-based tasks which one would otherwise not be able to do. He explains his view on the perils of pupils using a copy-paste approach to schoolwork with ChatGPT. This way pupils bridge their competences to avoid the task at hand and thereby avoid learning. He expresses this concern by assuming that ChatGPT-use is attractive for pupils through experiences of shallow successes when they can make a "pretty good contribution" in lessons without much

effort (6). This "short-term" gain implies a long-term loss because this way, they have not developed their competencies (4-5). Related concerns emerged multiple times across all interviews and highlights the complex responsibility for teachers to decide how pupils should (not) use ChatGPT. A part of this responsibility is to figure out when 'sometimes' (1) is: In which use scenarios? To what degree?

But even in cases where everyone agrees, such as the copy-paste approach, the participants experienced problems in putting this responsibility into practice. *Sandra* describes a typical situation when I asked her about her feelings when she was confronted with the denial of ChatGPT-use:

1	***Sandra:*** I found it sad because I think ... so with the other students too ... yes, I think you can
2	communicate that to me openly ... ehm ... I think that ... ... the person was afraid ... ehm ... then
3	maybe also ... not necessarily failing but getting a bad grade for the essay. But then when I ... I
4	asked twice and said: "You can tell me this openly. I don't think you wrote this on your own."
5	Ehm... the person still didn't admit it to me... I felt a bit powerless in the end.

Sandra describes the experience of debating with a pupil about the suspected ChatGPT-use for a philosophical take home essay. She expresses that the conversation made her sad (1) because it conflicts with her interpretation of being a good teacher. She wants to give students the feeling that they can be open with her (2) and this intention contradicts her perceived obligation for interrogation. Even though she is empathic in that she points to potential fears about bad grades (3) she feels responsible to twice reaffirm her suspicions and demand a confession (4). When the pupil refuses, she describes a feeling of powerlessness (5). This shows how the possibility to use ChatGPT can undermine relations between teachers and pupils. All participants plausibly expressed confidence to recognize the use of ChatGPT in sharp contrast to pupils' language deficiencies. However, three of the participants emphasized that it is problematic to prove the usage, while *Patrick* stated that he was not affected due to his subjects and *Martin* avoids this problem to some extent by actively including ChatGPT in exams and homework. The others find it difficult to provide evidence because the ChatGPT-use mostly takes place outside the teachers' sphere of influence. Also, ChatGPT generates texts. Unlike traditional copy-pasting, the teachers struggled to clearly identify ChatGPT-use through internet searches or plagiarism software. Since teachers cannot enforce responsible usage, they face the challenge to convince pupils to do so. This implies that even if teachers may feel equipped to differentiate between responsible and irresponsible use

cases, the peculiarities of the functionality and usage of ChatGPT make it difficult to implement this responsibility. In consequence, the participants must rely on their understanding of what signifies a ChatGPT-based text – as apparent when *Sandra* referred back to the situation later in the conversation when I asked her about her learning experiences with ChatGPT:

1	Ehm ... I think, yes, the learning experience I've had is that it really ... very ... depends on how
2	exactly or explicitly you ask ChatGPT ... in other words, what question you ask. I also noticed
3	that in the student's corrections, because I think she put very open questions in there.

When *Sandra* reflects on the insight, acquired through experimentation with ChatGPT, that the perceived quality of the output depends on exact and explicit prompts (1-2), she recalls the situation thematized within the last excerpt. She describes that during the correction of the text, she noticed that the essay was suspiciously vague and lacked an opinion statement (2-3). This highlights that her suspicion is based on her practical understanding of ChatGPT-use which becomes projected towards pupils.

3.2.3. Divides among teachers and isolated approaches: "There needs to be more exchange"

The third theme concerns experiences of the social conditions under which teachers make sense about ChatGPT-use in schools. All participants encountered controversies about ChatGPT-use within their collegium and emphasize the need for more exchange in the sense of constructive discussions and a collaborative development of technical and didactic know-how as well as a common attitude towards students. Furthermore, the dynamics within the interviews themselves indicate the stimulating effect of joint reflection. The atmosphere regarding ChatGPT-use within schools is perceived as a divide among teachers. When I asked *Rea* about her views on how the approach to ChatGPT in her school should change, she replied:

1	***Rea:*** Oh, that's difficult ... (laughs) ... because I don't know what is actually possible. But ... In
2	any case, I think there needs to be more exchange [...] because ... if everyone does their own
3	thing and some say: "Well ... somehow it's okay ... we use it this way." And others totally
4	demonize it ... that would somehow be totally confusing for the pupils. That's why I think we
	should ... have a common stance. But I think that some colleagues just haven't really gotten the
5	message yet ... and ehm ... that it will take a few more years ... (laughs).
6	

The first thing to notice is that *Rea* finds it hard to imagine desirable changes because she feels unsure what changes are possible (1). This emphasizes how the embeddedness of the teachers within a broader school system bears practical and political obstacles which can lead to the perception of restrictions regarding self-centered articulation of opinions and imagination. This underpins her decisive demand for more exchange (2) in the sense that this proposal is immediately related to her experience of a status quo of predominantly isolated approaches to ChatGPT due to a smoldering controversy (2-3). This controversy, according to *Rea*, divides teachers who endorse the application and make use of it in teaching and potentially for learning (3) and other colleagues "totally demonize" ChatGPT (4) and may have confusing effects for pupils who may experience instructions that are unclear and contradictory for them. This perception of a divided teachership is present throughout the interviews. This indicates how ChatGPT-use in this setting provokes very different processes of moral understanding and threatens to undermine reciprocal understanding. The implied encouragement of procedural vices in discourse such as ignorance, personal attacks, exposure is evident in *Martin's* account of his attempts to persuade skeptical colleagues with constructive suggestions for dealing with problematic aspects of ChatGPT-use:

1	***Martin:*** It was a kind of direct confrontation and you very, very quickly slip into the direction
2	that the colleagues who find themselves in this situation right now, from which they cannot
3	get out without having to make admissions or with work ... to get out of it with work. In other
4	words, those who come to you constructively and say: "I'd like to learn something." It's cool
5	with them anyway. The others, they usually don't come at all, but that manifests in discussion
6	groups [...]with 10 to 40 people and you introduce ChatGPT and ... or alternative exam culture
7	and in this context ChatGPT and the use of it. And then you get some stupid, snarky
8	comments ... along the lines of: "Then we don't have to write any more or they won't write
9	anything anyway, especially not by hand and especially not with a pen ... so with pen on
10	paper ... and you think: "Wow, is it even worth it for me to go into this right now?" [...] But it
11	also depends on who says it. I think that's really ... the necessity will change most people's
12	minds [...].

Martin describes two opposed experiences for engaging with colleagues about ChatGPT (4-5). The unapproachability of parts of the staff and the implied relocation of the discussion in big groups shapes his experience. He must take the initiative to defend ChatGPT, his ideas about how to apply it, and how it can improve exam culture in front of an audience. In this situation, he feels exposed to what he perceives as "stupid, snarky comments" and ignorant knock-down arguments on his views which he perceives as ignorant and as targeted against him (11). This experience culminates

in the attitude of being unwilling to further approach other-minded colleagues and – based on deterministic assumption (11-12) – to wait until others to bow to necessities rather than arguments. This makes apparent how ChatGPT-use becomes involved and escalates pre-existing controversies in schools depending on how it fits or threatens respective normative agendas. *Martin* advocates vehemently throughout our conversation for changing the exam culture pointing to harms for pupils in form of "serious mental problems of kids, which then lead to abstinence from school [...]." Based on this perspective, he perceives ChatGPT as a way to change this situation, for which he develops quite sophisticated workflows:

1	***Martin:*** Because corrections get on my nerves ... I often use it to let students make their own
2	corrections. [...] They write a text. For example, handwritten on GoodNotes. Then I let them
3	convert it using this lasso function and then they push it into ChatGPT and then they write the
4	correct text from ChatGPT ... so I give them the prompt on how they should do it so that the
5	linguistic expression is not distorted, but really only deals with spelling, grammar, sentence
6	structure and so on, and punctuation ... and then they should mark everything with a pen that
7	ChatGPT has changed and somehow ... depending on what kind of text it was ... pick out five
8	to ten mistakes, preferably of different types, and say what they did wrong, so to speak, what
9	the rule would have been that they broke. Ehm ... so that they get to the meta level, so to speak,
10	and ... ehm, exactly ... I'm spared this stupid correction work at the same time, which the bot
11	can do just as well.

This excerpt illustrates what *Martin* meant by constructively approaching potentially negative influences on learning. The integration of ChatGPT into correction processes is enabled by iPads and the GoodNotes application, which are available to most pupils in all of the participants' schools in higher grades. Pupils can handwrite texts on iPads and use a text recognition function to convert the handwriting into digital text. In this way, *Martin* tries to counter concerns, as expressed for instance by *Nino*, that ChatGPT-use impedes the acquisition of this skillset and related cognitive development. He prescribes a prompt so that formal errors, rather than linguistic expression, are targeted by ChatGPT. Then, he describes a reorganization of assessment in which pupils themselves engage with the corrections provided by ChatGPT *and* Martin's prompt while being instructed to select and reflect their mistakes. In light of this proactive attempt to both account for implied risks for learning and improving exam practices for pupils, it becomes not only more tangible why *Martin* feels frustrated by the disinterest of his colleagues. By blocking *Martin's* suggestions, however, opportunities are missed to thoroughly evaluate his proposal: Do all pupils have a tablet, a pen and access to GoodNotes? How reliable does the text recognition work? Does

his prompt prevent a distortion of linguistic expression *in all cases*? Depending on how these questions are evaluated from different perspectives, a practice-oriented discussion amongst teachers may provide fruitful insights to the advantages and disadvantages of *Martin's* approach.

Another related problem concerns the lack of joint development of ChatGPT-related know-how. All participants expressed the desire to for collaborative learning and training in their schools as expressed by *Nino*:

1	***Nino:*** I think it would be very nice and important if we had internal school training on this ...
2	that our school management takes this to heart, that it is relevant ... that it is important ... that we
3	learn this so that we can also teach it, and the pupils can learn with it.

Nino here relates his desire for developing know-how to the school management and urges a provision of time and resources based on a recognition of the relevance of developing didactical competence about ChatGPT. This demand also draws from his experience of the trend to privatize school training in Germany. Like *Patrick*, he refers to the fact that the leading provider Fobizz offers training courses, but teachers have to pay for them themselves, which draws a connection to the political dimension within the first theme. He further explains:

1	***Nino:*** [...] I ... ehm ... want to prepare thoroughly ... and as long as I haven't done that yet, I
2	wouldn't want to just go into the situation like that ... eh ... when you plan lessons, you think
3	about a learning objective, what you want to achieve at the end of the lesson ... ehm ... and I
4	haven't used ChatGPT yet [in lessons]... so I think I know how to use it, definitely how to use
5	it ... but I haven't thought about it so didactically yet ... so didactically integrated it in such a way
6	that I can now use it in my teaching practice.

Nino describes an experience of unpreparedness for using ChatGPT in lessons. While he feels competent to use it privately (4), he puts the didactical integration in a different category (5-6). He thereby expresses how valuable preparedness and control over the course of lessons feels to him (1-2) and with it, a sense of responsibility for dedicated lesson preparation which he depicts as instrumental for providing pupils with the opportunity to achieve learning progress (3). This explains his wish for *internal* training, that is, collaborative engagement with colleagues involved in the same context and confronted with similar experiences with pupils. The lack of shared engagements encourages a 'trial and error' approach to learning about ChatGPT as *Martin* described when I asked him how he achieved the feeling of stable routines:

1	***Martin:*** Boah, it's really hard to describe [...] I believe it's actually through trial and error, to
2	see what ... Well, to see in different use cases: "How does ChatGPT react?" ChatGPT has
3	already written solutions for me that I simply ... I just said: "Okay, he won't get it any better,
4	I'll let it go now." Often creative products are like that. That's ... It just didn't meet my
5	standards. He simply didn't improve the mistakes, even though I said: "Improve exactly this
6	mistake!" He didn't do it. And then I thought to myself: "Ok, maybe it's me or maybe it's the
7	prompts or maybe it's the limits of this AI." It was really learning by doing. Lots and lots of
8	chatting with ChatGPT. […]

Martin, like all participants, found it difficult to describe how he learned to use ChatGPT (1). He describes an experimental approach of testing the extent of ChatGPT's fit to teaching by "lots and lots of chatting" and discovering its limitations with respect to different applications (1-2 and 7-8). If he does not get the desired output after repeated testing, or output that does not meet his expectations, he has to detect the source of the problem: his capabilities, the quality of the prompt, or ChatGPT's capabilities. This explicates different facets of experimental approaches to ChatGPT. It suggests that the interaction with ChatGPT is intuitive and encouraging enough to motivate users to auto-didactically acquire its use. It hints at the experimental effort required to feel competent. It implies that, in such isolated approaches, teachers have to deliberate whether failures are due to them or to ChatGPT. This flags up a lack of external or intersubjective references for assessing their own capacities and those of the tool. This stimulates desire for more exchange, collaboration and training on ChatGPT-use for teaching. That interpersonal exchange stimulates critical reflection and revisions is highlighted by *Patrick*:

1	***Patrick:*** I have to become aware that ... ehm ... depending on how the data ... ehm. .... have
2	been obtained, for example ... eh ... that it is based on the achievements and knowledge of
3	others. Maybe it wasn't a big focus at the beginning, but now I think about it more often. [...]
4	I personally have absolutely no problem with that ... I'm in favor of making knowledge
5	accessible and without costs anyway. Ehm ... but I can imagine that people who are ... working
6	on it ... eh ... see that as very problematic. For example, I've got to know someone […]. He's
7	a graphic designer [...] and he'll probably lose the customers who don't value the quality of
8	the results so much in the long term. And that somehow makes me think ... where I think to
9	myself: 'Yes, that's right!'

He described the process of becoming aware that what ChatGPT achieves – and thus what he achieves through ChatGPT – grounds on the achievements and knowledge of others (1-3). Initially, he had no problem with this personally because he favors free availability of knowledge (4-5).

However, an encounter with a graphic designer made him aware that there are people and professions whose existence is threatened by content-generating technologies (6-8). This motivated him to rethink his previous understanding (8-9). It shows that a reflective and critical mind-set must be developed through imaginative engagement with other perspectives and a rethinking of one's own perspective. This suggests that if teachers are to equip children with dispositions for critical reflection and responsible action in relation to technological transformations, then they must practice these dispositions themselves.

3.3. Summary of the findings

The study revealed three super-ordinate experiential themes against which the participants found and ChatGPT-use meaningful in multifaceted ways that relate to their sense of responsibility.

The first theme showed that the participants experience time pressure and lack capacities to respond to the ceaseless flow of perceived didactical, pedagogical, administrative, communicative or interpersonal obligations. This is not only threatening their physical and mental well-being but also potentially leads to triages of enacting their responsibilities especially towards pupils. Against this background, ChatGPT-use becomes meaningful for them as a time-saving assistant that enables them to achieve teaching practices more efficiently to save time and capacity to respond to more valued teaching activities. This way, the excerpts indicate how intimately ChatGPT can be interwoven into teaching practices. Yet, ChatGPT-use in public schools also means additional demands for them. They must invest time and capacity to become proficient with ChatGPT themselves but also to supervise and potentially guide pupils' usage. In this sense, ChatGPT means an additional burden on their disposition to cope with their expanding responsibilities. This has revealed a political dimension in which the participants have critically questioned the use of ChatGPT in the context of a lack of recognition and support for their work.

The second theme concerned the overarching purpose of teaching: to guide as many pupils as possible towards independence. Based on rich and nuanced accounts of what it means to prepare children for their future, the participants portrayed ChatGPT's ambivalent effects on this endeavor. This theme highlighted a fundamental challenge of teaching in public schools: to respond to heterogenous needs of pupils in class-compounds. Against this backdrop, the possibility to bridge competence gaps sometimes was highly valued. The possibility to generate different versions of lesson material according to different needs enabled a majority of participants to respond to their

responsibility to provide as many pupils as possible with the opportunity to gradually develop. The involvement of ChatGPT in educational practices, however, was not only found to signify need for critical supervision of ChatGPT's contribution to teaching but also prompted concerns about pupils ChatGPT-use. Here, ChatGPT-use was perceived as a burden for the relation between pupils and teachers and necessitates teachers to find ways to effectively respond to pupils' over-reliance.

The third theme gravitated around perceived divides amongst teachers with respect to engagements with ChatGPT-use in public schools. All participants found the lack of constructive engagement and collaboration with ChatGPT's presence in public schools problematic. This revealed how ChatGPT exacerbates debates around exam culture and creates divides amongst teachers that undermine constructive discussions and collaboration. All participants expressed desire for exchange and training which responds to either their perceived unpreparedness, particularly in relation to didactic application, or their desire to collaborate and develop a consistent stance towards pupils. This contrasts with the predominantly isolated approaches to ChatGPT-use that currently lack external guidance and collaborative inquiry. Finally, it was shown how exchange and expansion of one's own horizon can support empathic reflection and the identification of significant societal issues.

4. Interpretation of the Findings

The empirical findings show that the participants appropriate ChatGPT in creative and multifaceted ways. Against the backdrop of the three super-ordinate experiential themes of time pressure, heterogenous needs, and controversy they attributed ChatGPT-use with different responsibility-related meanings from their situated perspectives. In this chapter, I interpret these findings through a philosophical analysis based on the theoretical framework discussed in the second chapter to then discuss implications for the research question.

I will first explicate the lemniscate structure of teachers' process of understanding responsibilities in relation to ChatGPT-use in public schools that was empirically captured within the IPA-based appropriation study. This is to disclose interrelations between the three active 'components' of the lemniscate model – as explained in section 2.3. – and their impact on interpretation by addressing the question of how ChatGPT-use mediates the participants' understandings of their responsibilities in public schools. To do so, I will follow the lemniscate to propose answers to the

following sub-questions: (1) How do the participants' dispositions enable appropriation? (2) How becomes ChatGPT involves in appropriation processes? (3) How does ChatGPT-use shape the participants' perceptions towards their socio-cultural world? (4) How does the socio-cultural world become significant for appropriation processes? (5) How does ChatGPT-use influence teachers' responsibility-related perceptions and actions? Then, I will address the research questions by an engagement with two related questions: (6) What understandings emerged from the appropriation process? (7) To what extent enables the interpretation of these understandings a revision the working hypothesis?

4.1. How do the participants' dispositions enable appropriation?

The interviews showed that sense-making requires human efforts which can be understood in terms of an exercise of their projective agency or practical agency. Throughout the interviews, the participants put these capacities into practice by conceptualizing, comparing, making meaning and revisioning as well as by reflecting on their practical agency of interacting with ChatGPT (Kudina 2019, p. 85). These dispositions enable user appropriation based on pre-understandings.

Teachers appropriate ChatGPT on the foundations of their pre-understandings of what it means to enact 'good teaching'. While their reflections disclosed nuanced interpretations based on different personal histories – involving trusting, sympathizing, empathizing, caring, mentoring, scaffolding, adapting, reflecting and many, many more – the findings indicate that most of these interpretations aim at an overarching purpose of teaching: to guide all children towards independence. The contributing valuations become lived realities through the participants' commitments to enact them. Moreover, they became valuable and sometimes re-interpreted depending on how they play out in relation to the participants' environment. All participants cared about pupils' reactions. *Rea* pinpoints this: "Pupils also mirror back to me that... they feel comfortable with me, that they are not afraid to make mistakes. [...] That motivates me in my work, and that is really, really important to me."

The participants also expressed different degrees of technical pre-understandings on the basis of which they first confronted ChatGPT and continued to engage with it. This is significant for their interpretations of responsibilities because the identification and exercise of responsibility-related practices – detecting and negotiating pupils' usage, critical supervision or proofreading, amongst others – depend on degrees of technical competence. This indicates how technical and value-related

pre-understandings are and continue to be entangled throughout the processes of appropriation. Proofreading and re-prompting generated material, for instance, requires both understandings regarding ChatGPT's performance and ways for practical interaction but also understandings about the significance of values like coherence or appropriateness in educational contexts.

The shared experiences of time pressure and experiences of lack of time and capacity also emphasized the relevance of concrete time and capacity budgets for appropriation. We humans are finite beings not only in terms of the limits of what we can possibly understand but also in terms of how much time we actually have. The participants' experiences indicate in concrete terms how time budgets can shape appropriation. Due to their high workload, engagement with ChatGPT competes with, for instance, other teaching practices, other pursuits of self-development, or recreational practices. Understanding ChatGPT's impacts on education requires time for practices like prompting, experimenting, didactical and pedagogical reflections, researching, or attending further training courses. Appropriation is thus not detached from temporal constraints (Emejulu & McGregor 2019, Coeckelbergh 2021/2022).

4.2. How becomes ChatGPT involved in appropriation processes?

All participants experience their work with pupils as rewarding, fulfilling, and enjoyable. But they also experience a dissonance between the commitment to respond to all the apparent needs of pupils and their frequent recognition of not being able to do so. This is relevant for their perception of ChatGPT, as it became explicit in *Nino's* reflections about stress and overload, because the participants pushed to identify ways to increase their efficiency. Against this backdrop, the participants predominantly reported to use ChatGPT to save time and to render effortful tasks feasible.

The findings show that ChatGPT can be used for a spectrum of learning and teaching activities. ChatGPT's capacity to process textual input and to generate text in form of synthetic data for a wide range of topics, languages, formats or styles allows for multifaceted applications in learning and teaching contexts. The participating teachers appropriated ChatGPT in creative and versatile ways including but not limited to the creation of evaluation horizons, personalization of lesson material, a source of information and inspiration, semi-automatization of corrections, a sparring partner for argumentative exercises in class, an examination tools, a scriptwriter for dream journeys, an assistant for writing recommendations letters or mails, or as a translator.

While this is perceived mainly as contributing positively to their teaching, *Sandra's* remark that the novelty of this technological transformation of teaching and the lack of a conceptual basis to engage with it, also points to the ambivalent experiences. ChatGPT via an augmentation of teaching capacities not only saves time but also costs time. This perceived sense of ambivalence illustrates a responsible attitude because it acknowledges the need to invest efforts and time in the development of one's capacities to competently interact and supervise ChatGPT and to develop an informed critical stance. While all participants experienced development space of ChatGPT-related capacities, they displayed different levels of confidence and willingness to involve ChatGPT in teaching and classroom-practices. Some participants explained this through a sense of unpreparedness regarding the anticipation of the didactical effects of ChatGPT-use on learning processes. This displays a kind of professional ethos to only utilize ChatGPT to the extent to which the foreseeability of its effects on lessons are plausible for oneself.

Most of the development of ChatGPT-related competences occurred through interaction with ChatGPT. Its design was experienced as intuitive, enjoyable and as inviting them to experiment in a playful way. However, in one case it was also perceived as uncanny and bizarre which indicates that ChatGPT may also provoke negative impressions. This predominant experimental approach was complemented to varying degrees with information through social media and occasionally by exchanges with colleagues. The participants report that, for instance, their 'hands-on' interactions – actually interacting with ChatGPT through hardware – happens mainly in isolation. In fact, interacting with ChatGPT via a keyboard limits the number of possible users at a time. This mainly isolated approach to ChatGPT is seen critically by the participants which is evident in the analysis against the superordinate theme of the desire for more exchange.

4.3. How does ChatGPT-use shape participants' perceptions towards their socio-cultural world?

This leads us to the right-sided apex of the lemniscate, that is, to the cultural and social environments and how it is affected by ChatGPT in the participants' perspective. Public schools as a social environment consist of a complex web of social relationships between teachers, pupils, colleagues, parents, inclusion workers, school managers, and others. ChatGPT's "presence" (Farazouli et al. 2023, p. 10), influences social relations, especially between pupils and teachers.

All participants faced situations in which they suspected pupils to have used ChatGPT-use for school-related tasks. ChatGPT influences teachers' perceptions of pupils' written submissions. It's a value-related perception because, for instance, it can stimulate suspicion and concerns about pupils' laziness or an impairment of learning processes. This becomes apparent in Sandra's reference to the way the openness and non-opinionated character of ChatGPT-based texts that motivated interrogation. It illustrates that her perception is based on interaction with ChatGPT, that is, experimentally discovering that ChatGPT generates rather open replies. This, again, links to ChatGPT's design process of seeking to avoid moral advice through human supervision (Ouyang et al. 2022) in order to prevent potentially contradictory advice (Krügel et al. 2023) or discriminatory biases (Bender et al. 2021). Crucially, *Sandra's* reference shows that her moral perception of the pupil's suspicion is based not only on the contrast between the submitted text and her prior understanding of the pupils' writing style, spelling, etc., or the presence of ChatGPT, but also on her understanding of the characteristics of ChatGPT texts. She sees the student's text through her understanding of ChatGPT texts. She further exemplified this when remarking that the pupil has written the prompts too vaguely. This perception is related to her responsibility both due to her concerns regarding detrimental effects on the learning process and because the sanctioning of attempted cheating is demanded of teachers by the school and the ministry. In this way, ChatGPT co-constitutes her perception of the pupil as a suspect.

This burden of the social relationship between pupil and teacher is perceived as highly problematic for different reasons. First, linking back to time pressure and overload, the handling of ChatGPT-enabled cheating signifies additional obligations that become delegated to teachers. Here, ChatGPT-use is perceived as a waste of time. Moreover, the fact that ChatGPT-use is perceived as easy to detect but hard to prove leads to an atmosphere of suspicion in public schools. It is important here to note that, within the participants' views, this depends on age, subjects, the socioeconomic situation of children, or the language competence of pupils which highlights the relevance of context-specifics for enacting obligations for handling cheating in practice. Affected participants describe a change of their ability to control pupils' ChatGPT-use which is signified by expressions of feeling powerless and frustration when students, confronted with suspicion, deny the application. Against the background of valuing the development of trusting relationships with pupils, the presence of ChatGPT is also perceived as a burden on this essential work because it constitutes not only the pupil as suspect but also teachers in an invidious role as an inquisitor who lacks, even

worse, the instruments for interrogation. The fact that ChatGPT's ability to generate text is valued differently points to the postphenomenological insight that technologies are multistable (Rosenberger 2020; de Boer 2021) and ambivalent, that is, that the same technical affordance is both 'good' and 'bad' depending on who is using it, when, and in which contexts.

The findings also indicate how ChatGPT-use impacts the German school culture. This surfaced at multiple moments. The participants perceive a conflict between cultivated formats of examination and an established appreciation of analogue text work and the presence of ChatGPT in schools. They unanimously describe a division of the teaching staff with regard to valuations of ChatGPT use in schools. They point to two dimensions of evaluations: in relation to usage by teachers or by pupils. Concerning the latter, there is controversy about the correct pedagogical approach to ChatGPT. It seems to be common sense that the possibility for students to circumvent learning efforts through ChatGPT-use is not reducible to misuse. It is even more related to the risk of an impairment of pupils' development: ChatGPT allows pupils to achieve a performance in text-based tasks that one could not achieve without its usage. Some of these 'delegated' tasks are traditionally considered as requiring cognitive efforts (cf. Babushkina & Votsis 2021; Cassinadri 2024). Consequently, it is plausible to worry that pupils' use of ChatGPT might have detrimental effects not only on their character (cheating), but also on their cognitive development (learning). These concerns seem to stimulate projections of potential breakdowns, moments in which a technology becomes present because it is not available (cf. Verbeek 2011, p. 7). *Sandra*, for instance, said: "I also want to train them in text comprehension [...] They have to read the text like this, without aids, and they have to understand the text without AI." Thus, from a process-oriented mediation perspective, this worry can be interpreted as depicting the co-constitution of pupils' agency through ChatGPT-use, which may transform their cognitive development.

The participants perceived this co-constitution ambivalently, as they pointed to both its potentially debilitating effects but also emphasized the benefit of bridging competences. The personalization of lesson material is just one example of this. ChatGPT – as an explainer, simplifier, or source of inspiration – can enable learning by bridging overchallenging tasks. However, he recalled debates with colleagues suggesting that recognizing the ambivalence of ChatGPT usage is controversial in the 'teaching-room-culture'. Therefore, two dimensions can be separated here: First, there is disagreement on how to deal with ChatGPT-use. The participants share the view that teachers cannot address this problem by merely banning ChatGPT and sanctioning cheating. They do not

welcome this new extension of their responsibilities, but they perceive it and feel obligated to respond to it. Nonetheless, they circumscribe that the dominant approach is to ignore ChatGPT-use beyond sanctioning. Thus, in classrooms ChatGPT-use is endorsed to different degrees or not at all. As *Rea* pinpointed, this divide is problematic as this way pupils lack guidance. The findings indicate, secondly, that ChatGPT-use is not only controversial by itself but also becomes involved in pre-existing debates about examination culture or the digitalization of learning and teaching. This is apparent in *Martins* experiences of how ChatGPT enables him to put his agenda for transforming traditional examination formats into actual practice. In this light, the shared perception of ChatGPT's demonization on part of conservative colleagues indicates how ChatGPT-use can exacerbate pre-existing conflicts between traditionalism and progressivism.

4.4. How does the socio-cultural world become significant for appropriation processes?

The socio-cultural environment is not only a projection surface but actively shapes as a "soundboard" the ways in which ChatGPT-use becomes meaningful for the participants. The findings emphasized that the participants find and give responsibility-related ChatGPT-use in relation to their lifeworlds. They discover and attribute meaning to ChatGPT from their situated perspective which is always directed towards their socio-cultural environments.

The participants experience ChatGPT-use in different ways shaped by the particularities of their social environment. ChatGPT-use becomes meaningful for them depending on, for instance, whether or not they teach subjects that involve take-home assignments that provoke suspicion. This social factor influences the valuation of ChatGPT because it increases the likelihood of experiences of frustration, violations of trust and powerlessness in interrogations with pupils. Through the social condition of the heterogeneity of pupils' needs in the given social context we can understand why and to what valence the personalization of lesson materials through ChatGPT is given positive meaning. In more homogenous contexts, like Gymnasium or Universities, these practices are also desirable (Deunk et al. 2018; Zawacki-Richter et al. 2019) but plausibly not to the same degree. In the social contexts of a Gesamtschule, however, the ChatGPT-based possibility for teachers to respond to more of the different needs of their pupils is of crucial importance. Avoiding continually over-challenging weaker students and under-challenging stronger students is fundamental and therefore ChatGPT-use is given positive meaning in this context because it enables teachers to

provide more students with opportunity for development. In this sense, ChatGPT's presence may influence what is considered 'good' or 'fair' teaching.

The cultivation of the current state of the school system also provoked political sense-making. The participants' working conditions are shaped by politically encouraged cultural shifts regarding the digital transformation in general (Asmussen et al. 2017; Dander 2018; Eickelmann et al. 2020; Haberer 2020), the inclusion of children with special needs in public schools (Linder & Schwab 2020) or the recent endorsement and legal requirement for discovering AI technologies (Ministry of Education NRW 2023). As the findings reveal, these drastic transformations of the long-established German school culture tend to mean additional burdens for teachers. Yet they lack support. For example, some of the participants are confronted with the situation of having to look after children with special needs in the classroom without any further additional educational staff. The teachers interviewed experience a systematic overload due to such additional workload intensity with unchanged working hours and feel pushed to their limits. Against this background, ChatGPT-use not only becomes meaningful as a timesaver to avoid triages and better cope with the heterogeneity in classrooms, but also becomes politized. The participants interpret the calls for teachers' responsibility for ChatGPT-use critically. The public and political demand for teacher's responsibility is found to reiterate the perceived pattern of additional workload without adequate support or recognition of teachers' working conditions. The demanded pedagogical engagement with pupils about ChatGPT is perceived as indeed necessary but also competes with other issues for teachers' time and capacity.

4.5. How does ChatGPT-use influence teachers' responsibility-related perceptions and actions?

Following the lemniscate, we now move back through ChatGPT towards users. A central tenet of the appropriation approach concerns the active or mediating role of technologies in moral understanding. From this view, ChatGPT-use actively co-constitutes teachers value-related perceptions, actions and understandings. The interpretation disclosed several responsibility-related mediation effects although up until this point the focus has been on ChatGPT presence rather than actual use.

To disclose the emerging co-constitution of teachers' perceptions and actions within ChatGPT-use, the example of the creation of an evaluation horizon is suitable because this form of use was

reported by all participants and because it allows to illustrate the often-implicit normative character of educational actions. Within the participants reflection, this practice appeared as a repetitive and time-consuming task. Due to the curriculum's requirement to hold several exams per year, this task is difficult to postpone, which is why it often displaces other important tasks such as lesson preparation. Given the scarcity of time, the main intent of the participants is to speed up the task. ChatGPT's involvement in this practice leads to a sequence of interactions between teacher and chatbot whereby the text comprehension, translation, and the summarization in bullet points are delegated to ChatGPT. The teacher takes an instructing and supervision role. The latter refers to the critical attitude that all participants described within their approaches to ChatGPT. This was very explicitly a task – in the form of proofreading, correction, modification via prompts or manually – which all teachers understood as indispensable. This sequence of interactions is a vivid example of a co-constituted practice since it demonstrates how the active contributions of teacher (prompting, reading, assessing, re-prompting, ...) and chatbot (processing, generating, re-processing, re-generating, ...) becomes intertwined in ways that make it hardly possible to separate the respective shares in the resulting text.

This teacher-chatbot practice involves normative actions because it involves centrally the specification of how or what pupils should be able to perform in exams. Selecting, summarizing, adapting, and comparing to an external standard (e.g. the curriculum or a textbook) and the current performance of pupils require normative and value-laden assumptions: What should pupils know? What content is appropriate? How fast should they be able to perform? (Lewin 2021) ChatGPT thus "co-performs" (Kudina & Coeckelbergh 2021) and mediates normative and value-laden decisions and actions in close interaction with the prompting, supervising and modifying teacher. While reading synthetic text, the teacher must compare and evaluate the fit between, for instance, language level, word count, thematic suitability, etc., against prescriptions within the curriculum and her view on what should be expected from pupils. The point here is not primarily to evoke scenarios in which students encounter morally inappropriate content in exams or that they are overburdened without the teacher realizing it. Rather, the point is that this is a clear example or a door opener for semi-automation of educational perceptions and actions. Consequently, it is a question of which areas of application are affected, to what extent which tasks are delegated, how the supervision processes are organized, and, above all, which other forms of automation or AIED applications will be used in the future (Selwyn 2022). An appropriation perspective might prove

helpful to proactively explore in which ways future AIED systems may influence teachers' educative understandings.

4.6. What does this imply for conceiving of understanding responsibilities in the given context?

Having followed the course of understanding through the lemniscate, I will now focus on the understandings of ChatGPT-related responsibilities of teachers that emerged from this mediated process. For this, I return to the proposed working definition of understanding responsibility which I have broadly characterized as a process that involves agents' developing dispositions to both implicitly and explicitly identify and engage with value meanings in relation to ChatGPT-involving practices. I will now use this working definition as a soundboard to interpret their emergent understandings of ChatGPT-related responsibilities which I aim to render tangible through refinement of the definition. This aims at further developing our understanding of what it means to understand responsibilities in the given context.

The IPA-based appropriation study indicated that participants recognized ChatGPT-use as becoming part of their teaching responsibilities. The enactment of their ambitions of good teaching entails a flow of endeavors and obligations that is hard to meet under their conditions of practice. Against this backdrop, ChatGPT becomes meaningful as a time-saving assistant that enables teachers to work more efficiently but also to render time-consuming good teaching practices feasible. Moreover, they found or imagined ways to use ChatGPT to enable new teaching formats to engage their pupils and thus to stimulate their learning processes to greater extent. ChatGPT thereby becomes involved in their practices as an instrument to enact their responsibilities as teachers. A similar picture arises with regard to the perceived necessity to approach ChatGPT in a critical way. The teachers displayed awareness for potential flaws in ChatGPT's output and recognized the need for supervision and proofreading. It became clear that such complementary practices are conceived as responsibilities within ChatGPT-based teaching practices. Here, it seems that the supervision of ChatGPT is perceived as not fundamentally different from previous practices, for instance, critically reading textbooks or internet articles. In this sense, supervising ChatGPT appeared not a novel task for them but comparable to known forms of responsibility for ensuring the appropriateness of lesson materials. Their understanding of responsibility seems to remain stable in their perspective since ChatGPT-supervision requires them to respond and enact

the same didactical and moral values – like factuality, criticalness, engagement, appropriateness – as within already known teaching practices. In this sense, their perception of their responsibility seems to remain unchanged, in that the ends – contributing to the abstract purpose of guiding pupils towards independence – remain the same. From a top-down perspective, focusing on responsibility on an abstract level, there seems to be no need to revise the understanding of responsibility itself.

The focus here is rather on the development of practical agency in the sense that teachers need to adapt competences to the use of a new tool in order to continue to fulfil this responsibility. This corresponds with the frequent expressions of desire for further exchange and training to use ChatGPT and to teach about it in a more competent way. They referred, to varying degrees, to the desirability of developing their practical agency regarding ChatGPT-use. Even more pronounced was the shared wish for a development of projective agency, for instance, with respect to understanding the didactical potential of ChatGPT-use in classrooms, to conceptualizing its use and impact, and to teach pupils about how to use or when not to use. Especially those teachers who teach humanities have also expressed that they want to develop themselves to engage with the ethical and societal implications of ChatGPT and other AI technologies on a higher level. This highlights that concrete enactments of responsible teaching depend on factors like different subjects, age groups but also on different productive backgrounds of teachers. In this sense, the emergent understandings of the participants correlate both with the developmental dimension and the differentiation between responsibility as an entity and responsibility-meanings that emerge from concrete practices.

Another theme that provoked valuations regards the challenge of ChatGPT-use through pupils. A central issue for teachers is the possibility to use ChatGPT to generate essays and other text-based exercises and assignments. Here, the teachers responded to the policy instruction to detect and sanction cheating. These teaching responsibilities were perceived as familiar. Also, the participants expressed confidence to recognize ChatGPT-written text in contrast to their understanding of their pupils' written language competence. While it is important to acknowledge the risk for false positives (Farazouli et al. 2023; Fleckenstein et al. 2024), this also applies to the consideration of the specifics, such as the age of the pupils, their language skills, or the specifics of public schools. However, the difficulty to prove ChatGPT-use was perceived as a novel situation since ChatGPT's ability to generate new synthetic text precludes detection for now. This implies new and additional responsibilities for preventing cheating for teachers due to a lack of control over pupils. To

compensate the participants needed to apply their mediated understanding of ChatGPT-texts to pupils' text or hold oral interviews. While the responsibility to discourage cheating through pedagogical sanctions remains rather stable, it becomes apparent that ChatGPT is perceived as undermining the enactment of their responsibilities as teachers and requires new practices for enforcement or persuasion.

Moreover, pupils' usage and teachers' lack of control were also perceived as new challenges in their domain of responsibility. The participating teachers respond to concerns about potential dependencies and detrimental effects on pupils' development. The potential co-constitution of children and ChatGPT was recognized as a novel and dangerous development. The lack of control over ChatGPT-use was perceived as undermining their disposition to enact valued responsibilities. ChatGPT's presence and the constitution of pupils as suspect and teachers as inquisitors was experienced as a burden to trustful relations between pupils and teachers. Even more serious concerns were expressed about the impact on the development of pupils' independence. The interpretation has shown that the teachers' concerns are not only related to cheating, but to the undermining of the development of reading and text comprehension, creative activities, or writing skills. In this sense, the participants expressed that ChatGPT-use, and its presence can undermine their ability to enact responsibilities even though they perceived the issue. This coincides with the experienced lack of time and capacity that also points to the need to also conceive of the limitation of enacting their responsibilities. This yields important implications for revising the working definition.

It refers back to the relevance of the participants' experiences of a constant unfulfillment of their capacity to enact responsibilities. Given the experienced necessity to triage their responsibilities and the associated negative valuations it becomes tangible to what extent this time-saving capacity for text-based teaching tasks can become valuable for teachers. If they can save time through ChatGPT for indispensable tasks like exam preparation, then they have more time to engage in lesson preparation, pedagogical work, and other valued teaching actions. Such valuations were not only accompanied by critical practices such as monitoring the generated output but also by reflection on the limits of ongoing appropriation processes. Constrains of time and capacity budgets continued to limit engagement with ChatGPT and scarce opportunities for mutual exchange restrict collaborative engagement and reflection. In addition, participants expressed varying degrees of

confidence in experimenting with applications in the classroom. This is interesting because, on the one hand, such experiments provide experience of didactic effects that are relevant for teaching responsibilities. On the other hand, routinised ChatGPT-based workflows indicate how stable understandings can develop that may reduce sensitivity to critical aspects. Since ChatGPT is valued primarily as a time-saver in hectic everyday life, it becomes apparent that responsible use requires an ongoing realization of the limitations of one's own understanding. Thus, understanding of responsibilities with respect to ChatGPT is a continuous and gradual process. This yield risks for responsible ChatGPT-use *because* appropriation never fails (Kudina 2019, p. 87). If teachers skip the engagement with problematic aspects of ChatGPT-use or it remains too implicit, they may come to limited understandings of their responsibilities while using it which could nurture developing dependencies or growing reliance on ChatGPT not only by students but also by teachers. This implies that understanding responsibilities for ChatGPT also involves continuously revising the concrete limitations of one's understandings.

This also refers to the politization of ChatGPT-use by teachers. Based on reflection about why they use ChatGPT they identified their constantly experienced overload and stress as a systemic problem. This was related to the current approach to ChatGPT in policies and through the school management. This links to the super-ordinate theme of their expressed desire for more exchange, collaboration and training. This highlights that responsible use of ChatGPT in public schools requires support and is thus a political matter of priorization (Verbeek 2020) and agenda setting (Gudowsky et al. 2021). If societal stakeholders care about processes of understanding responsibilities for ChatGPT-use in public schools, this requires political support in terms of freeing up time and capacities to enable and stimulate shared processes of understanding that not only focus on the development of practical agency but also on projective forms of agency like empathy, anticipation, or imagination (Fesmire 2003; Bauer & Herrmann 2022). Consequently, understanding responsibilities also involves that agents become able to articulate concrete limitations and that there is responsiveness to such voices. The captured experiences of stress and overload but also of isolated teaching work and desire for more exchange point to the importance of more collaboration and constructive discussions amongst teachers. They also point to the responsibilities of political stakeholders who shape the working conditions of teachers. This implies that understanding responsibilities for ChatGPT-use is not reducible to the individual but involves collective and political processes.

The most salient limitation, however, concerns the lack of awareness regarding the mediation effects of their own agency. It became apparent in that ChatGPT's co-constitutive role was addressed with respect to pupils' usage but remained subconscious with respect to their own usage. The interpretation in the previous sections indicated how ChatGPT-use mediated teaching practices including perceptions and actions that are normatively salient. The analysis thereby indicates how responsible teaching practices become co-constituted. ChatGPT-use renders time-consuming responsibilities not only feasible but leads to the emergence of new co-constituted practices for which the responsibility distributions are philosophically debated (for different views: Hanson 2009; Coeckelbergh 2019; Tigard 2019; Köhler 2020). This indicates a potential disruption of what it means to be responsible as a teacher (Löhr 2023; Hopster et al. 2023). As argued within the second chapter (2.3.), this does not imply to conceive ChatGPT as a responsible agent, but highlights need for human 'becomings' to recognize this new co-constituted form of responsibility. Moreover, the practice-oriented view highlights the need to understand and engage with this technological transformation of the human condition on a practical level, that is, with respect to concrete sequences of co-constituted actions. The findings show that ChatGPT becomes in morally relevant teaching actions but also in what inconspicuous way. This suggests that the working hypothesis, from a technological mediation perspective (cf. Verbeek 2011, p. 87; Kudina 2019, p. 249) must be extended to involve a self-responsiveness for mediation effects on one's own perceptions, actions, and understandings.

5. Conclusion

5.1. Recapitulation and Findings

In this thesis, I explored how the participating teachers understand their responsibilities in relation to ChatGPT-use in public schools. The findings produced by the IPA-based methodology vindicate the plausibility that they do so through a continuous appropriation process that depends on their hermeneutic efforts, the relations towards their socio-cultural lifeworld, and the mediation through ChatGPT's presence and usage. I hypothesized that responsibility involves responding and acting according to values, and consequently, that 'understanding responsibilities' involves the development of dispositions for identifying value-meanings within ChatGPT-related practices. Based on the theoretical framework, these dispositions were addressed in terms of practical and

projective agency which depend on pre-understandings and personal histories. The emerging understandings supported the hypothesis of a development of dispositions by revealing different degrees of occupation and application, different degrees of agency and understanding; development and revisioning of meanings within the interviews; and articulations of personal and systemic limitations which were related to desires for exchange, training, and an improvement of their working conditions. Moreover, the interpretation motivated refinements of the hypothesis which direct attention from the agents-to-become-responsible towards their transforming conditions of practice. The study indicated the following key influences on understanding processes of teaching responsibilities for ChatGPT-use in public schools:

Shifting social relations: Understanding and enacting teaching responsibilities depends on social relations. ChatGPT-use in public schools influences those relations in ambivalent ways which in turn co-shapes understandings and enactments of responsibilities.

Conditions for collaboration: Hermeneutic processes seem to thrive through collaborative and constructive exchange with others. Divided approaches to ChatGPT and its involvement in ongoing debates about transformations of school systems and culture co-shape processes of understanding and enacting responsibilities in rather destructive ways.

Recognition of limits: Understandings and enactments of responsibilities face concrete limits within daily practice. While ChatGPT as a time-saver can push current limits of teaching responsibilities, situated working conditions and personal dispositions constrain developments and realizations of pedagogically and didactically responsible approaches. Also, we may reach limits for sense-making about co-constituted teaching practices through current understandings of responsibility. Awareness for personal, systemic and conceptual limitations in relation to ChatGPT co-shapes understandings and enactments of responsibilities.

Degrees of political support: Responsible approaches to ChatGPT require didactical and pedagogical engagement, but this demands time and capacity for training, preparation, and didactical and pedagogical engagements which is hardly available. This highlights the responsibilities of those who can influence these practical conditions and emphasizes the significance of societal recognition and political support for understanding and enacting responsibilities.

5.2. Methodological Reflections

The chosen approach provided a conceptual apparatus and concrete methodological requirements for the research design, interviews, and analysis. The production of the super-ordinate themes according to IPA implied a focus on experiences of teaching in public schools. This required treating technological mediations not as a starting point but to trace how technologies become entangled in human-world relations and processes of sensemaking. This was challenging at times because the focus set on the participants understandings of ChatGPT implied in the scope of the thesis a reduced treatment of ChatGPT's technical affordances. However, through the conversations and the iterative interpretative process, it became traceable how and why ChatGPT becomes embedded and 'fitted' into relations between teachers and their socio-cultural environment of public schools. The laborious engagement with the data thus rewards with empirically grounded insights into processes through which people understand technologies in their lifeworld. Future studies could strengthen the link between conversations about technologies and concrete interactions with them – provided that the technology is already usable as it is the case with ChatGPT – by involving them in the interviews to (re-)enact practices that complement the study.

In this thesis, I did not primarily aim to reveal instances of value-change, but to disclose hermeneutic processes through which the participants themselves make sense about ChatGPT-related responsibilities. I thus structured my interpretation according to the lemniscate to explicate the dynamics through which their understandings emerged at different stages. This allowed to target the research question through disclosure of the co-constitutive elements of responsibility-hermeneutics with a focus on the development of participants' dispositions and with the aim of substantiating relevant target dimensions for further engagements. Retrospectively, I recognize certain difficulties associated with this adaptation that could be addressed within future research. The open formulation of the question of the work has underestimated the richness and breadth of the produced value meanings. The data showed that identifying responsibilities is a complex process in which various valuations, idiosyncrasies, contextual elements, et cetera become interwoven. This made it difficult to represent and interpret the findings within the given scope. For future appropriation studies, a narrower question and hypothesis would be helpful in order to target, for instance, more specific phases, conditions, or values. Moreover, my aim was to understand development processes. Yet, I only conducted one interview per participant.

Consequently, developments had to be presented based on respective expressions and pre-understandings as well as development processes within the interviews. For further researching the dynamicity of meaning-making, iterative research designs would be desirable in which multiple interviews are conducted over longer periods of time to study shifts and developments of understandings (Smith et al. 2009, p. 202-204).

5.3. Adressing Societal Implications

I described, based on the hermeneutic efforts of teachers, how ChatGPT-use can co-shape understandings of responsibilities. Thus, I propose to conceive the 'understanding of responsibilities' in relation to ChatGPT-use as dynamic, transformative and open-ended processes in the course of which humans, technologies, our socio-cultural environments reciprocally change. This implies the social challenge of finding answers to the question of what we can do to understand and influence the future course of these processes in a responsible way. Based on the theme and insights of the thesis, I suggest that we direct attention towards processes and places where future understandings of responsibilities are shaped at scale, that is, towards public education. To make this concrete, through two critical themes, I will outline how future appropriation studies could accompany educational processes for the development of responsibility relations to ChatGPT and (AI) technologies in general.

First, the feasibility and effectiveness of educational policies must be critically accompanied. The underlying rationale is that transferring responsibilities for AI technologies to citizens is only meaningful – and politically legitimate – if the development of responsibilities is feasible for citizens (Stahl 2021, p. 87; Sirsch 2021) and if political measures effectively improve critical shortcomings. Policy guidelines and conceptual frameworks conceptualize different levels of digital competence for citizens. For illustration, the latest iteration of the DigComp added 73 examples for AI-related competences and included 34 of them within the framework – 25 of them concerned ethical issues, 13 were included in the DigComp (p. 77-83). This gives an impression about the substantial efforts for citizens to develop 'responsible' relations to AI technologies. Additionally, there are specific competence demands for educators (Redecker & Punie 2017) and ethical considerations regarding the application of AI in education (EC 2022). Yet, the results of this study demonstrated that there are concrete limitations to teachers' time and capacity for training and engagement with ChatGPT which plausibly extends to other emerging AI systems. This

indicates how IPA-based appropriation studies could empirically identify and/or test concrete "feasibility restrictions" (Sirsch 2021, p. 291).[2] For this, policy analyses could serve as a basis for the formulation of hypotheses and iterative studies could scrutinize the feasibility of competence prescriptions and relate it to the effectiveness of implemented political measures, educational approaches, institutional designs, et cetera. Furthermore, different educational systems and cultures could be compared in order to understand how certain cultural characteristics or socio-economic conditions affect understandings of responsibilities.

Secondly, we need to further explore how our relations to AI technologies like ChatGPT can be co-shaped in responsible ways. The appropriation approach allows to empirically trace how our perceptions, actions, and understandings become co-constituted. This can provide avenues to constructively address concerns about possible dependencies on AI technologies or detrimental influences on human development that concern societal and political stakeholders. For this, IPA-based appropriation studies could be combined with action research methodologies (Greenwood & Levin 2007) to explore how *active educational engagement*s with our co-constitution can influence understandings of responsibilities. This would imply that the researcher actively attempts to influence hermeneutic processes of educational stakeholders – teachers but also those who educate teachers – within AI-orientated practices and iteratively capture the development of understandings through the IPA-based methodology to evaluate impacts. Respective objectives would be defined with the participants. Iterative workshops or the creation of lesson series could provide platforms for such research approaches. The results of such experiments could not only be used scientifically but also be made available to educational practitioners. IPA-methodology could be implemented either by conducting interviews with the participants after the workshops or by employing a focus group research setup. Yet, this means substantial research efforts. Especially the latter option, as Smith et al. (2009, p. 199-201) emphasize, can be used for IPA studies but requires careful planning due to the scope of the study and the social dynamics of meaning making which are hard to foresee. On the other hand – given the apparent disagreements about ChatGPT-related responsibilities among teachers – it would also be interesting to study value-conflicts to elicit and trace explicit normative considerations (Wagemans 2023), and to inquire possibilities to move beyond "'agree-

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[2] There might be also potential to employ appropriation studies to scrutinize linguistic interventions in policy contexts by inquiring to what extent they can be understood and applied by relevant stakeholders (Löhr 2022; Queloz & Bieber 2022; Hopster & Maas 2023). Since such approaches would substantially differ from this study, I leave it to future research to evaluate the possibility and desirability of such research.

to-disagree' situations" (Popa et al. p. 729). The active interventions would not consist in steering debates in a preset direction but, for instance, in correcting contra-factual statements, selecting or adapting case studies, or preparing input sessions that provide information or visualize disagreements within previous sessions (Popa et al. 2020). Due to the implied effort, the need for critical reflection, and the transdisciplinary nature of such research projects, it seems advisable to conduct such IPA-based appropriation studies in transdisciplinary teams rather than alone.

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7. Appendix

7.1. Master Table

#	Theme	Analysis	English	German
1	Saving and consuming teachers' time: "I often reach my limits of time and capacity"	1. ChatGPT's ambivalent effects on teachers' time and capacities (I1-5) a. Experience of lack of time and capacity to enact perceived responsibilities i. Being teacher involves many obligations (I1-5) 1. In class teaching (I1-5) 2. communication to parents (I1,2,3) 3. conferences (I1,23,4,5) 4. break supervisions (I2,5) 5. permanent problem solving (I1-5) 6. very, very much pedagogical work (I1-5) 7. inclusion of children with special needs (I1,2,3,5) 8. Value of innovative teaching through stimulation of pupils' interest (I1-5) 9. Digital media and ChatGPT as innovative (I1-5) ii. Experience of unfeasibility responding to all perceived responsibilities 1. So many pupils (I1-5)	<u>I2 the lack of time and capacity to constantly realize good teaching as a systemic problem:</u> *Sandra:* Well, I do find it interesting, but in normal everyday life the workload is simply so high and my capacity to absorb knowledge is limited […] you have so, so many pupils and classes, and that's so exhausting, and then it's sometimes difficult to learn new things or engage with lesson preparation. It's just ... the way the school system is set up, it's just not possible. So, I wish I could do much better at innovative teaching, but I often come up against my limits in terms of time and resources ... it's just not possible. **Philipp**: When you say: "That's not how the school system is set up." [...] Can you take me with you into your experience of being a fulltime teacher? *Sandra*: [...] I'm usually at school from 8:00 to 15:00 and have ... ehm ... actually, I don't	*Sandra:* Also, ich finde es schon interessant, aber so im normalen Alltag ist einfach der Workload so hoch und auch meine Kapazität, Wissen aufzunehmen, nicht mehr so vorhanden […] also, man hat so, so viel mehr SchülerInnen und Klassen, und das ist so anstrengend, und dann ist es manchmal schwierig, noch neue Sachen zu lernen oder sich viel mit Unterrichtsvorbereitung auseinanderzusetzen. Das ist einfach ... so wie das Schulsystem aufgebaut ist, einfach nicht drin. Also ich wünschte, ich könnte viel besser innovativen Unterricht machen, aber ich stoße oft an meine Grenzen von Zeit und Ressourcen ... dass es einfach nicht so gehen. **Philipp:** Wenn du sagst „So ist das Schulsystem nicht aufgestellt." […] kannst du mich da nochmal in die Erfahrungswelt als Lehrerin in Vollzeit mitnehmen? *Sandra:* […] ich bin in der Regel von 8:00 bis 15:00 Uhr in der Schule und hab ... ehm ...

2. Not enough rest (I2,4,5) 3. Dissatisfaction with own performance (I2,3,4,5) 4. Experience of lack of time and capacity (I1-5) 5. Experience of infeasibility of responding to all perceived responsibilities (I1-5) 6. Has to triage responsibilities (x : I1-5) 7. Prioritization is at the expense of pupils (I1-5) 8. Glad to come home and able to regenerate (I2,4,5) iii. Triages of responsibilities as a systemic problem 1. Too many working hours (I1-5) 2. Not enough support and resources (I1-5) 3. Reference to outdated school system (I1,2,3,5) iv. Fulfilment of interpersonal and pedagogic work 1. Importance of building relationships (I1-5) 2. Caring about pupils' reactions (I1-5) 3. Interest for pupil's situation and needs (I1-5)	usually have a break, because there are also break supervisions, et cetera ... I'm happy when I eat something [laughs] ... or there's always a problem to sort out. There's a lot of organizational stuff going on.. on the side ... there's also very, very much pedagogical work at our school ... Conversations with parents ... and then you're glad when you're at home and can switch off a bit, and then I actually think it's a pity... So, for example, my lessons ... I'm never double-staffed, even though I have pupils with special needs. [...] if you are not so burdened then you'd have time after school to think of nice things to do in class. Because I do that ... I always focus on one course, one class in which I can do it, because otherwise there's not enough capacity. I think you would have to teach fewer lessons to guarantee that. I2 on relationships to pupils *Sandra:* Okay, they can always come to me, no matter what! […] they don't always have the best family circumstances and cannot approach everyone […]. I2 on ChatGPT as a motivating factor for pupils *Sandra:* […] because ChatGPT also fosters interest. That's positive, because working with digital media ... is also always a motivating factor for pupils […].	eigentlich in der Regel keine Pause, weil eben auch Pausen-Aufsichten mit reinkommen, et cetera ... ich bin froh, wenn ich mal was esse [lacht] ... oder es gibt immer irgendein Problem zu klären. Es ist super viel Organisatorisches, das noch nebenbei läuft ... an unserer Schule auch einfach sehr, sehr viel Erziehungsarbeit ... Gespräche mit Eltern ... und dann ist man froh, wenn man zuhause ist und ein bisschen abschalten kann, und dann finde ich es eigentlich schade ... Also zum Beispiel meinen Fächern ... ich bin nie doppelt besetzt, obwohl ich Schülerin habe mit Förderschwerpunkten. […] weil man nicht so doppelt belastet ist, dann hätte man nach der Schule auch noch einfach Zeit, sich im Unterricht wieder schöne Sachen zu überlegen. Weil ich mache das ... ich fokussiere mich dann immer so auf einen Kurs, auf eine Klasse, in der ich das gerade machen kann, weil sonst reicht die Kapazität nicht. Ich glaube, man müsste weniger Stunden unterrichten, um das zu gewährleisten. *Sandra:* „Okay, die können immer zu mir kommen, egal was ist [...] die haben auch nicht immer die besten familiären Verhältnisse und können nicht zu allen Leuten kommen […]. *Sandra:* […] weil ChatGPT also auch Interesse fördert. Das ist schon positiv, weil einfach mit digitalen Medien arbeiten ... ist für

	b. Overload as a political struggle (I1-5)
	
	   i. High workload
	      1. To many teachings hours (I1-5)
	      2. Lack of support: children with special needs (I1,2,3)
	      3. Working unpaid extra-hours as default (I1-5)
	
	   ii. Experience of continuous negative stress
	      1. Feels negative stress at the end of a working day (I2,5)
	      2. Feeling paralyzed (I2,5)
	      3. Shared experience with many colleagues (I1-5)
	      4. Feels very empty, emotionless, exhausted and tired (I5)
	      5. Experience of not being able to recover (I1,2,4,5)
	
	   iii. Risk of a vicious circle
	      1. Then usually he has to go back to work and prepare something (I1-5)
	      2. Having to deliver (I1-5)
	
	   iv. Lack of recognition: "can't see that from the outside"
	      1. Public not aware
	      2. No effective political representation: teachers unions
		<u>I5 on teachers' health as a political struggle</u>
		
		Nino: That is always the thing ... these hours that teachers work ... this high workload or this risk of burnout is also a result of that. You can't see that from the outside. The public is not so aware of it. There is a lot of criticism. So, the teachers' unions have been dealing with this for a long time and want to reduce the high workload and cut hours [...]. There's a lot of talk about ... ehm ... to introduce everyday assistants who can take over many administrative tasks from teachers […].
		
		Philipp: How does this … stress feel for you?
		
		Nino: [Sighs] Well... stress usually doesn't feel good. So, there is also positive stress. Positive stress is something that can motivate you and also, so to speak, again and again ... ehm ... ...to keep going. But unfortunately, there is also negative stress, and I notice it particularly when I come home at the end of the day and just lie paralyzed on the couch for two hours. Well, I've heard from many colleagues that they feel very [...] empty or even emotionless and exhausted and tired and could... so never really being able to fully recover. And that's something I also notice when I come home after a long day of lessons ... eh ... and then I'm exhausted, I just fall onto the couch and I'm really not able to
			SchülerInnen auch immer ein motivatorischer Faktor […].
			
			Nino: Das ist immer so ... diese Stunden, die Lehrkräfte ableisten ... diese hohe Arbeitsbelastung oder diese Burnout-Gefahr entsteht auch eben dadurch. Das sieht man von außen nicht. Die Öffentlichkeit ist sich dessen nicht so bewusst. Es gibt viel Kritik. Also, die Lehrergewerkschaften setzen sich damit schon länger auseinander und wollen eben die hohe Arbeitsbelastung senken und Stunden verringern [...] Es wird viel danach ... ehm ... gewünscht, so Alltags-Assistenten einzuführen, die eben viele Verwaltungsdinge übernehmen können von Lehrkräften [...].
			
			Philipp: Wie fühlt sich Stress für dich an?
			
			Nino: [Seufzt] Ja... Stress fühlt sich meistens nicht gut an. Also es gibt auch positiven Stress. Positiver Stress ist etwas, was einen motivieren kann und auch so quasi immer wieder ... ehm ... anheizt, auch weiterzumachen. Aber leider gibt es auch negativen Stress, und den merke ich besonders, wenn ich am Ende des Tages nach Hause komme und dann einfach nur zwei Stunden gelähmt auf der Couch liege. Also, das habe ich von vielen Kolleginnen und Kollegen gehört, dass sie sich sehr […] gefühlsleer oder eben emotionslos und erschöpft und müde und konnte... also niemals wirklich sich komplett erholen können. Und das ist etwas, wo ich dann auch merke, wenn ich nach Hause komme nach

	actively do things anymore, I can just passively let myself be entertained by something. Eh ... and then you usually must go back to work in the evening and sit down again to prepare something for the next day or something. So that's the thing for me... that's when I notice stress... or when it's... ehm ... it's about having to do things ... ehm ... to deliver ...	einem langen Unterrichtstag ... eh ... und dann erschöpft, einfach nur auf die Couch falle und dann wirklich nicht in der Lage bin, aktiv Dinge noch zu machen, sondern einfach mich passiv von irgendwas berieseln lassen kann, nur noch. Eh ... und dann muss man ja abends meistens auch nochmal ran und sich trotzdem nochmal hinsetzen, um irgendwas vorzubereiten für den nächsten Tag oder so. Also das ist für mich das.. da merke ich Stress... oder wenns ... ehm ... darum geht, dass man Dinge ... ehm ... abliefern muss ...

v.   ChatGPT-use to save time and capacity
    1. Reducing workload by means of assistants (I1-5)
    2. Desire to avoid triages for lesson preparation (I1,3,4,5)
    3. Time-consuming and prescribed tasks like exams and corrections (I1-5)
    4. ChatGPT saves time and capacity (I1-5)
    5. Hopeful perspective on ChatGPT (I1,3,4,5)
	<u>I3 on timesaving</u>
	
	Rea: Because it's often lacking ... [laughs] ... especially for lesson preparation. I have two correction subjects, so I often have a lot of corrections on my desk that need to be done [...] if something suffers, its somehow the preparation of lessons ... and ... ehm ... that's why it's somehow important to save time, because I mean ... correct faster ... I can't correct things on paper any faster. I now also do vocabulary tests online so that they are automatically corrected.
		Rea: Weils daran oftmals mangelt ... (lacht) ... gerade für die Unterrichtsvorbereitung. Also ich hab ja zwei Korrekturfächer, dementsprechend auch oft viele Korrekturen auf dem Tisch, die erledigt werden müssen ... [...] leidet irgendwie am meisten dann, wenn, die Unterrichtsvorbereitung ... und ... ehm ... deswegen ist es da irgendwie wichtig, Zeit zu sparen, weil ich meine ... schneller korrigieren ... also die Sachen auf Papier kann ich nicht schneller korrigieren. Vokabel-Tests mache ich inzwischen auch schon online, dass der automatisch korrigiert wird.

c. ChatGPT becomes practically meaningful as a timesaving teaching assistant (I1-5) i. Making things faster and easier: ChatGPT as a timesaver	<u>I4 on using ChatGPT for evaluation horizons to save time</u> *Rea:* I also use it a lot in Spanish for my expectation horizons. [laughs] So, when I then... I copy the newspaper article that I use for this	*Rea:* Ich benutze auch ganz viel in Spanisch für meine Erwartungshorizonte. (lacht) Also, wenn ich dann... dann kopiere ich den

1. Using ChatGPT to generate lesson exercises (I1,3,4) 2. Using it for expectation horizons (I1-5) 3. Insert texts and let summarize in bullet points (I1-5) 4. Spares capacities (I1-5) 5. Saves time (I1-5)	into it and say: "Please summarize it here in bullet points!" Ehm ... then my horizon of expectations is ... finished super quickly. Of course, I always check it again ... so I don't rely on it a hundred percent ... but that simply saves me the time of having to find formulations myself. If you then check the content again, then... then it works... so it's much quicker than writing it yourself...	Zeitungsartikel, den ich für die so nehme, da rein und sag: "Bitte hier in Stichpunkt zusammenfassen!" Ehm ... dann ist mein Erwartungshorizont ... superschnell fertig. Ich kontrolliere das natürlich immer nochmal ... also ich verlasse mich da nicht hundertprozentig drauf ... aber das erspart dann einfach die Zeit, selber irgendwie Formulierungen zu finden. Wenn man den Inhalt dann noch mal checkt, dann... dann geht das... also ist es schon deutlich schneller, als es selber zu... zu schreiben.

d. ChatGPT demands time for supervision (I1-5)
 	
    i. Need to supervise ChatGPT
      1. Output mostly perceived as correct and useful (I1-5)
      2. No experiences of ChatGPT generating un-factual or offensive output (I1-5)
      3. Experiences of dissatisfying content (I1,4,5)
      4. Emphasis on critical attitude (I1-5)
      5. Enactment through proofreading (I1-5)
      6. Enactment through re-prompting (I1,3,4)
      7. Enactment through manual adaptations (I2,4,5)
	<u>I4 on the workflow and need for supervision</u>
	
	Rea: Yes, so with the evaluation horizon... I copy the text in ... and say... for the first task ... is always a summary ... and that's why I then write ... well, that's the text in Spanish. Then I say: "Write me the summary in bullet points in German." And then I look at what kind of bullet points come out ... [laughs]. Most of the time ... so often, it's really quite good. Sometimes I think to myself: "Hm ... one or two aspects that I'd like to take into account when ..." I've already read the text before ... that I noticed is missing ... then I'll add it. But apart from that, I... I almost take it over from the... I copy everything over into my expectation horizon. Sometimes I make the wording a little shorter ... if it's too... formulated too extensively ... or I say again beforehand ... before I copy it ... like
		Rea: Ja, also beim Bewertungshorizont... ich kopiere den Text rein ... und sag... für die erste Aufgabe ... ist ja immer Zusammenfassung ... und deswegen schreibe ich dann ... also, der ist ja Spanisch dann der Text. Dann sage ich: "Schreib mir die Zusammenfassung in Stichpunkten auf Deutsch." Und dann gucke ich an, was für Stichpunkte bei rumkommen ... [lacht]. Meistens ist ... also oft, es ist wirklich schon ganz gut. Manchmal denke ich mir so: "Hm ... der eine oder andere Aspekt, den ich beim... ich habe den Text ja vorher schon gelesen ... der mir da aufgefallen ist, fehlt ... dann ergänze ich den noch. Aber ansonsten nehme ich... übernehme ich das eigentlich fast vom... also, ich kopiere dann einmal alles rüber in meinen Erwartungshorizont. Manchmal

		ii. Omissions of ChatGPT's technical features
		  1. Focus on the screen (I1-5)
		  2. No reflection of ChatGPT's technical design (I2,4)
		  3. No reflection in relation to concrete practices (I2,3,4)
			this: "Shorter bullet points!" [laughs] And ehm ... right then, I'm actually almost done with it. Then I move on to the second task. [laughs]	mache ich es vom Wortlaut noch ein bisschen kürzer ... wenn er mir zu... zu umfangreich formuliert ... oder ich sage dann auch vorher noch mal ... bevor ich es kopiere ... so: "Kürzere Stichpunkte!" [lacht] Und ehm ... genau dann, da bin ich eigentlich schon fast fertig damit. Dann geht es dann die zweite Aufgabe. [lacht]

		iii. Recognition of ChatGPT's influence on teaching practices
		  1. Experiences of ChatGPT generating output that does not fit to teaching practices (I1-5)
		  2. Experience of ChatGPT's output overchallenging pupils (I2,3,4)
		  3. Emphasis on heterogeneity and complexity of pupils needs (I1-5)
		  4. Relevance of understanding pupils and their needs (I1-5)
		  5. Perceived need to supervise and contribute real-world experiences regarding pupils' needs (I1,2)
		  6. Efforts in terms of time and capacity to mobilize ChatGPT's capabilities for didactic purposes (I1,2,3,5)
			<u>I2 on ChatGPT generating too demanding evaluation horizons</u>
			
			Sandra: Sometimes ... it's very detailed, which is basically a good thing, but I don't necessarily expect that from my students in the exam. [...] ChatGPT summarizes everything, so to speak, and I don't find some points so important. I then remove them."
			
			<u>I1 on ChatGPT's missing pupils</u>
			
			Martin: [...] what I really miss with ChatGPT [...] is ultimately the concrete situation ... so the whole thing [...] when I'm standing in class and have to teach the whole thing as a lesson. [...] I think what ChatGPT is missing, so to speak, are my pupils ... with their very special needs ... in order to refine the lessons, in order to meet all these needs ... they are so complex and so concrete and so interdependent [...].
				Sandra: Manchmal ... ist es sehr detailliert, was ja eigentlich gut ist, aber die Erwartung habe ich dann nicht unbedingt von meinen SchülerInnen in der Klausur. [...] ChatGPT fasst ja alles quasi zusammen und manche Punkte finde ich quasi nicht so wichtig. Die streiche ich dann raus.
				
				Martin: [...] was mir bei ChatGPT dann wirklich noch fehlt [...] ist letzten Endes, dass die wirklich die konkrete Situation … also das Ganze [...] wenn ich in der Klasse stehe und das Ganze als Unterricht runterreißen muss [...] ich glaub, ChatGPT fehlt da sozusagen fehlen da konkret meine Schülerinnen … mit ihren ganz besonderen Bedürfnissen … um Unterricht da zu verfeinern, um da diese ganzen Bedürfnisse … die sind so komplex und so konkret und so interdependent [...].

			I1 on efforts necessary for using ChatGPT	

		e. Demands on teachers' time and capacity through pupils' ChatGPT-use (I1-5)
		
		    i. Controlling pupil's use
		        1. Pupils use of ChatGPT for cheating demands time and capacity (I2,4,5)
		        2. Instructions transfer this load to teachers (I2,5)
		        3. Means more work for teachers (I1-5)
		
		    ii. Efforts to become competent to use ChatGPT for teaching
		        1. Feeling not prepared for ChatGPT (I2,5)
		        2. ChatGPT must be conceptualized (I2)
		        3. Old-fashioned school system is not ready for ChatGPT (I1-5)
			Martin: The thing is, it's often no less work than actually doing it yourself […].
			
			I2 on ChatGPT as an additional burden in face of the old-fashioned German school system
			
			Sandra: [...] and the instruction we then received from the head of the Oberstufe was: "Yes, if you suspect that it was written with ChatGPT, then you could invite the pupil again and ask them three or four questions about the work and then find out whether it was written with an AI or not." Which ultimately means more work for us, of course. [...] So for me it is ... or was ... or is it still all a bit new and fuzzy and somehow ... the ... still outweighs the ... well, what do you mean by negative ... but the critical things rather than the positives. Because I don't think the system is so ... it's also new and everything still must be conceptualized ... the exams and so on ... schools are simply still very old-fashioned in Germany.
				Martin: Der Witz ist ja, dass es häufig gar nicht weniger Arbeit ist als eigentliche Selbst-Machen […].
				
				Sandra: […] und die Anweisung, die wir dann von der Oberstufenleitung bekommen haben, war: "Ja, wenn ihr den Verdacht habt, dass es mit ChatGPT geschrieben wurde, dann könnte ihr den Schüler oder die Schülerin noch mal einladen und denen drei, vier Fragen zu der Arbeit stellen und dann eben so rausfinden, ob das mit einer KI geschrieben wurde oder nicht. […]Also für mich ist es ... oder war ... oder ist es immer noch alles so ein bisschen neu und schwammig und irgendwie ... bei mir überwiegen auch noch so ... die ... ja was heißt Negativen ... aber so die kritischen Sachen als die Positiven. Weil ich glaube, das System noch nicht so ... es ist ja auch neu und alles muss noch konzeptualisiert werden ... also die Prüfung und so ... Schule ist einfach noch sehr altmodisch in Deutschland.

2	Ambivalent effects on student independence: "To bridge gaps in	2. Ambivalent effects on student independence: "To bridge gaps in competence sometimes" (I1-5) a. Guiding pupils towards independence feels rewarding but challenging (I1-5) i. Working towards step by step towards independence	I3 on laying cobblestones for path-building **Patrick:** As a teacher, I do not have the opportunity to somehow ... eh ... to give them the complete principles, but I can lay individual	**Patrick:** Als Lehrperson habe ich nicht die Möglichkeit, irgendwie ... ehh ... denen die kompletten Grundsätze mitzugeben, aber ich

competence sometimes"		1. Teaching aims at enabling young people to become independent (I1,2,3,5) 2. Teachers can only stimulate this process (I1,3,5) 3. Learning processes develop step by step (I1-5) ii. Accompanying pupils' development towards independence 1. Positive attitude towards teaching profession (I1-5) 2. Fulfilment of companioning pupils (I1-5) 3. Helping children to discover the world (I1,3,5) 4. Educational objective: to become independent (I1-5) 5. Political objective: autonomous citizens (I3,5) 6. Relation to teaching subjects (I3,5) 7. Taking fears to make mistakes (I1-5) 8. Stimulating self-motivation (I1,2,3,5)	cobblestones where they then eventually build the path through their own experience and their lifeworld. I5 on the fulfilment to guide pupils towards independence *Nino:* I really like the work because you contribute to... ehm ... children and young people ... ehm ... to educate ... firstly ... of course ... but you're also a development companion ... I always like that a lot, so that gives me a lot in return ... Helping children and young people to discover the world for themselves and [...] to become independent, autonomous citizens ... within this society and ... ehm ... especially now specifically with the content of my subjects ... I find the combination very, very interesting ... so the work gives ... gives me a lot of enjoyment ... exactly. *Nino:* [...] hands over the rudder [...] takes the fear to make mistakes or simply to engage with something ... not just because you have to, but because you somehow manage to arouse or generate interest in what you want to convey [...].	kann so einzelne Pflastersteine legen, wo sie dann letztendlich durch ihre eigene Erfahrung und ihre Lebenswelt ... ehm ... den Weg bauen. *Nino:* Mir gefällt die Arbeit sehr, weil man dazu beiträgt ... ehm ... Kinder und Jugendliche ... ehm ... zu bilden ... erstens .. natürlich ... aber man ist auch so ein Entwicklungsbegleiter ... das mag ich immer sehr, also das gibt mir auch sehr viel zurück ... Kindern und Jugendlichen dabei zu helfen, die Welt für sich zu entdecken und […] eigenständige, autonome Bürgerinnen und Bürger zu werden ... innerhalb dieser Gesellschaft und ... ehm ... besonders auch jetzt speziell mit den Inhalten meiner Fächer ... finde ich das kombiniert sehr, sehr interessant ... also die Arbeit gibt... bereitet mir sehr viel Freude einfach ... genau. *Nino:* [...] das Ruder abzugeben [...] wenn man da den Schülerinnen und Schülern auch die Angst, Fehler zu machen oder sich einfach mal mit was auseinanderzusetzen ... nicht nur, weil man es muss, sondern wenn man es schafft, irgendwie ein Interesse für das, was man vermitteln möchte, zu wecken oder zu erzeugen [...].

iii. Challenging but rewarding task 1. Challenge of teaching is the reduce complex content according to specific needs (I1-5) 2. Requires deep engagement of teachers with the content (I1,3,5) 3. "Fillet it and package it into bite-sized pieces" (1,3,5) 4. Sense of self-efficiency (I1-5) 5. Risk of pupils not understanding tasks (I1,2,3)	I1 on the challenge of teaching *Martin*: [...] And I think the challenging thing about it, so to speak, is that you must transform or reduce complex subject content a lot to ... to ... transmit it. Which requires engaging with it so deeply that you can fillet it and package it into bite-sized pieces. And that, I think, is the professional requirement and then it is simply cool to work with kids. It's fun. You have a really great sense of self-efficacy, yes.	*Martin:* […] Das Herausfordernde dabei, dass man komplexe Fachinhalte sehr stark transformieren oder reduzieren muss um sie … um sie … also zu vermitteln. Was eigentlich voraussetzt, dass man sich selbst so tief auseinandergesetzt hat, dass man sie quasi wirklich so filetieren und in mundgerechte Stücke verpacken kann. Und das, finde ich, das ist der fachliche Anspruch und dann ist einfach das Arbeiten mit Kids ist einfach cool. Das macht Bock. Man hat total hohe Selbstwirksamkeits-Erlebnisse, ja.	
	Martin: […] which is completely foreign to them. So, they don't know where these tasks come from, don't know how to prepare for them and what, above all, the point of everything is."	*Martin:* […] die für sie komplett konstruktionsfremd ist. Also sie wissen überhaupt nicht, woher diese Aufgaben kommen, wissen überhaupt nicht, wie sie sich darauf vorbereiten sollen und was das davor alles überhaupt für einen Sinn hat.	
b. Different levels of independences and the problem of supporting all learning needs (I1-5) i. Heterogeneity of pupils in public schools 1. Cultural and linguistic background (I1,2,3,5) 2. Level of interest and motivation (I1,-5) 3. Level of ability (I1-5) 4. Level of external support (I2,3,5) 5. Access to technologies (I1-5)	I3 on the value of understanding pupils *Patrick*: Yes, first of all to know what ... ehm ... what is the background of my pupils anyway. Where do they come from? What languages do they speak? Which ... eh ... particular educational needs do they have? Ehm ... Do they have any other special needs? Firstly, this also helps me to plan my lessons well, because I can then respond to these different needs as well as possible, and [...] to pick up as many as possible.	*Patrick:* Ja, erst mal zu wissen, was ... ehm ... was ist überhaupt der Hintergrund von meinen Schülerinnen und Schülern. Wo kommen sie her? Welche Sprachen sprechen sie? Welche ... eh ... sonderpädagogischen Schwerpunkte haben sie? Ehm ... haben sie sonstige Bedarfe, die besonders sind? Das hilft mir erstens auch, gut im Unterricht zu planen, weil ich dann genau auf diese verschiedenen Bedürfnisse so gut wie möglich eingehen kann […] so viele wie möglich abhole.	

	c. ChatGPT-based personalization for addressing different needs (I1,3,4)
	
	    i. ChatGPT-based personalization
	      1. ChatGPT can modify texts depending on the skill level of courses (I1,3,4)
	      2. Different versions of lesson materials for different needs (I1,3,4)
	      3. Personalization as a time-consuming task (I3,4)
	      4. Importance of precise prompts for personalization (I4)
	
	    ii. ChatGPT-based teaching
	      1. Experience of ChatGPT as a support (I1,3,4,5)
	      2. ChatGPT-use for creative tasks (I1,3,4)
	      3. ChatGPT-use for text-comprehension (I1-5)
	      4. Need for critical supervision (I1,3,5)
	      5. Ensure that 'nuances' are right (I3,4)
	      6. Teachers focus their capacities and time on supervising the fittingness with pupils needs (I3,4)
	      7. Benefits lessons and pupils' learning (I1,3,4)
		<u>I4, I3 on the value of using ChatGPT for personalization</u>
		
		Rea: [… ChatGPT can] generate texts and you can even say what language level it should have ... so you can ... write down ... Level B2 or Level B1 ... depending on how advanced my course is ... and then he does it in simpler language ... or a bit more complicated ... and ... that ... ehm ... somehow it hadn't occurred to me before to type it in, and ... ehm ... when I saw it, it was like: "Oh great!" So instead of spending hours on... ... clicking through lots of pages to somehow find a suitable informative text with which we can practice reading comprehension, I'll just let one be written in the subject area ... at the level I need ... ehm ... in the word length ... (laughs) ... in the number of words I need. Ehm ... that's a real time-saver for sure!
		
		Patrick: It's certainly a support for me first and foremost. Ehm... I ... eh ... don't use the results without reflection. There's usually a bit of crap in there. You must take a look ... ehm ... that there ... eh ... the nuances are right. On the one hand, you definitely must improve it. The ... ehm ... exhausting work in which you must ... you must get creative yourself by somehow reading through newspaper articles to get the
			Rea: [… ChatGPT kann] Texte generieren und man kann ja sogar sagen, welche Sprachniveau das dann haben soll ... also man kann ... quasi hinschreiben ... Level B2 oder Level B1 ... je nachdem, wie weit mein Kurs auch ist ... und dann macht er das ja auch in einfachere Sprache ... oder eben etwas komplizierter ... und ... das ... ehm ... irgendwie bin ich vorher gar nicht auf die Idee gekommen, das mal halt einzutippen, und .. ehm ... als ich das dann gesehen habe, war das so richtig: "Ach super!" Bevor ich jetzt also wieder stundenlang mich auf... auf ganz vielen Seiten durchklicke, um irgendwie einen passenden Informationstext zu finden, mit dem wir Lese-Verstehen üben können, lasse ich mir doch einfach in dem Themenbereich einen schreiben ... auf dem Niveau, was ich brauche ... ehm ... in der Wortlänge ... [lacht] ... in der Wortzahl, die ich brauche. Ehm ... das ist ne richtige Zeit-Ersparnis auf jeden Fall!
			
			Patrick: Es ist für mich auf jeden Fall in erster Linie eine Stütze. Ehm... ich ... eh ... nutze die Ergebnisse nicht unreflektiert. Meistens steht da auch ein bisschen Mist drin. Da muss man schon mal reinschauen ... ehm ... dass da ... eh ... die Nuancen passen. Einerseits, man muss auf jeden Fall nachbessern ...die ... ehm ... anstrengende Arbeit, in der man sich selbst... selbst kreativ werden muss, indem man

			input, then somehow linking and putting it together and then creating a worksheet at the end. Ehm... there's no need for that and you can focus more on ... ehm ... the smaller adjustments, which in turn make a worksheet ... ehm ... that is even better adapted for my students in the end ... ehm ... yes.	irgendwie Zeitungsartikel durchlesen muss, um die Inputs zu bekommen, um das dann irgendwie das zu verknüpfen und zusammenzusetzen und am Ende dann ein Arbeitsblatt zu erstellen. Ehm... das fällt halt weg, und da kann man sich mehr darauf fokussieren, halt auf ... ehm ... die kleineren Stellschrauben, die wiederum so ein Arbeitsblatt ... ehm ... das noch besser angepasst für meine Schülerinnen und Schüler letztendlich ... ehm ... ja ist.
		iii. Risk of not being able to offer every pupil the same opportunities for gradual learning in school classes 1. Differentiation between ideal and feasible teaching (I1-5) 2. Need to adapt teaching to addresses (I1-5) 3. Problem if materials are not useful for pupils (I1,3,4) 4. Teaching fails if there is no engagement with pupils (I1,3) 5. Weaker pupils cannot follow (I1,3,4) 6. Stronger pupils remain underchallenged (I3,4) 7. More disruptions (I3)	**Philipp:** Why is it so important to personalize ... to adept? *Patrick:* Hmm... yes, teaching ideally ... unfortunately you can't do that ... always must adapt lessons to the ... ehm ... addressees. Ehm ... because teaching simply fails if you don't... engage with the pupils you have […] it can happen quite quickly, for example, that you create worksheets that are not at all useful for these pupils. Ehm... then various things can happen. You lose them ... ehm ... or they lose interest in the lesson itself. Eh ... the learning success is lower or in the end it can ultimately lead to more frequent disruptions.	**Philipp:** Warum ist es so wichtig, das zu personalisieren ... anzupassen? *Patrick:* Hmm... ja, Unterricht im Idealfall ... das schafft man leider nicht ... muss Unterricht immer an die ... ehm ... AdressatInnen angepasst werden. Ehm, weil einfach Unterricht fehlschlägt, wenn man nicht.. sich auf die Schülerinnen und Schüler einlässt, die man hat. […] kann es ziemlich schnell passieren, dass man zum Beispiel Arbeitsblätter erstellt, die für diese Schülerinnen und Schüler gar nicht gut verwertbar sind. Ehm. Dann können verschiedene Dinge passieren. Man verliert die ... ehm ... also beziehungsweise die verlieren das Interesse am Unterricht selbst. Eh ... der Lernerfolg ist geringer oder letztendlich sogar kann sogar dazu kommen, dass Störung einfach häufiger stattfinden.

		d. The ambivalence of ChatGPT bridging competence gaps (I1-5)
		
		  i. ChatGPT can help as a scaffold to bridge gaps in competence
		    1. Sometimes ChatGPT-use can maintain learning processes by preventing blockades due to overchallenging subtasks (I1-5)
		    2. Reference to text-simplification and personalization (I1,3,4)
			<u>I1 ChatGPT as a competence bridge</u>
			
			Martin: So ... hm to bridge gaps in competence sometimes, to use it as a kind of scaffold … text simplification ... so if a pupil has the feeling: "Wow, that text doesn't work for me at all." "Ok, let's have ChatGPT rewrite it."
				Martin: Also ... also ... hm Kompetenzlücken manchmal zu überbrücken, sie als so eine Art Scaffolds zu nehmen … Text-Vereinfachung ... also, wenn eine Schülerin oder ein Schüler das Gefühl hat: "Boah, der Text, der geht bei mir gar nicht rein." "Ok, lassen wir den von ChatGPT umschreiben."

		ii. Risk of skipping learning processes through ChatGPT-use
		    1. ChatGPT's capacity to bridge competence gaps can prevent learning (I1-5)
		    2. Skipping learning process (I1,2,3,5)
		    3. Appeal through short-term success (I1,2)
		    4. Risk for long-term development of pupils' independence (I1-5)
			<u>I1 on ChatGPT-use preventing pupils' development</u>
			
			Martin: So, they haven't developed their competencies with it [...] but they skip everything in this whole learning process and that might help them in the short term, as I said, because they can make a ... possibly a pretty good contribution when the homework is discussed with each other ... ehm ... but they have no learning progress ... no real ... no lasting progress.
				Martin: Also sie haben ihre Kompetenzen damit nicht ausgebaut [...] sondern das überspringen sie alles in diesen ganzen Lernprozess und das damit ist ihnen vielleicht kurzfristig geholfen, wie gesagt, weil sie einen … einen dann womöglich ganz guten Beitrag in leisten können, wenn die Hausaufgaben miteinander besprochen werden ... ehm ... aber sie haben keinen Lern-Zuwachs … keinen Wirklichen … keinen nachhaltigen.

		iii. Frustration and limitations for guiding pupils' ChatGPT-use
		    1. Feels sad because she wants to be perceived as approachable (I1,2,5)
		    2. Aims for trustful and honest relations (I1,2,3,5)
			<u>I2 on interrogating pupils</u>
			
			Sandra: I found it sad because I think ... so with the other students too ... yes, I think you can communicate that to me openly ... ehm ... I think that ... ... the person was afraid ... ehm ... then maybe also ... not necessarily failing but getting
				Sandra: Ich fands traurig, weil ich glaube ... also bei den anderen Schülern auch ... ja ich glaube, man kann mir das schon offen kommunizieren. Ehm... ich glaube, da hat dem ... bei der Person so die Angst mitgespielt.

		3. Empathetic approach to pupils (I1-5) 4. Frustration about climate of mistrust and suspicion (I2,4,5) 5. Prescribed and felt responsibility to prevent cheating (I2,4,5) 6. Need to interrogate due to difficulty to prove ChatGPT-use (I2,3, 7. Experience of feeling powerless	a bad grade for the essay. But then when I ... I asked twice and said: "You can tell me this openly. I don't think you wrote this on your own." Ehm... the person still didn't admit it to me... I felt a bit powerless in the end.	Ehm... dann vielleicht auch ... was heißt durchzufallen, aber eine schlechte Note für das Essay zu bekommen. Aber als ich dann ... ich hatte zweimal nachgefragt und hab gesagt: "Du kannst mir das auch offen kommunizieren. Ich glaube nicht, dass du das allein geschrieben hast." Ehm... die Person mir das trotzdem nicht zugegeben ... da hab ich mich auch ein bisschen machtlos gefühlt im Endeffekt.
		iv. Detecting ChatGPT-use through own use-experience 1. Describes own learning about the effects of precise prompts for generated output (I1-5) 2. Refers back to the situation of correcting essays and raised suspicion (I2) 3. Assumes that suspected pupil prompted in unprecise way (I2)	<u>I2 on detecting pupils' ChatGPT-use through own use-experiences</u> *Sandra:* Ehm ... I think, yes, the learning experience I've had is that it really ... very ... depends on how exactly or explicitly you ask ChatGPT ... in other words, what question you ask. I also noticed that in the student's corrections, because I think she put very open questions in there.	*Sandra:* Ehm ... ich glaube, ja, so die Lernerfahrung, die ich gemacht habe, ist, dass es echt ... sehr ... darauf ankommt, wie genau oder explizit man ChatGPT ... also welche Frage man stellt. Das hab ich auch so an Korrekturen von den der Schülerin gemerkt, weil ich glaube, die haben ganz offene Fragen da reingestellt.
3	Division among teachers and isolated approaches: "There needs to be more exchange"	Divisions among teachers and isolated approaches: "There needs to be more exchange" (I1-5) a. ChatGPT-use causes divides amongst teachers and it's a problem (I1-5) i. Need for more exchange 1. Difficulty to imagine how much support is possible (I2,4)	<u>I4 on problematic divides among teachers and need for exchange</u> *Rea:* Oh, that's difficult ... [laughs] ... because I don't know what is actually possible. But ... In any case, I think there needs to be more exchange [...] because ... if everyone does their own thing and some say: "Well ... somehow it's okay ... we use it this way." And others totally demonize it ... that would somehow be totally	*Rea:* Oh, das ist schwierig ... [lacht] ... weil ich ja gar nicht weiß, was dann noch alles so möglich ist. Aber ... auf jeden Fall finde ich, muss... da muss da mehr Austausch stattfinden […] weil ... wenn jetzt wieder jeder irgendwie sein eigenes Ding macht und die einen sagen: "Joa ... irgendwie ist okay ... wir benutzen das

	2. There needs to be more exchange (I1-5) 3. Everyone does her own thing (I1-5) 4. Some say its ok, some demonize it: divide (I1-5) 5. Totally confusing for pupils (I4) 6. Need for a common stance (I2,4) 7. Points that many teachers are not willing to engage with ChatGPT's benefits and risks (I1-5) 8. Thinks that this will take a long time (I1-5)	confusing for the pupils. That's why I think we should ... have a common stance. But I think that some colleagues just haven't really gotten the message yet ... and ehm ... that it will take a few more years ... [laughs].	so und so." Und andere verteufeln das total ... das wäre halt irgendwie für die Schüler wieder total verwirrend. Deswegen sollte man, finde ich, dass schon so bisschen ... eine gemeinsame Haltung dann auch zu haben. Aber ich glaube, dass es bei einigen Kollegen einfach noch gar nicht richtig angekommen ist ... und ehm ..dass das noch ein paar Jahre dauern wird ... [lacht].
	ii. A snippet of the divide: the unconstructive dynamics of exchange between different attitudes 1. Need to engage constructively engages with the problems (I1-5) 2. Involvement in controversies (I1) 3. If he makes an actual argument, they are stubborn and do not reply (I1) 4. Necessity will change the minds (I1,3) 5. Feeling not in a position to convince colleagues (I1,3,5) 6. But hopes that they will turn back to him (I1) 7. Thinks that this process will take a super long time (I1-5)	I1 on the course of controversies **Martin:** It was a kind of direct confrontation and you very, very quickly slip into the direction that the colleagues who find themselves in this situation right now, from which they cannot get out without having to make admissions or with work ... to get out of it with work. In other words, those who come to you constructively and say: "I'd like to learn something." It's cool with them anyway. The others, they usually don't come at all, but that manifests in discussion groups [...]with 10 to 40 people and you introduce ChatGPT and ... or alternative exam culture and in this context ChatGPT and the use of it. And then you get some stupid, snarky comments ... along the lines of: "Then we don't have to write any more or they won't write anything anyway, especially not by hand and especially not with a pen ... so with pen on paper ... and you think: "Wow, is it even worth it for me to go into this right now?"	**Martin:** War das direkt so eine Art fronten ist und du ganz, ganz schnell in die Richtung rutschst, dass die Kolleginnen und Kollegen, der sich jetzt gerade in dieser Situation ausgesetzt sehen, aus der sie nicht herauskommen, ohne Eingeständnisse machen zu müssen oder mit Arbeit ... mit Arbeit da rauszugehen. Das heißt, diejenigen, die konstruktiv zu einem kommen und sagen: "Ich hätte Bock mal was zu lernen." Mit denen ist sowieso cool. Die anderen, die kommen meistens gar nicht, sondern das äußert sich dann so Gesprächsrunden [...] mit 10 bis 40 Leuten und stellst ChatGPT vor und ... oder alternative Prüfungskultur und in diesem Rahmen ChatGPT und den Einsatz davon. Und dann kommen so blöde, bissige Kommentare ... so nach dem Motto: "Dann müssen wir jetzt gar nicht mehr schreiben oder die schreiben sowieso schon nichts mehr, vor allem nicht mit

	[...] But it also depends on who says it. I think that's really ... the necessity will change most people's minds [...].	der Hand und vor allem nicht mit dem Stift ... also mit Stift auf Papier ... und denkst dir: "Boah, ist mir das jetzt das gerade Wert überhaupt darauf einzugehen?" [...] Aber es kommt ja auch drauf an wer es sagt. Ich glaube, das ist wirklich ... die Notwendigkeit wird die meisten Leute umstimmen […].
iii. ChatGPT becomes involved in existing controversies 　1. Experiences serious mental problems for kids due to current exam culture (I1) 　2. Leads, in some cases, to abstinence from schools (I1) 　3. Motivates alternative exam formats (I1,3, 4) 　4. But also, annoyance from correction tasks (I1-5)	<u>I1 on the perils of the current exam culture</u> *Martin:* […] serious mental problems of kids, which then lead to abstinence from school [...].	*Martin:* […] krasse mentale Probleme von Kids, die gerade bei uns in der Schule dann auch zu Schul-Abstinenz führen […].
iv. Potential for constructive approaches 　1. Pupils handwrite a text in the GoodNotes application to foster handwriting skills (I1) 　2. Handwriting significant for pupils development (I1,2,5) 　3. Use the text-recognition function to convert handwriting to digital text to be insertable for ChatGPT (I1) 　4. He prescribes the prompt for ChatGPT to correct pupils' text (I1) 　5. Aims to not distort linguistic expression (I1)	<u>I1 on alternative correction workflows through ChatGPT</u> *Martin:* Because corrections get on my nerves ... I often use it to let students make their own corrections. [...] They write a text. For example, handwritten on GoodNotes. Then I let them convert it using this lasso function and then they push it into ChatGPT and then they write the correct text from ChatGPT ... so I give them the prompt on how they should do it so that the linguistic expression is not distorted, but really only deals with spelling, grammar, sentence structure and so on, and punctuation ... and then they should mark everything with a pen that ChatGPT has changed and somehow ... depending on what kind of text it was ... pick out five to ten mistakes, preferably of different	*Martin:* Weil mir Korrekturen tierisch auf den Keks gehen … benutze ich es ganz häufig, um damit SchülerInnen ihre eigenen Korrekturen anfertigen zu lassen. […] Sie schreiben einen Text. Beispielsweise handschriftlich bei GoodNotes. Dann lasse ich sie das über diese Lasso-Funktion umwandeln und dann schieben sie das bei ChatGPT rein und dann schreiben sie den korrekten Text von ChatGPT … also ich gebe ihnen den Prompt vor, wie sie das machen sollen, sodass auch der sprachliche Ausdruck nicht verfälscht wird, sondern wirklich nur um Rechtschreibung, Grammatik, Satzbau und so weiter geht, und Zeichensetzung … und dann sollen sie quasi alles mit dem Stift

		6. Pupils are instructed to pick mistakes marked by ChatGPT and reflect and identify mistakes (I1) 7. They get on a metalevel (I1) 8. Is spared by stupid corrections (I1) 9. Assumes that ChatGPT can do the job as well he can (I1)	types, and say what they did wrong, so to speak, what the rule would have been that they broke. Ehm ... so that they get to the meta level, so to speak, and ... ehm, exactly ... I'm spared this stupid correction work at the same time, which the bot can do just as well.	markieren, was ChatGPT verändert hat und sich irgendwie … je nachdem, was für ein Text es war … fünf bis zehn Fehler raussuchen, die möglichst unterschiedliche Typen haben, und sagen was sozusagen sie da falsch gemacht haben, was die Regel gewesen wäre, gegen die sie verstoßen haben. Ehm… sodass sie quasi auf die Metaebene kommen und … ehm, genau … mir gleichzeitig diese bescheuerte Korrekturarbeit erspart bleibt, die einfach der Bot einfach mindestens genauso gut kann.

		b. Desire for joint development of didactic know-how about ChatGPT within the collegium (I1-5)
		
		1. Desire for support
		  1. States that it would be nice and important to have internal training (I1-5)
		  2. Wishes that his school management takes to heart that ChatGPT's presence and usage is relevant (I2,3,4,5)
		  3. Points to need for self-development of teachers to able to teach pupils how to learn with ChatGPT (I2,4,5)
		
		2. Feeling unprepared for using ChatGPT
		  1. He wants the be prepared in lessons (I4,5)
		  2. Thus, he wants to prepare the application of ChatGPT in lessons thoroughly (I5)
		  3. He thinks he knows how to use
		  4. But not yet didactically: not the same (I1-5
			I5 on the need for training
			
			Nino: I think it would be very nice and important if we had internal school training on this ... that our school management takes this to heart, that it is relevant ... that it is important ... that we learn this so that we can also teach it and the pupils can learn with it.
			
			I5 on the value of preparedness for didactical usage
			
			Nino: [...] I ... ehm ... want to prepare thoroughly ... and as long as I haven't done that yet, I wouldn't want to just go into the situation like that ... eh ... when you plan lessons, you think about a learning objective, what you want to achieve at the end of the lesson ... ehm ... and I haven't used ChatGPT yet [in lessons]... so I think I know how to use it, definitely how to use it ... but I haven't thought about it so didactically
				Nino: Ich finde es sehr ... schön und wichtig, wenn wir schulinterne Fortbildungen dazu hätten ... dass unsere Schulleitung sich das ... ehm ... zu Herzen nimmt, dass das relevant ist ... dass das wichtig ist ... dass wir das lernen, damit wir das auch lehren können und die Schülerinnen Schülern damit lernen können.
				
				Nino: Weil ich ... ehm ...das gründlich vorbereiten möchte ... und solange ich das noch nicht gemacht habe, würde ich jetzt ungern einfach so in die Situation reingehen ... eh ... wenn man Unterricht plant, dann überlegt man sich ein Lernziel, was am Ende der Stunde am besten erreicht werden soll ... ehm ... und ich habe jetzt bisher noch nicht mich mit ChatGPT ... also ich glaube schon, dass ich

			yet ... so didactically integrated it in such a way that I can now use it in my teaching practice.	damit umzugehen weiß, auf jeden Fall, wie man es benutzt ... aber ich habe noch nicht so didaktisch dann gedacht ... also didaktisch das so eingebunden, dass ich das in der Unterrichtspraxis jetzt mitnehme

		3. Trial and error through chatting - outside of the collegium
		    1. Has difficulty to describe how he achieved the routines with ChatGPT
		    2. Describes it as trial and error
		    3. Tested different use cases
		    4. Refers to the recognition of the limitations of the model
		    5. That's how he differentiated what HE is able to do with ChatGPT
		    6. "Learning by doing"
		    7. Refers to inspirations on social media
		    8. Concludes by stating that ChatGPT feels "fairly intuitive anyway"
			<u>I1 on testing ChatGPT's limitations through experimentation</u>
			
			Martin: Boah, it's really hard to describe [...] I believe it's actually through trial and error, to see what ... Well, to see in different use cases: "How does ChatGPT react?" ChatGPT has already written solutions for me that I simply ... I just said: "Okay, he won't get it any better, I'll let it go now." Often creative products are like that. That's ... It just didn't meet my standards. He simply didn't improve the mistakes, even though I said: "Improve exactly this mistake!" He didn't do it. And then I thought to myself: "Ok, maybe it's me or maybe it's the prompts or maybe it's the limits of this AI." It was really learning by doing. Lots and lots of chatting with ChatGPT.
				Martin: Boah, das zu beschreiben ist echt schwer […] ich glaub, tatsächlich durch Ausprobieren, zu sehen … also in verschiedenen Anwendungsfällen zu sehen: „Wie reagiert ChatGPT?" ChatGPT hat schon Lösungen für mich geschrieben , die hab ich einfach … da hab ich einfach gesagt: „Okay, er kriegt das jetzt nicht besser hin. Ich lass es jetzt sein." Das sind dann häufig so Kreativ-Produkte. Das … das hat einfach meinen Ansprüchen nicht genügt. Er hat die Fehler einfach nicht verbessert, auch wenn ich gesagt habe: „Verbesser' genau diesen Fehler!" Hat er nicht gemacht. Und da dacht ich mir: „Ok, vielleicht liegts an mir oder vielleicht liegt es an den Prompts oder vielleicht sind das die Grenzen dieser KI." Learning by doing war das tatsächlich. Ganz ganz viel chatten mit ChatGPT.

		c. Exchange stimulates critical reflection 1. States that he must be aware that use of generative AI models is based on the achievement of others	<u>I3 on broaden one's horizon through exchange with different perspectives</u> *Patrick*: I have to become aware that ... ehm ... depending on how the data ... ehm. .... have been obtained, for example ... eh ... that it is based on the achievements and knowledge of	*Patrick:* Ich muss ja bewusstwerden, dass ... ehm ... je nachdem, wie die Daten ... ehm. .... bekommen worden sind, zum Beispiel ... eh ... dass es ja auf Leistung und Wissen anderer

2. Was not a focus earlier but now it became recently 3. He personally is in favor of open access to knowledge 4. But recognizes the legitimacy of other perspectives now 5. Refers to meeting a graphic designer in person: empathy 6. Describes his situation and approach 7. Thinks about the place of the designer in future society	others. Maybe it wasn't a big focus at the beginning, but now I think about it more often. [...] I personally have absolutely no problem with that ... I'm in favor of making knowledge accessible and without costs anyway. Ehm ... but I can imagine that people who are ... working on it ... eh ... see that as very problematic. For example, I've got to know someone […]. He's a graphic designer [...] and he'll probably lose the customers who don't value the quality of the results so much in the long term. And that somehow makes me think ... where I think to myself: 'Yes, that's right!'	beruht. Es war vielleicht am Anfang kein großer Fokus, aber jetzt mach ich mir auch öfters Gedanken. […] ich persönlich habe da absolut kein Problem dafür ... ich bin sowieso dafür, dass Wissen kostenlos zugängig gemacht werden müsste. Ehm ... aber ich kann mir vorstellen, dass Leute, die da ... daran arbeiten ... eh ... das sehr problematisch sehen. Ich habe zum Beispiel auch jetzt in Person kennengelernt […]. Der ist Grafikdesigner […] und wird wahrscheinlich die Kunden, die nicht so einen großen Wert auf die Qualität der Ergebnisse legen, dauerhaft verlieren. Und das macht mir halt auch irgendwie Gedanken ... wo ich mir denke: "Ja stimmt!

7.2. Production of Superordinate Themes

According to the IPA method (Smith et al. 2009, p. 79-82), there are six different ways to produce superordinate themes:

Abstraction	Synthesizes related emergent themes by giving them a new name that is supposed to represent them on a higher, more abstract level.
Subsumption	One emergent theme itself gains a superordinate status because it links other related themes together.
Polarization	While the last two analytical levers were aimed at commonality, polarization allows the production of a superordinate theme based on differences and oppositions between themes.
Contextualization	Focusses on temporal, cultural, or narrative themes that might be bound together by local experiences or significant events.
Numeration	Reflects the frequency with which experimental topics appear within the interviews.
Function	Accounts for particular functions of themes within the narratives of the participants.

An IPA-based appropriation study follows this analytical process (Kudina 2019, p. 124).

7.3. Interview Guides

German Version	English Version
1. Warum bist du Lehrerin geworden? Was war dein Antrieb?	1. Why did you become a teacher? What was your inspiration?
2. Was bedeutet es für dich eine gute Lehrerin für deine SchülerInnen zu sein? Wie setzt du das in der alltäglichen Praxis um?	2. What does it mean to you to be a good teacher for your pupils? How do you put this into your daily practice?
3. Kannst du dich an den Moment erinnern, als du das erste Mal ChatGPT ausprobiert hast? Wie würdest du die Erfahrung beschreiben, mit einem Chatbot zu kommunizieren?	3. Can you remember the moment when you tried ChatGPT for the first time? How would you describe the experience of communicating with a chatbot?
4. Wofür benutzt du Chatbots in der Unterrichtsvorbereitung? Warum macht es hier für dich Sinn Chatbots nutzen?	4. For what do you use chatbots in lesson preparation? Why does it make sense for you to use chatbots here?
5. Hast du das Gefühl, den Output von ChatGPT kontrollieren zu können?	5. Do you feel in control of the output of ChatGPT?
6. Denkst du, dass deine SchülerInnen Chatbots nutzen? Wie hast du reagiert?	6. Do you think your students use chatbots? How did you react?
7. Wie könnten Chatbots die Lebenswelt deiner SchülerInnen verändern?	7. How could chatbots influence your students' lives?
8. Wie möchtest du die Art und Weise, wie deine SchülerInnen mit Chatbots umgehen, beeinflussen? Wie sollen sie Chatbots auf keinen Fall benutzen? Welche Anwendungen siehst du positiv?	8. How would you like to influence the way your students handle chatbots? How should they not use chatbots under any circumstances? Which applications are positive in your view?
9. Hast du Chatbots während des Unterrichts benutzt? Wofür?/Warum nicht?	9. Have you used chatbots during lessons? For what/why not?
10. Hast du vor, Chatbots (ggf. weiterhin) explizit zu einem Gegenstand in deinem Unterricht zu machen? Warum? Warum nicht?	10. Do you intend to make chatbots an explicit subject in your lessons (or continue to do so)? Why/Why not?
11. Hat sich die Art und Weise, wie du mit Chatbots umgehst, über die Zeit verändert?	11. Has the way in which you engage with chatbots changed over time?
12. Gab es Situationen in der Schule, in denen du mit anderen Menschen über die Nutzung von Chatbots gesprochen hast? Mit wem? Worüber?	12. Were there situations at school where you discussed the use of chatbots with other people? With whom? About what?
13. Hast du die öffentlichen Diskussionen um ChatGPT in der Schule verfolgt? Was hältst du davon?	13. Have you followed the public discussions about ChatGPT at school? How do you feel about it?
14. Was sind deine Erfahrungen mit Anweisungen „von oben" zum Umgang mit ChatGPT? Hat sich dieser Rahmen über die Zeit verändert?	14. What are your experiences with instructions "from above" on how to deal with ChatGPT? Has this framework changed over time?
15. Wie sollte sich der Umgang mit ChatGPT in deiner Schule verändern? Auf welche Weise würdest du gerne unterstützt werden?	15. How should the ways of engaging with ChatGPT change in your school? How would you like to be supported?

The following table shows the compilation of Patrick's transcript based on the questions that were included in the first or second interview:

Patrick 1st interview	Patrick 2nd interview
1. Why did you become a teacher? What was your inspiration?	
	2. What does it mean to you to be a good teacher for your pupils? How do you put this into your daily practice?
	3. Can you remember the moment when you tried ChatGPT for the first time? How would you describe the experience of communicating with a chatbot?
	4. For what do you use chatbots in lesson preparation? Why does it make sense for you to use chatbots here?
	5. Do you feel in control of the output of ChatGPT?
6. Do you think your students use chatbots? How did you react?	
	7. How could chatbots influence your students' lives?
	8. How would you like to influence the way your students handle chatbots? How should they not use chatbots under any circumstances? Which applications are positive in your view?
	9. Have you used chatbots during lessons? For what/why not?
	10. Do you intend to make chatbots an explicit subject in your lessons (or continue to do so)? Why/Why not?
	11. Has the way in which you engage with chatbots changed over time?
12. Were there situations at school where you discussed the use of chatbots with other people? With whom? About what?	
13. Have you followed the public discussions about ChatGPT at school? How do you feel about it?	
	14. What are your experiences with instructions "from above" on how to deal with ChatGPT? Has this framework changed over time?
	15. How should the ways of engaging with ChatGPT change in your school? How would you like to be supported?

7.4. Information Sheet

7.4.1. English Version

<u>Information Sheet</u>

Before agreeing to participate in the interview, it is **important that you read** the following explanation of this study. You (a participant) will be given a copy of this information sheet.

Title of research: A in-person interview about teacher's understanding with respect to their active responsibility in the light of the presence of AI chatbots in education, in the context of a thesis project on the moral mediation of educational technologies

Researcher: Philipp Greinacher, PSTS (Philosophy of Science, Technology and Society) student, University of Twente, NL

Purpose of the research:

The purpose of the interview is to understand how teachers interpret their active responsibility with respect to presence of AI chatbots (e.g. ChatGPT) in educational contexts, encouraging them to reflect on their active responsibility within this technological transformation and to articulate their perspective, evaluations, and attitudes.

Explanation of procedure:

You will be invited to answer a series of questions explaining your understandings and views about your responsibility as a teacher in the light of the usage of AI chatbots in education. The estimated duration of the interview ranges from one to one and a half hours, depending on the course of the conversation. The interview may be followed by further interviews to explore the issue in greater depth. The researcher will audio record the conversation in order to have a detailed recollection of the conversation for further analysis. The audio record will be later transcribed for subsequent analysis.

Risks of participating:

Participation in the interview is safe for the participants. By participating in this study, you do not undergo specific risks, and there are no side effects reported. The research project has been reviewed and approved by the BMS Ethics Committee (Humanities & Social Sciences).

Confidentiality and Data Management:

The interview will be audio-recorded and later transcribed and analysed to understand how teachers interpret their active responsibility with respect to presence of AI chatbots (e.g. ChatGPT) in educational contexts. Any personal data, such as names and identities will be anonymized to ensure that anonymized data cannot be linked back to you. Processing and storing of the data will be handled in accordance with the 2016 European Union General Data Protection Regulation. Only the researcher (Philipp Greinacher) will have access to the raw interview data (audio recording and original transcripts). The anonymized data (e.g., quotes from the interview) may be used for research and publications.

Procedures for withdrawal from the study:

Taking part in the interview is voluntary. You are free to withdraw consent and discontinue the interview or complete retrieval of your data at any time, without prejudice from the researcher.

Retention period:

The raw data (audio recording and original transcripts) will be stored for 10 years on the private secure servers of the University of Twente in the Netherlands, with double password access, available only to the researcher.

Contact information:

Any questions concerning the research and the interview and/or in the case of issues due to the research can be directed to the researcher, Philipp Greinacher, either in person or via p.greinacher@student.utwente.nl

If you wish to receive a copy of the interview transcript, please, let Philipp Greinacher know, and he will provide it as soon as it is ready.

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, file a complaint, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee/domain Humanities & Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl

7.4.2. German Version

Informationsblatt

Bevor Sie sich zur Teilnahme an dem Interview bereit erklären, ist es wichtig, dass Sie die folgenden Informationen zu dieser Studie sorgfältig lesen. Sie (als teilnehmende Person) erhalten eine Kopie dieses Informationsblatts.

Titel der Untersuchung: Interview mit LehrerInnen zu Ihrer Verantwortung im Kontext der Präsenz von KI-Chatbots in Bildungseinrichtungen, im Rahmen eines Thesis-Projekts über die moralische Mediation von Technologien

Forscher: Philipp Greinacher, PSTS (Philosophie der Wissenschaft, Technologie und Gesellschaft) Student, Universität Twente, NL

Ziel der Forschung:

Ziel des Interviews ist es, zu verstehen, wie LehrerInnen ihre aktive Verantwortung in Bezug auf die Präsenz von KI-Chatbots (z.B. ChatGPT) in Bildungskontexten interpretieren. Sie sollen dazu angeregt werden, über ihre aktive Verantwortung innerhalb dieser technologischen Transformation nachzudenken und ihre Perspektive, Beurteilungen und Haltungen zu äußern.

Beschreibung des Ablaufs:

Sie sind eingeladen, eine Reihe von Fragen zu Ihrer Interpretation der Verantwortung von LehrerInnen in Zeiten von KI-Chatbots zu beantworten. Die geschätzte Dauer des Gesprächs liegt zwischen einer und eineinhalb Stunden, je nach Verlauf des Gesprächs. An das Interview können sich weitere Gespräche anschließen, um das Thema zu vertiefen. Der Forschende wird das Gespräch aufzeichnen, um für die weitere Analyse auf eine umfassende Dokumentation des Gesprächs zurückgreifen zu können.

Risiken der Teilnahme:

Die Teilnahme an der Befragung ist für die Teilnehmer sicher. Durch die Teilnahme an dieser Studie gehen Sie keine besonderen Risiken ein, und es sind keine Nebenwirkungen bekannt. Das Forschungsprojekt wurde von der BMS-Ethikkommission (Geistes- und Sozialwissenschaften) geprüft und befürwortet.

Vertraulichkeit und Datenmanagement:

Das Interview wird aufgezeichnet und später transkribiert und analysiert, um zu verstehen, wie Lehrkräfte ihre aktive Verantwortung in Bezug auf die Präsenz von KI-Chatbots (z. B. ChatGPT) in Bildungskontexten interpretieren. Alle persönlichen Daten, wie Namen und Identitäten, werden anonymisiert, um sicherzustellen, dass keine Rückschlüsse auf Sie gezogen werden können. Die Verarbeitung und Speicherung der Daten erfolgt in Übereinstimmung mit der Allgemeinen Datenschutzverordnung der Europäischen Union von 2016. Nur der Forscher (Philipp Greinacher) hat Zugang zu den Original-Interviewdaten (Audioaufnahmen und Original-Transkripte). Die anonymisierten Daten (z. B. Zitate aus dem Interview) können für Forschungszwecke und Veröffentlichungen verwendet werden.

Vorgehensweise beim Ausstieg aus der Studie:

Die Teilnahme an der Befragung ist freiwillig. Es steht Ihnen frei, Ihr Einverständnis zurückzuziehen und das Interview abzubrechen bzw. die Daten vollständig abzurufen, ohne dass Ihnen seitens des Forschers irgendwelche Nachteile entstehen.

Aufbewahrungsfrist:

Die Rohdaten (Audioaufnahmen und Originaltranskripte) werden 10 Jahre lang auf den privaten, sicheren Servern der Universität Twente in den Niederlanden aufbewahrt, mit doppeltem Passwortzugang, zu dem nur der Forscher Zugang hat.

Kontaktinformationen:

Bei Fragen zur Forschung und zum Interview und/oder bei Problemen im Zusammenhang mit der Forschung kann der Forscher, Philipp Greinacher, entweder persönlich oder über p.greinacher@student.utwente.nl kontaktiert werden.

Wenn Sie eine Kopie des Interviewprotokolls wünschen, teilen Sie dies bitte Philipp Greinacher mit, der es Ihnen zur Verfügung stellen wird, sobald es fertig ist.

Wenn Sie Fragen zu Ihren Rechten als Studienteilnehmer haben, Informationen einholen, Fragen stellen, eine Beschwerde einreichen oder Bedenken zu dieser Studie mit einer anderen Person als dem/den Forscher(n) besprechen möchten, wenden Sie sich bitte an das Sekretariat der Ethikkommission/des Fachbereichs Geistes- und Sozialwissenschaften der Fakultät für Verhaltens-, Management- und Sozialwissenschaften der Universität Twente unter ethicscommitteehss@utwente.nl

7.5. Informed Consent

Consent Form for an interview on teachers' responsibility in the light of the presence of AI chatbots in education

YOU WILL BE GIVEN A COPY OF THIS INFORMED CONSENT FORM

Please tick the appropriate boxes	Yes	No
Taking part in the study		
I have read and understood the study information dated _____ , or it has been read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.	□	□
I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason.	□	□
I understand that taking part in the study involves being interviewed on a series of questions explaining your understandings and views about your responsibility as a teacher in the light of the usage of AI chatbots in education. The researcher will audio record and later transcribe the conversation in order to have a detailed recollection of the conversation for further analysis.	□	□
Use of the information in the study		
I understand that the information I provide will be used for research in the context of the thesis project. The audio recordings will be transcribed and analysed to understand how teachers interpret their active responsibility with respect to presence of AI chatbots (e.g. ChatGPT) in educational contexts. The anonymized data (e.g., quotes from the interview) will be used for research and the publication of the thesis project.	□	□
I understand that personal information collected about me that can identify me, such as my name, address, age, or place of work will not be shared beyond the study team.	□	□
I agree that my information can be quoted in research outputs in anonymised form.		
	□	□
Consent to be audio recorded		
I agree to be audio recorded.	□	□

Signatures

_____   _____.   _____

Name of participant [printed]   Signature   Date

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

_____.   _____   _____

Researcher name [printed]   Signature   Date

Study contact details for further information:

Philipp Greinacher

p.greinacher@student.utwente.nl

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee/domain Humanities & Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl.