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RECEIVED 13 December 2025

REVISED 30 January 2026

ACCEPTED 12 February 2026

PUBLISHED 13 March 2026

CITATION

Brynildsen S (2026) Who – or what – is writing now? Exploring upper secondary students' chatbot-mediated writing practices.

Front. Educ. 11:1767132.

doi: 10.3389/feduc.2026.1767132

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Who – or what – is writing now? Exploring upper secondary students' chatbot-mediated writing practices

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This study explores how upper secondary students in Norway use conversational chatbots when writing essays in authentic classroom settings. Drawing on socio-cultural perspectives of writing as mediated action, the research examines how chatbots function as mediational tools and how students negotiate and navigate their affordances. Video data from ten students and their two teachers were analyzed through thematic and narrative analysis, resulting in four key themes: (1) variations of integrating generated text, (2) getting chatbot feedback, (3) navigating academic integrity, and (4) outsourcing and humanizing the writing work. To visualize the complexity of these processes, the study introduces thematic timelines which map students' writing trajectories sequentially, temporally and thematically. All together findings reveal that chatbot-mediated writing is neither uniform nor routinized as students display diverse practices, from deliberate appropriation of generated content to outsourcing the writing to the generative AI tools. These practices challenge established notions of authorship, academic integrity, and writing instruction but also introduce new forms of student agency. Findings have implications for teachers, teacher educators, policymakers, educational researchers and other stakeholders invested in the emerging writing practices in the age of generative AI.

KEYWORDS

chatbot-mediated writing, chatbots, generative AI, K-12 education, upper secondary school, writing instruction, writing process

1 Introduction

This study examines how upper secondary students use conversational chatbots when writing essays in authentic classroom environments. It contributes empirically and methodologically to research on writing with generative artificial intelligence (AI) and provides insights into how these emerging practices challenge and reshape prevailing conceptions of writing in education. Although the evolution of writing tools has always changed writing practices and instruction (Bazerman and Applebee, 2018; Graham, 2022), the introduction of chatbots has really “rocked the writing world” (Bueie et al., 2025, p. 2). This makes it necessary for research to help untangle what writing is when human and algorithmic voices intertwine.

Conversational chatbots, like ChatGPT, are trained on extensive corpora of human-produced language and built to generate human-like texts, based on our input, in a way that feels authentic (Lin et al., 2023; Lo, 2023). Such chatbots are already a major part of young people's lives at school and in their spare time (Holm et al., 2025; Madden et al., 2024; Statistics Norway,

2025). Their text-generating abilities have so far raised many debates among teachers, teacher educators, and scholars. Some argue that chatbot use only leads to cheating (Ulvestad, 2025; Walsh, 2025) or that we risk losing our abilities to think and reflect (Selås, 2025). Others uphold that we must guide students to use it responsibly (Furze, 2023) and point out the opportunities of using chatbots as collaborators in the writing process (Seligmann et al., 2025). To move away from debates and make solid judgements about supporting students' writing, we need empirical studies to understand what writing with this new technology entails. This necessitates looking at the chatbot-mediated writing practices students are already engaging in at school.

Writing is a central competence and basic skill. In Norway, all subject teachers are responsible for teaching writing, however the study is set within the Norwegian subject because it has a particular responsibility for fostering students' writing skills (Directorate for Education and Training, 2020). Writing not only involves mastering formal writing skills, but also developing students' subject knowledge, learning, thinking and a personal voice, which ultimately lead them to participate in work and society (Directorate for Education and Training, 2020).

To gain knowledge of the phenomenon this research is guided by the following question: *How do upper secondary students use chatbots when writing essays in the Norwegian subject?*

The study builds on video recordings of ten students and analysis draw on the thematic and narrative analysis approach (Letnes, 2025). It investigates how students employ chatbots as mediational means and how this shapes their writing. Grounded in sociocultural perspectives (Vygotsky, 1978; Wertsch, 1998), it maps out students' chatbot-mediated writing practices by searching for patterns of use and variations within these patterns.

2 State of the art

2.1 Process-oriented views of writing

Writing research has over the last fifty-plus years conceptualized writing processes in a variety of ways, from being directed at the individual student's writing to social aspects and reflecting shifts in theoretical and pedagogical orientations (Dysthe et al., 1993). Early process-oriented approaches emphasized writing as a movement between prewriting, writing, and rewriting. This included foregrounding writing as exploratory, iterative, and shaped through drafting and revision (see, e.g., Elbow, 1973; Murray, 1985). Also, an interest in studying writing as it unfolds in practice, not just finished products, was established (see, e.g., Emig, 1971). Cognitive models, such as the seminal work of Flower and Hayes (1981), further developed process thinking by conceptualizing writing as a recursive problem-solving activity involving stages of planning, translating, and reviewing.

Subsequent writing research has increasingly emphasized the social, dialogic, and institutional dimensions of writing processes. In Nordic contexts, sociocultural traditions are dominant, and scholars often build on these perspectives to explore writing as emerging in the interplay between individual, society, and culture (Bremholm et al., 2022; Smidt, 2012). Scholars such as Dysthe et al. (1993) have conceptualized process-oriented writing as an unfolding, dialogic classroom practice shaped by interaction, cycles of writing, feedback, rewriting,

and evaluation with peers and under teacher guidance. Similarly, the *Wheel of Writing* model (Berge et al., 2016) conceptualizes writing as a purposeful meaning-making activity that is always mediated by the use of semiotic tools. Mediation involves both linguistic and textual resources as well as the writing tools and technologies employed in the act of writing (Berge et al., 2016).

Across these perspectives, there is a shared interest in understanding how texts are produced through processes. At the same time, the ways in which specific writing technologies actively mediate and reorganize these processes have received comparatively less analytical attention. Building on this, the present study approaches writing as a process but foregrounds mediation as the primary analytical focus. This becomes especially salient with the introduction of new and potentially transformative writing technologies like generative AI.

2.2 Research on writing with chatbots

Research on writing with chatbots has expanded in recent years but remains limited (Bueie et al., 2025; Li et al., 2025). In the review for this study, several scholarly databases (ERIC, Scopus, Google Scholar) were consulted to identify literature related to school-aged students and contexts, that included qualitative observational or video-based studies. Only a very small number were identified. This echoes research concluding that the majority of existing empirical studies are from higher education (HE) and include interview and survey data that explores students' perceptions (see, e.g., Albadarin et al., 2024; Bueie et al., 2025; Li et al., 2025).

However, one identified study, even if set in HE, is Guo et al. (2024). They investigated university students' use of a specialized chatbot for writing argumentative essays. By analyzing screen recordings and texts they found that the students formed a co-writing partnership with the technology. While the chatbots scaffolded the writing process, students also had to rely on other resources to complete their texts revealing the complex interplay between the students, chatbots and other tools when writing (Guo et al., 2024). Similarly, Svenlin (2025) focused on the complex relationship between humans and tools, but in a completely different genre. She recorded upper secondary students' collaborative scriptwriting in a musical project, arguing that students worked together with various technology, including chatbots, to write scripts. Findings showed that the digital resources supported creativity but also slowed down processes when ideas had to be converted into texts (Svenlin, 2025).

Finally, Levine et al. (2024) recorded high school students' screens to explore their use of ChatGPT in an after-school writing session. Focusing on when and how chatbots were used in the writing process, they found that students primarily used the chatbot for planning and idea generation (Levine et al., 2024). They also found that students rarely copied text or adopted ChatGPT's exact language during these phases, however when revising students mostly accepted the chatbot's edits without critical evaluation (Levine et al., 2024).

Together, these studies provide valuable knowledge of students' engagement with chatbots, but they are few and out of traditional school writing contexts. To paint a broader picture of existing research on students' writing with chatbots, I therefore turn to research focusing on student perspectives. Although actions and perceptions do not always align, students' beliefs about AI also shape their use of chatbots (Bueie et al., 2025).

Existing studies often identify a mix of perceived benefits and concerns among students. Students see benefits for language and writing

support, as well as easy access to information, but also express worries about academic integrity, plagiarism, trustworthiness or becoming overdependent (see, e.g., Boillos and Idoiaga, 2025; Zhao et al., 2024). Many attribute these worries to lacking instructions on how to use generative AI responsibly and call for clearer guidelines (Barrett and Pack, 2023; Yan, 2023).

Students report using chatbots in very individual ways and as one of several tools (Wang et al., 2024). Some value chatbots in early stages of writing but think it is less acceptable for revising or use to automatically produce full texts (Barrett and Pack, 2023). Some students criticize the chatbots' generic tone and want to maintain their own voices (Wang et al., 2024; Zhao et al., 2024), while others are tempted to automate the writing process (see, e.g., Yan, 2023).

Hutson et al. (2024) documented how university students gradually shifted from mistrusting the technology to practically integrating chatbots in their writing. A contrast, and rare example reflecting school-aged students' beliefs, is Bueie et al.'s (2025) large-scale Norwegian study of upper secondary students. They observed a marked increase in chatbot use from 2023 to 2024, but also a continued and growing concern among students to use chatbots in writing, connected to accuracy, academic value and ethical use (Bueie et al., 2025).

In sum, existing research is dominated by HE contexts exploring students' perceptions. Studies on actual use based on video data are scarce and involve specialized chatbots or out-of-school contexts. Thus, we know little about how school-aged students engage with chatbots during authentic classroom writing tasks, which is arguably where they spend most of their writing training. Addressing this gap requires observational approaches that capture the complexity and variations of students' practices. This research responds to such needs by analyzing video data of upper secondary students' chatbot-mediated writing.

3 Writing with chatbots as mediated action

This study adopts sociocultural perspectives on chatbot-mediated writing by drawing on Wertsch, 1991, 1998 conceptualization of *mediated action*. Building on the works of Vygotsky and Bakhtin, sociocultural research is concerned with describing and interpreting culturally, socially, and historically situated human action (Wertsch, 1998). A fundamental assumption is that actions are always mediated by mediational means, including both material tools (e.g., digital writing technologies) and symbolic signs (e.g., language) that humans employ (Wertsch, 1998). Writing as mediated action emerges through the dialectical unity between the human agent, i.e., the student, and the mediational means, i.e., the chatbots. It cannot be understood by focusing on one element in isolation but must be examined through their dynamic relationship (Wertsch, 1998).

A central characteristic of mediated action is that there is an *irreducible tension* between the human agent and the mediational means employed (Wertsch, 1998). Mediational means shape and transform action in essential ways, but humans also actively use and transform the tools they employ. When a student writes by prompting a chatbot and rewriting generated text, the writing action emerges through the interplay of human intention and knowledge as well as the affordances and constraints of the chatbot. An important consequence of this

irreducible tension is that the boundary between what is human and what is tool is blurred. Chatbots may erode these boundaries more than regular writing tools, because the technology is both trained on vast amounts of human text and also generate human-like text. When we engage with conversational chatbots the clear distinction between what is human knowledge or intention and what is algorithmic probability is challenging to discern.

These irreducible tensions are inherently sociocultural and mediated action is never context-free. The mediational means available and the ways in which they can be used are shaped by cultural, historical, and institutional conditions (Wertsch, 1998). In school-writing, such conditions include curricular expectations, assessment practices, school policies and teacher knowledge. These factors shape how chatbot-mediated writing may be taken up and what kinds of actions are perceived as legitimate, meaningful and valued in classroom contexts.

Mediated action foregrounds human agency and although there is an irreducible tension between agent and mediational means, human agency is ontologically prioritized (Wertsch, 1998). Mediational means are deemed powerless to do anything on their own and can only have an impact when taken up by an agent (Wertsch, 1998). Agency is however not an innate individual trait, but enacted and negotiated within specific sociocultural contexts (Rajala et al., 2016). Even when students have access to the same means, in the same classroom, they can enact agency differently to negotiate, resist, or make use of chatbot affordances.

At the same time, chatbots challenge the notion of tools as powerless in important ways. Chatbot output is generated quickly, fluently and often with an authoritative voice. Generated text may therefore exert a strong influence on students' writing actions and complicate their ability to maintain control, or even confidence, in their writing process. Building on this, chatbots as mediational means are not neutral but value-laden and associated with power and authority (Wertsch, 1998). Large language models are trained and designed within particular social and cultural contexts. The outputs thus reflect dominant linguistic patterns, genre conventions and epistemic assumptions embedded in the training data. Therefore chatbot-generated text privileges certain ways of expressing knowledge while marginalizing others or produce inaccurate or biased output.

Connected to agency and authority are Wertsch, 1998 distinction between mastery and appropriation. Mastery means developing practical competence in using mediational means in particular contexts and is understood as a form of "knowing how" (Wertsch, 1998, p. 50). In chatbot-mediated writing, mastery may involve skills such as prompting and managing generated text. However, a deeper form of mastery, like understanding how the technology works to generate language and how to prompt and interact with it purposefully is demanding.

Appropriation is closely related to mastery but goes beyond practical competence and refers to "the process of taking something that belongs to others and making it one's own" (Wertsch, 1998, p. 34). This necessitates that one appropriates the affordances and constraints of the mediational means but also have the power and possibility to choose how these will be appropriated (Wertsch, 1998). Drawing on Bakhtin, using language always involves engaging with words that are inherited and shaped by the intentions of others, but we also have the capability to populate these words with our own intentions and meaning (Wertsch, 1998). In chatbot-mediated writing, students engage directly with generated text that is explicitly authored by 'another voice', which they may include in their own textual voices.

Appropriation involves agency, resistance and friction, as students may adapt, combine or resist chatbot output rather than passively adopting it. Importantly, mastery (i.e., knowing how to) does not necessarily entail appropriation (i.e., wanting to make it 'one's own').

Finally, Wertsch (1998) argues that the introduction of new mediational means may transform an action into a qualitatively new form of mediated action. From this perspective, writing with chatbots may be understood as a new form of writing that challenges established notions of writing skill, authorship and competence in school contexts. Because the mediational means provide the standards by which skills are assessed, the introduction of chatbots raises questions about which writing practices are recognized, and by whom, as valid indicators of competence.

Taken together, these perspectives position chatbot-mediated writing as a socioculturally situated form of mediated action, drawing attention to questions of authorship and agency.

4 Methodological approaches

This study has a qualitative approach to explore how students use chatbots when writing essays in the Norwegian subject. The following section describes the setting, participants, data collection strategies, and analytical approaches.

4.1 Overall setting

After the release of ChatGPT in 2022, generative AI rapidly entered Norwegian classrooms both in unregulated and regulated forms. Although students themselves prefer to use the unregulated ChatGPT services, several counties and municipalities have provided students with access to chatbots, like Copilot, that comply with privacy regulations and may be used in education (Bueie et al., 2025). Many teachers and students now use chatbots for schoolwork, though the scope, openness of use and competency levels vary significantly (Directorate for Education and Training, 2024). Trainings, as well as guidelines, are scarce leaving students and teachers to make sense of the new mediational means and practices involved.

4.2 Participants

The participants are ten upper secondary students and their two teachers. The students are 16 years old and in their first year of a three-year academic program. The teachers describe them as a representative group of students with varying skills and motivation for writing, as well as experience with using chatbots. The teachers themselves are experienced Norwegian subject teachers who work together as a teaching team and have 16 and 35 years of experience. Neither have specific competencies in using chatbots, but they are curious to explore how these mediational means influence their students' writing.

Teachers were recruited following my announcement of the need for participants at an upper secondary teacher and school leader conference held in March 2024. Subsequently, I was granted access to two classrooms where students were informed about the project and volunteered to participate. All participation is voluntary, based on informed consent and participants' identities are protected and anonymized. The research adheres to the Guidelines for Research Ethics in the Social Sciences and the Humanities (NESH, The National

Committee for Research Ethics in the Social Sciences and Humanities, 2021) and was approved by the Norwegian Agency for Shared Services in Education and Research (SIKT) before entering the field. Table 1 shows an overview of participants.

4.3 Data collection strategies

To capture students' writing as it unfolded in their school environment, videos were recorded in class under as authentic circumstances as possible. The video data was collected during a writing session in November 2024 which marked the end of a four-week teaching plan about cultural encounters in literature. During these weeks, the teachers also provided a basic introduction on how to use chatbots and write prompts. The assignment was to write an essay discussing the above-mentioned topic and analyze a specific song lyric. All students were encouraged by the teachers to draw on the full range of resources they had access to. This included paper hand-outs of the assignment and lyrics, digital word processors, online resources, peer collaboration, teacher guidance and chatbots. The students were told to use Microsoft's Copilot by their teachers, because of data protection regulations, however the video material later revealed that six of ten used ChatGPT instead.

The participating students followed the same teaching plan and did the same writing assignment as the non-participating students. The teachers were asked by the researcher to conduct the writing session as usual, and the participating students were asked to act and write as they would normally do. To film only the participants, they were moved to the back of the classroom.

4.4 Video as empirical data

The data consists of video recordings which allowed for systematic and nuanced examinations of each student's writing process and practices as they unfolded. Specifically, two types of videos were collected: (1) screen recordings of the student's PC screen and (2) video-camera recordings of the student, including sound.

The students sat in pairs with one video camera filming each pair from behind (i.e., 5 cameras in total). Screen-recording software was used to film each student's screen (i.e., 10 screens in total). In addition to me, the principal researcher, four co-researchers assisted in filming the students.

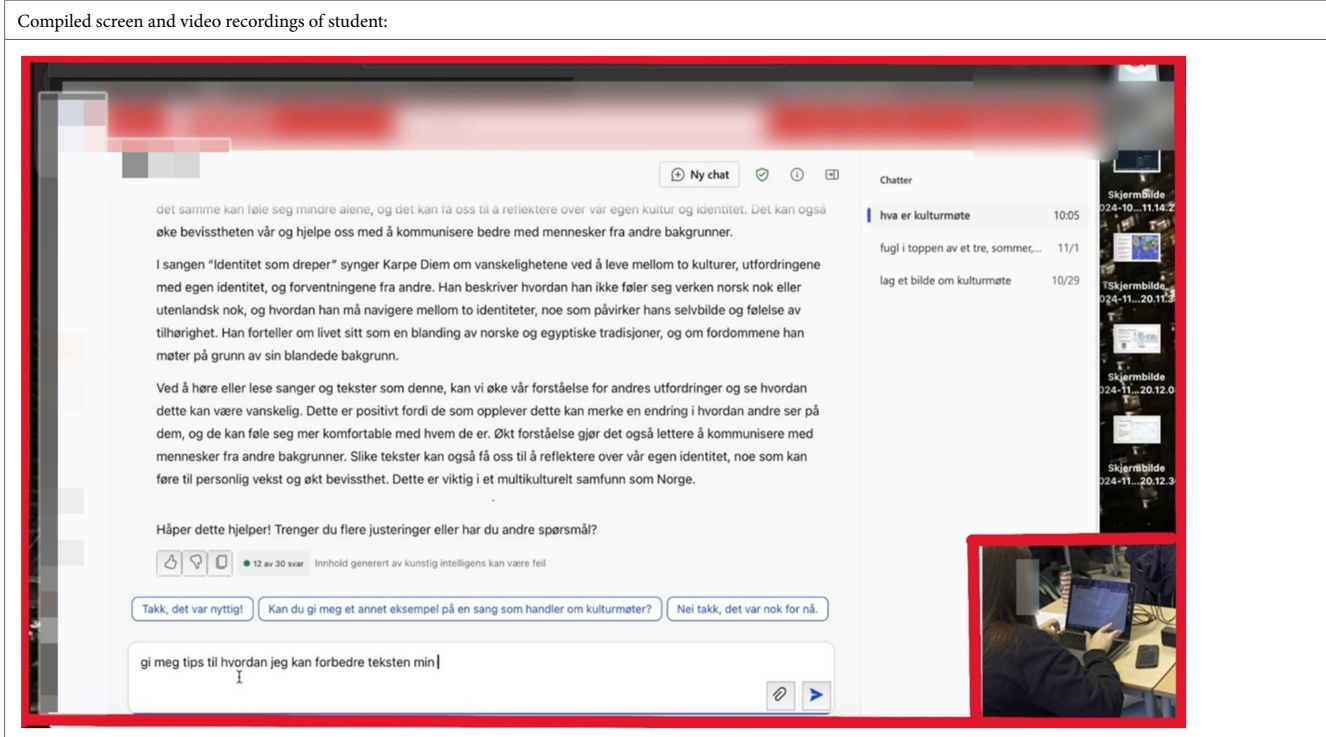
After the data were collected, I synchronized and compiled the screen and video recordings of each student into the same video file. The screen recordings made it possible to see in detail what the students did and wrote on their computers, while the video camera recordings captured their actions and conversations. Table 2 illustrates the set-up and compiled recordings.

The writing session lasted approximately 2 h. 20 min., which included a 15-min break. During the break cameras and screen recordings were turned off. The amount of video data collected was

TABLE 1 Overview of the participants.

Participants	Class A	Class B
Teachers (pseudonyms)	Mrs. Tina	Mr. Thomas
Students (pseudonyms)	Nora, Niclas, Ronald, and Ravi	Aron, Arman, Mina, Miriam, Ingrid and Iman

TABLE 2 Set-up in class and video-recordings.



extensive and incorporated approximately 46 h. 40 min. of recordings in total. Table 3 shows an overview of the video recordings.

4.5 Analytical approaches

The analysis is inspired by the thematic and narrative analysis approach (Letnes, 2025). Specifically, reflexive thematic analysis (Braun and Clarke, 2021) has been used for identifying and analyzing patterns and themes across the data. The narrative analysis approach (Polkinghorne, 1995) has been used to construct narrative episodes that illustrate and provide in-depth understandings of the themes and chatbot-mediated actions as they unfolded. When combined, the two

TABLE 3 Approximate time of video recordings per student and in total.

Students	Screen recordings	Video recordings	In total
Per student	2 h. 20 min.	2 h. 20 min.	4 h. 40 min.
In total (n = 10)	23 h. 20 min.	23 h. 20 min.	46 h. 40 min.

approaches aim to enrich the analysis and expand Braun and Clarke's (2019) notion of themes as being "creative and interpretive stories about the data, produced at the intersection of the researcher's

theoretical assumptions, analytical resources [...] and the data themselves” (p. 594). Figure 1 illustrates the overall process.

4.5.1 Reflexive thematic analysis approach

The coding and theme development was inductive and drew on Braun and Clarke's (2006, 2021) reflexive six-phase process. First, my familiarization with the data included thorough viewings of all the video recordings and the writing of comprehensive content logs. The content logs were inductively divided into sequences, marked by natural starting and stopping points of a writing action. The logs included time stamps, screen shots, descriptions of the students' actions, as well as preliminary analytical ideas. The logs documented all writing activities and resources used by the students. Specific attention was, however, given to detailing the sequences that involved students' active engagement with chatbots, such as prompting, reading and using generated text, engaging with chatbot-related websites, talking about chatbot related topics and similar. The logs were then used to hand sketch preliminary timelines for each student's actions to visualize and further understand the temporal and contextual aspects of the sequences.

Second, all sequences from the content logs that included chatbot related actions were coded in NVivo15. Third, the codes were grouped based on similarities of the students' chatbot-mediated actions and preliminary themes were developed. Fourth, reviewing themes included moving back and forth between the preliminary themes, timelines and re-viewing of relevant video material. In the spring of 2025, the preliminary themes and timelines were presented at a local research conference on language education, and in the autumn the same year they were presented at the European Conference for Educational Research (ECER) for academic scrutiny. Similarly, the themes and timelines were presented to the two participating teachers in the autumn of 2025 for feedback and discussions. Both research and teacher dialogues led to refining the analysis, for example combining the two preliminary themes *Outsourcing the writing work* and *Humanizing generated text* into what finally became Theme 4: *Outsourcing and humanizing the writing work*. In the fifth phase the themes were further defined and finally named. In all, four themes were developed. Table 4 gives an example of the coding and theme development process.

The fifth phase of refining themes was closely related to the sixth, which was the process of writing up the report. The themes were conceptualized, analyzed and further defined through the writing process. This phase also involved refining and creating the final version of the thematic timelines. For further presentation see section 5.1. The sixth phase also involved selecting relevant chatbot-mediated sequences to

construct the narrative episodes that illustrate and provide detailed understandings of the themes. An initial draft of the report was read and discussed by colleagues in my institutional research group, before the manuscript was finalized.

Overall, the process of developing themes was inductive in the sense that the analyses were open and grounded in the data (Braun and Clarke, 2021). At the same time, a reflexive thematic analysis is inevitably shaped by the research question as well as the researcher's theoretical assumptions (Braun and Clarke, 2021). In this research this includes the sociocultural perspectives on mediated action and chatbot-mediated writing, as teased out in section 3. The viewing and analysis of data, however, was inductively approached to explore and understand which practices or actions occurred and how they unfolded. The connections between the empirical data, analysis and theory have been further elaborated during the writing and revision of this paper.

4.5.2 Narrative analysis approach

As stated above, the sixth and final analytical step included selecting and constructing short narratives, hereby referred to as episodes. These episodes were developed to illustrate and provide empirical evidence for each developed theme.

Polkinghorne (1995) distinguishes between analysis of narratives and narrative analysis. The first involves collecting data that are narratives and analyzing them to produce categories or typologies. The second involves collecting and combining data that consists of actions, events and happenings to construct stories (Polkinghorne, 1995). This study applied the latter. This approach was chosen because it enabled writing up situated and contextual (re)constructions of the students' chatbot-mediated actions based on the complex, multimodal data. The episodes serve as interpreted representations of the empirical material that aim to bring the actors to life through the researcher's presentation (Letnes, 2025).

The episodes presented in this paper were selected by the researcher based on what I understand as rich examples that illustrated both the breadth and depth of the empirical material and corresponding theme. Writing up each episode involved several viewings of the relevant video sequence to describe the interactions between the students, chatbots and teachers in further detail. First an extended version of the episode was written, which was then compressed into a more compact and concentrated version. The episodes were finally included in the presentation and analysis of the overall themes in the section 5, Findings and Analysis.

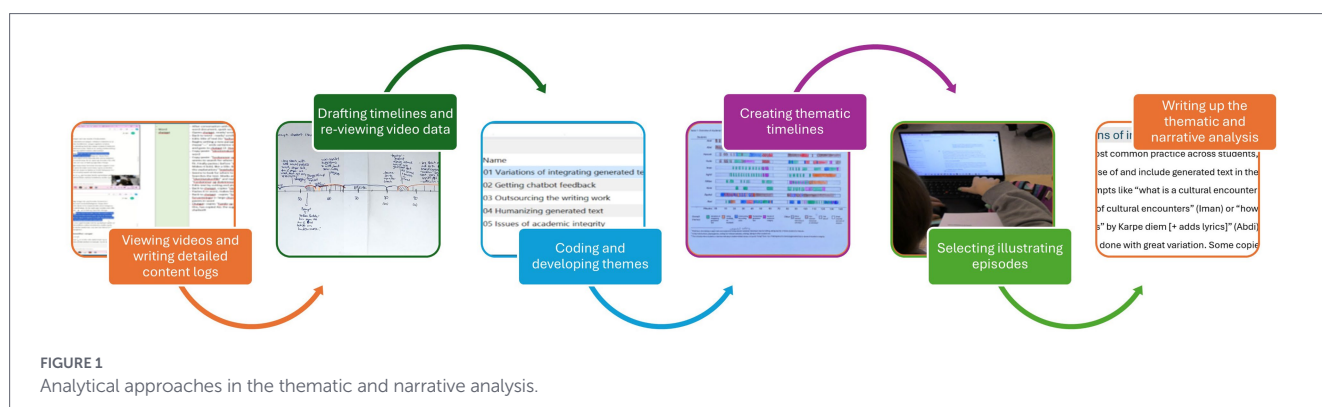


TABLE 4 Example of coding and developing Theme 1: variations of integrating generated text.

Excerpts from content logs ¹	Initial codes	Final theme
[Iman] switches back and forth between Word and Copilot, while reading and writing some text. Then she splits the screen and copies and pastes parts of the generated text into her own. Seems like she had gone from carefully selecting a few words from the bot to copy-pasting greater chunks of text.	<i>Copy and paste generated text</i>	Variations of integrating generated text.
[Nora] has now pasted all of four themes (paragraphs) ChatGPT has suggested for the lyrics. She then reads the paragraphs, line by line, and edits by removing words or parts of the sentence or swapping words, like “oppstå” [cause] with “skape” [create]. She also changes some verbs from passive to active. But Nora also adds examples and quotes from the Karpe lyrics that she has worked for so long to analyze. Uses ChatGPT text AND her own text to build on and expand it.	<i>Edit and integrate generated text</i>	
[Ingrid] prompts Copilot: “What is a cultural encounter.” She reads the generated text and begins writing in her Word document. She uses a few words from the generated text, like “interaction,” “positive,” “negative,” but does not copy-paste directly. Instead, she seems to be selecting words as ideas to develop (?). She also writes a lot seemingly independently of the generated text. Ingrid works effectively in her “modus operandi” of reading generated text (for ideas?) and writing chunks of text herself. Unlike many of the other students Ingrid spends quite a lot of time reading both the generated text as well as her own text.	<i>Get ideas and support for own writing based on generated text</i>	

Excerpts have been translated to English and rewritten for readability.

In sum, the narrative analysis complemented and expanded the thematic analysis by synthesizing and representing thematically identified actions. Also, the thematic and narrative analysis approach (Letnes, 2025) enabled attending to both the broader patterns of the data, as well as offering rich, contextualized understandings of the students’ use of chatbots and how this mediated their writing.

4.5.3 Researcher reflexivity

Throughout the process, researcher subjectivity has been understood as an analytical resource (Braun and Clarke, 2021). In addition, I have actively sought critique and scrutiny from peers and participants in my research groups, with my PhD supervisors and at national and international conferences to enrich and strengthen the analysis. I have strived for reflexivity and transparency across all stages of the research process, from planning and data collection to analysis and dissemination. My previous experiences as a Norwegian teacher in upper secondary school and current role as a teacher educator has informed my contextual understanding and interpretations of the classroom practices but also led to continuous reflexive attention to ensure that this has not unduly shaped the analytic work.

5 Findings and analysis

In line with the theoretical and analytical approaches outlined above, the findings and analysis are integrated and described in this section. Drawing on a combined thematic and narrative analysis (Letnes, 2025), the timelines, themes, and episodes are presented as interpretive representations of the data that make visible how students’ chatbot-mediated writing unfolds in classroom situations. Together they provide empirical insights into the research question of how upper secondary students use chatbots when writing essays in the Norwegian subject.

First, the thematic timelines are presented to show the breadth of the data and then the four themes and their corresponding episodes are introduced, which offer more detailed and in-depth understandings of the mediated action. The developed themes are: (1) *Variations of integrating generated text*, (2) *Getting chatbot feedback*, (3) *Navigating academic integrity* and (4) *Outsourcing and humanizing the writing work*.

5.1 Thematic timelines

The thematic timelines give a unique and comprehensive overview of the extensive body of video data. They are visual representations of the individual student’s writing process as it unfolded *in situ*. The timelines show the four developed chatbot-mediated themes, how the different writing actions followed or alternated with one another, as well as when and for approximately how long these actions occurred during the writing session. To situate the chatbot-mediated actions within the full writing context, the timelines also include activities and use of resources that were unrelated to the AI technology. The individual timelines are compiled into one figure, to enable simultaneously seeing each student’s writing trajectory as well as all of them, for comparison.

The timelines are presented in Figure 2. As the figure shows, the students’ pseudonyms are on the vertical axis, while the approximate time of the action is on the horizontal. The segments green, orange, red and blue represent the four overall themes. The grey segments represent when students were engaged in on-task activities that did not specifically involve chatbots. This included using the task hand-out, visiting relevant web sites, or writing independently of other aids. The brown segments represent students’ off-task activities, like scrolling their phones, visiting non-related websites, or chatting with peers. The diagonal hatching overlays any color indicates talk, either student–student or student-teacher. For example, diagonal hatching and orange color indicates talk about feedback and chatbots. The break is marked with a cross.

Importantly, the timelines aim at condensing the students' many complex actions, that sometimes overlap and sometimes change rapidly. The timeline is therefore not to be read as a minute-by-minute replica of students' writing, but rather an illustration of the main actions going on at the approximate time. For example, Iman's timeline shows how she starts using the chatbot after about 20 min and then changes between using the chatbot to integrate generated text (green color) and other resources (grey) until she enters a conversation after about 50 min concerning academic integrity (red) (Figure 2).

The most striking feature of these timelines is the variation and distinct individual traits of each student's chatbot-mediated writing process. The students differed both in when, how much and in what ways they drew on the chatbots. For example, we see how some students began using the chatbots early in the process, while others started later. Some relied more on the chatbots as mediational means, while others used them less. Some students' timelines include several of the four themes developed, while others only include two. The timelines also highlight how the chatbot-related sequences were combined in different ways and variously intertwined with other on-task activities or stretches of off-task activities.

Nora and Ronald's timelines distinctly illustrate these variations as they have markedly different chatbot-mediated practices and writing trajectories. Nora engages with the chatbot after twenty minutes of other on-task activities and mostly uses chatbots to integrate generated text in her own. Ronald, in contrast, immediately starts using the chatbot to outsource the writing of his essay before spending most of

the remaining time on off-task activities. In other words, across students the mediated action unfolded differently even when they operated with the same mediational means.

Despite these differences, the timelines also reveal significant similarities. Importantly, they show how all students engaged in using chatbots while writing. In fact, chatbot-related practices constituted substantial parts of their writing processes, with variations of integrating generated text as the most common theme. Overall, the students spent a lot of time engaging with chatbots during the writing session. Also, the chatbot appeared as one mediational means among several that they navigated during their writing process, like the paper hand-out and relevant websites and resources. It is, however, worth noting the overall limited presence of peer or teacher talk (hatched sequences). Even if the students were allowed to collaborate and ask the teacher for help, this was rarely done. The teacher-to-student talk that occurred was mostly related to challenging questions of academic integrity or feedback, while conversations about outsourcing and humanizing were only discussed among peers.

The thematic timelines do not reveal students' general motivation for writing, their overall writing skills or assess the quality of their choices and writing practices. Instead, they intend to identify distinct traits of the chatbot-mediated writing process and make visible how students negotiated the affordances and constraints of this new mediational means. When comparing all ten students' timelines it becomes evident that writing with chatbots is not a uniform practice. Chatbots are not taken-for-granted tools but rather

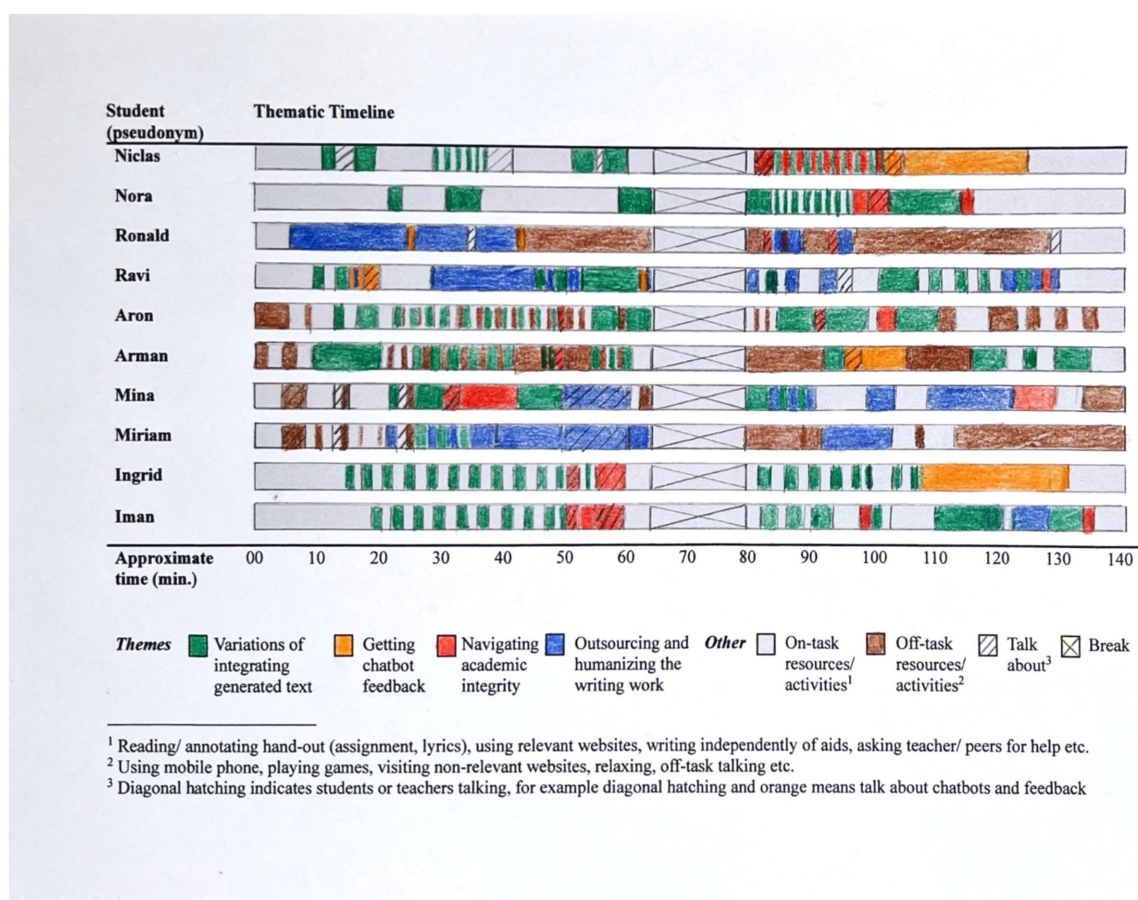


FIGURE 2
Presentation of the thematic timelines.

TABLE 5 Overview of themes and episodes.

Theme	Defining characteristics	Corresponding episode
1. Variations of integrating generated text	<ul style="list-style-type: none"> • Students prompt chatbots to obtain task-related ideas or information. • Generated content is selected and integrated through copying, adapting or rewriting. • Chatbot functions as one resource among several. • Authorship and writing responsibility mostly remain with the student. 	<ul style="list-style-type: none"> • Episode I: Arman • Episode II: Nora
2. Getting chatbot feedback	<ul style="list-style-type: none"> • Chatbot explicitly prompted for feedback on existing text. • Generated changes are not accompanied by explanations. • Challenging students to assess what constitutes improvements or not. 	<ul style="list-style-type: none"> • Episode I: Ingrid • Episode II: Niclas and Mrs. Tina
3. Navigating academic integrity	<ul style="list-style-type: none"> • Students negotiate how to disclose chatbot use. • Uncertainty about referencing and transparency among both students and teachers. • Efforts focused on making the text appear properly sourced. • Fear of cheating accusations. 	<ul style="list-style-type: none"> • Episode I: Ingrid, Iman and Mr. Thomas • Episode II: Aron
4. Outsourcing and humanizing the writing work	<ul style="list-style-type: none"> • Students prompt chatbots to write large segments or the entire essay to avoid writing themselves • Humanizer tools or techniques are used to mask AI use. • Tacit practices that circulate among the students • Writing of the essay is delegated to the technology, but some develop prompting skills and understanding of the AI technology. 	<ul style="list-style-type: none"> • Episode I: Miriam and Mina • Episode II: Ronald

linger between established writing practices and instruction and new, not routinized practices.

5.2 Themes and episodes

To connect the broader patterns of the timelines to concrete actions visible in the video data, I now move on to detailing the four developed themes and episodes. Table 5 shows an initial overview of the main characteristics of each theme as well as the corresponding episodes. The developed themes are not mutually exclusive or isolated from each other but rather represent dominant tendencies in the specific chatbot-mediated action.

5.2.1 Theme 1: variations of integrating generated text

This theme represents the most common practice across students and includes sequences where students typically use task-related prompts to get ideas or information, like “*what is a cultural encounter*” (Aron) or “*how are cultural encounters portrayed in ‘Identity that kills’ by Karpe diem*” (Arman). The generated content is then integrated into their texts to various degrees and in various ways. Some copy and paste entire paragraphs, others adapt sentences, select single words, or use the chatbot output as inspiration for independent writing. These variations do not only occur across students but also within an individual student’s writing. The same student sometimes copies and pastes directly, other times edits, rewrites or adapts certain concepts.

There are also differences in how the students position the chatbot as a mediational means among the other available means. Some rely more on only the chatbot and generated text, while others use an array of resources and integrate the chatbot output as part of their writing ecology. Students also differ in how deeply they engage with the generated material before choosing whether to integrate it or not.

A common trait, however, is that the students seem to actively seek out and select content they adapt or include in their own texts, while maintaining their authorship. This distinguishes the practice from outsourcing the entire writing task to the chatbot (see Theme 4).

To illustrate this theme and how the writing unfolds are two episodes from Arman and Nora’s timelines. Arman’s is a typical example of a student integrating singular words or ideas, while Nora illustrates a particular “copy-paste” practice.

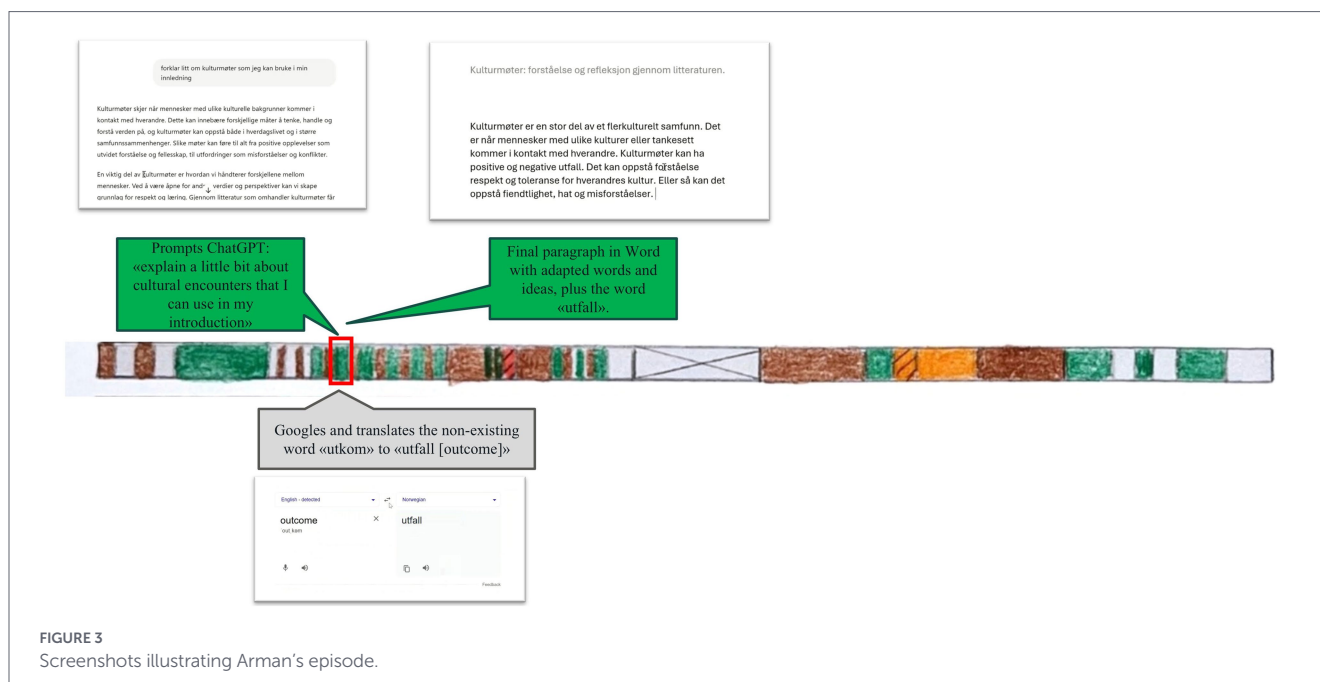
5.2.1.1 Episode I: Arman

[episode starts]

Arman has just prompted ChatGPT to “*explain a little bit about cultural encounters that I can use in my introduction*”. Within seconds a generated suggestion appears on his screen. Arman reads it before returning to his own document where he writes: “[Cultural encounters] is when people from different cultures meet and...”. He stops, goes back to ChatGPT, hovering his cursor over the text, as if to help him read. Switching again to his Word document, Arman then deletes *meet* and replaces it with another expression drawn directly from the generated text: *comes in contact with each other*. Arman continues typing: “These cultural encounters may lead to...” before he stops, pauses, and returns to read the generated text once more. Opening his Word document yet again, he now deletes his half-written sentence before inserting the chatbot generated term *mindset*. Then he starts writing about the positive and negative aspects of cultural encounters: “Cultural encounters can have positive and negative...” Arman stops before typing *utkom* which is an incorrect mix of the English word *outcome* and the Norwegian *utfall*. He understands something is off and googles the term “utkom.” Seeing it does not exist in Norwegian; he uses Google Translate to find the correct translation: *utfall [outcome]*. After making the extra effort to include this word, which is not from the chatbot, he completes the sentence: “Cultural encounters can have positive and negative outcomes.” Arman finally adds one sentence exemplifying positive outcomes and one sentence explaining negative outcomes, both mirroring, but not duplicating, the chatbot generated text.

[episode ends]

Arman’s episode illustrates a writer who to some extent actively engages with and adapts the generated text but whose writing is also shaped by the tool. He demonstrates mastery of the tool in the sense



that he prompts to get ideas and support and incorporate some of these in his essay. His agentic capacity is visible in his deliberate effort to include his own words, like “utfall.” At the same time, he repeatedly deletes and reformulates sentences and words he has written independently, only to replace them with generated terms. This could suggest that the chatbot’s phrasing becomes a reference point, or an authoritative voice, for what Arman perceives as good writing (Figure 3).

5.2.1.2 Episode II: Nora

[episode starts]

Most of the time prior to the break, Nora has spent close reading the task and analyzing the Karpe Diem lyrics. She has annotated the paper hand-out, reviewed some digital notes and written bits and pieces in her Word document. It takes her about twenty minutes before she opens ChatGPT the first time.

Now, almost an hour and forty minutes into the session, she has just copied and pasted four chatbot-generated paragraphs into her Word document. Each describes a theme related to the Karpe lyrics *Identity that kills*. She scrolls through her document, which is now a mix of her own writing and the generated paragraphs. Nora begins to slightly edit the paragraphs by swapping advanced chatbot words, like *convey*, with simpler words, like *talk about*. She also removes a few words and deletes parts of sentences.

In one of the paragraphs that thematizes *family and tradition* she leaves the first chatbot-generated sentence unchanged: “This song shows how family and traditions play important roles.” She then inserts her mouse cursor after the full stop and adds: “In this song karpe talks about [...]”. She pauses in the middle of writing the sentence, leaving her right hand resting on the keyboard. Her left hand flips through the printed hand-out, like so many times before during this writing session, her eyes searching through the lyrics. Both hands return to the keyboard as Nora completes her sentence by inserting the relevant quote she found: “he celebrates Christmas, the holidays are at Eid”. Finally, she adds: “This refers to family and tradition”.

Nora continues revising, turning passive verbs into active forms, or simplifying and tightening the paragraph.

[episode ends]

Nora’s episode must be understood in the context of her earlier writing actions. When she copies and pastes the generated paragraphs in this story, she connects them with her previous knowledge, interpretations, and textual evidence from the lyrics. Nora’s actions may be understood as an agentic and deliberate integration of relevant content into her own text, rather than an attempt to automate the writing. She seems to master writing essays and knows how to navigate and make use of the resources she has at hand. When she appropriates the generated text, she makes the content meaningful in her own text (Figure 4).

5.2.1.3 Analytical summary

Arman and Nora exemplify students’ complex chatbot-mediated practices that characterize this theme. Both engage with the output by adapting, resisting, and including it in their writing. At the same time, their agentic capacities are enacted differently.

Arman, even if using his own words, exemplifies how chatbot output can gain authority. Consciously or not, the generated text steers many of the students’ choices. Arman illustrates how it gains authority as a model for what is correct or quality writing. He and others spend a lot of time moving between their own texts and chatbot text selecting and judging the output, rather than writing independently or using other resources.

Nora, in contrast, illustrates how chatbot output can be recontextualized and expanded through independent analysis and the use of various mediational means. Nora appropriates the chatbot content by embedding it in her own analytical work and reasoning. She negotiates her human intentions and the generated text due to her agentic capacity. When Nora partly copies and partly writes independently, her actions illustrate how chatbot-mediated writing challenge traditional notions of authorship and what it means to use ‘one’s own words’ when writing. Students who manage to deliberately appropriate multiple voices from chatbots and other

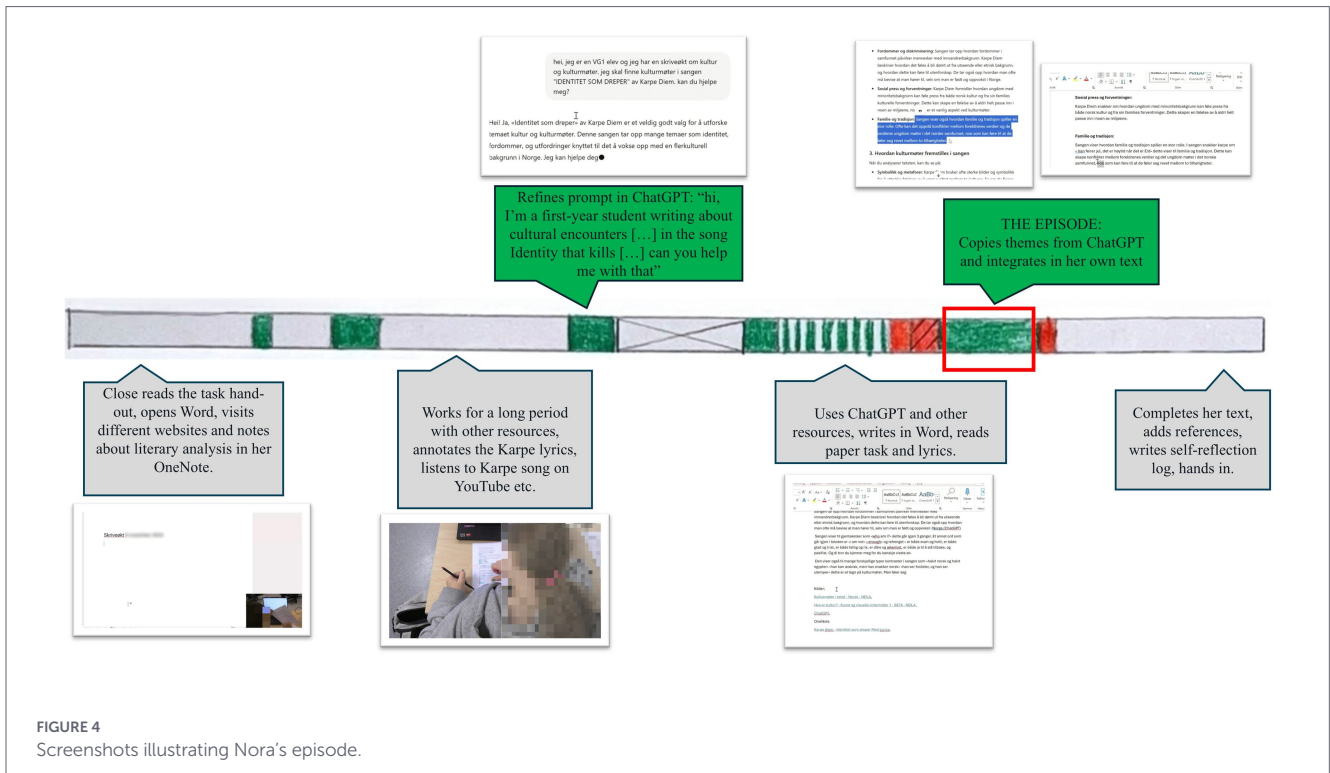


FIGURE 4 Screenshots illustrating Nora's episode.

mediational means, could be said to transform writing into a qualitatively new action. Students who lack agentic capacities (e.g., subject knowledge, writing skills or motivation) risk losing their voices to an algorithmic one.

5.2.2 Theme 2: getting chatbot feedback

This theme captures sequences where students explicitly ask the chatbot for feedback or help to improve their essays using prompts like: “Can you help me correct the grammar and make small adjustments to improve the text?” (Ravi) or “Tips for making some topical sentences less heavy and have shorter examples” (Arman). It also includes episodes when students and teachers discuss chatbot-feedback. The theme appears in five of the ten students’ timelines.

Ravi and Ronald engage in feedback practices early, while Arman, Ingrid and Niclas do it later. Ingrid and Niclas spend considerable time reviewing and adapting the chatbot suggestions, the others explore it more briefly. The theme is illustrated first by Ingrid who initiates the chatbot feedback herself and then by Niclas’ teacher-initiated feedback process.

5.2.2.1 Episode I: Ingrid

[Episode starts]

Ingrid has worked systematically and on-task all along. Her modus operandi has been changing between writing independently and integrating generated text as she sees fit. Now, she has a complete draft and plenty of time left. She scrolls up and down her essay before copying it into Copilot. She adds the prompt: “how can I improve my text?”. In seconds, the chatbot generates a new and revised version. Ingrid does not read it but prompts anew: “give me tips on how I can improve my text?”. The new prompt alters the outcome and Copilot no

longer rewrites her essay but creates a list of nineteen suggested improvements. The generated output displays original sentences from Ingrid’s text and then a suggested revision.

Starting from the top, Ingrid reads one suggestion at a time and finds the sentence it refers to in her Word document. Taking her time, she assesses the suggestions, sometimes implementing the tips, sometimes not. Some consist of lexical changes that seem to be more a rewriting of phrases, rather than actual improvements. Ingrid does not implement these. Other suggestions, however, help her improve the accuracy of her sentences. For example, she changes *enkelt sett* [simply seen] to *enkelt sagt* [simply said] and *en forveksling av ulike perspektiver* [a confusion of different perspectives] to *en utveksling av ulike perspektiver* [an exchange of different perspectives]. Notably, there are seldom occasions when the chatbot leads Ingrid astray content wise, like when she swaps the appropriate term *et fenomen* [a phenomenon] to *et forekomst* [a occurrence, including wrong article]. Continuing for another twenty minutes, Ingrid works rigorously and with much concentration through her text and all the feedback.

[episode ends]

Ingrid is a student who actively and deliberately seeks feedback from the chatbot. In this sense she makes use of the new tools’ particular affordances to provide specific feedback. The episode also shows how Ingrid wants to remain in control of her writing. This is particularly visible when she stops and re-prompts after the chatbot’s output does not meet her expectations, showing awareness of her ability to increasingly master the mediating tool and develop her prompting skills. Her selective adoption of chatbot suggestions demonstrates critical judgement and ownership of the text. At the same time there are moments where she ends up introducing errors which reveal how the chatbot-mediated feedback might also lessen the quality of her text (Figure 5).

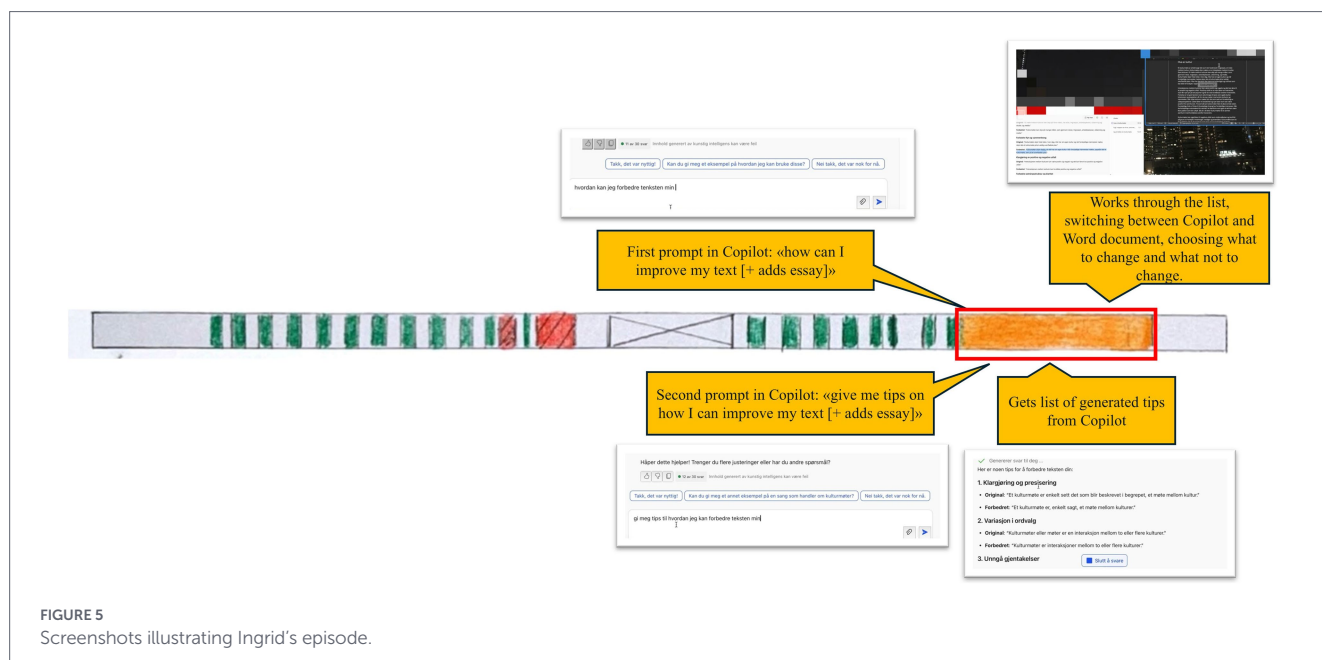


FIGURE 5
Screenshots illustrating Ingrid's episode.

5.2.2.2 Episode II: Niclas and Mrs. Tina

[episode starts]

Niclas raises his hand for the fifth time. When Mrs. Tina comes over, he asks when the lesson is finished. Mrs. Tina, smilingly, answers that nearly forty minutes are left. As Niclas replies he feels “pretty much done”, she sits down next to him, looks at his screen, and reads out his first sentence. In a friendly voice she asks if he is satisfied with it. “Yes,” Niclas grins, “but you’re not.” They laugh. Not sure how to fix it, Niclas asks for help and guided by Mrs. Tina, he sees that his sentence needs to be split and have a transitional word added. Through leading questions from the teacher, he inserts a full stop and the phrase “in addition” to make it flow.

Mrs. Tina then asks: “Have you tried using the chatbot to help you formulate better sentences?” Niclas says no and Mrs. Tina encourages him to try: “You just copy and paste your paragraph in the chatbot and ask. You might not be satisfied with the suggestions, but...” Mrs. Tina stops, as Niclas has already copied a paragraph and prompted Copilot: “*how can I formulate this paragraph better*”. He hesitates and asks how to formulate the prompt. Mrs. Tina reminds him of earlier lessons about prompting, including telling the chatbot who you are and what kind of answers you want. Niclas impatiently shrugs her advice off: “It’s not that super important. I think it’ll be fine.”

Copilot generates a new version of the paragraph. The vocabulary is advanced. Niclas hovers his mouse cursor over the word explores and reads it. Mrs. Tina asks if he would normally use that word. His response is negative: “it does feel insanely adult...” Mrs. Tina commends him for being critical and suggests he reviews the rest himself.

Left alone, Niclas studies the generated text and revises. He keeps phrases like *is about* and *in addition*, rather than advanced generated suggestions like *explores* or *furthermore*. He only includes one advanced suggestion, namely *the theme of cultural encounters*. He correctly adds capital letters to the name of the band, like the generated text has done.

Finally, Niclas swaps *be of use* to the generated suggestion *benefits*. This, however, alters the overall meaning of the content. The term *be of use*, which is now gone, does not necessarily imply something positive, like *benefits*, but rather that we can learn about both positive as

well as challenging aspects when reading about cultural encounters. In fact, the *Karpe Diem* song is more about the challenges of being multicultural, than the benefits. Now, Niclas’ final version has changed, whether he is aware of it or not.

[episode ends]

This episode shows the differences between the teacher and the chatbot feedback Niclas gets and how he applies these in his text. The teacher provides contextualized and dialogic feedback, guiding Niclas through questions and affirmations. In contrast, the chatbot feedback is decontextualized and seems more estranged to Niclas’ way of writing. Niclas is able to act on some of the most basic feedback he gets, but more subtle semantic shifts are unnoticed. He has limited capacity to judge or integrate the suggestions, in particular because he did not prompt the chatbot to explain the suggested improvement. Interestingly, however, he does act agentively in keeping words that are more aligned with his own voice, rather than implementing more complex terms (Figure 6).

5.2.2.3 Analytical summary

This theme reflects how chatbots afford new ways of providing students with specific feedback on their writing. However, the students engaging in this practice faced the challenge of evaluating and applying the output. While surface-level corrections were easier to understand and integrate, more complex suggestions risked being misunderstood or “improvements” that did not really improve the text were incorporated.

The students’ feedback practices reflect a lack of mastering prompting the chatbot, which influences the output greatly. Niclas’ shrugs it off when the teacher reminds him of how important purposeful and contextual prompting is. Even Ingrid, who refines her prompt for a more accurate output, does not make use of the tool’s affordances to explain or make visible the suggested improvements. This makes it difficult to critically evaluate the output.

The theme also reflects a distinct difference between the teachers’ feedback and chatbot-mediated feedback. The teacher knows the

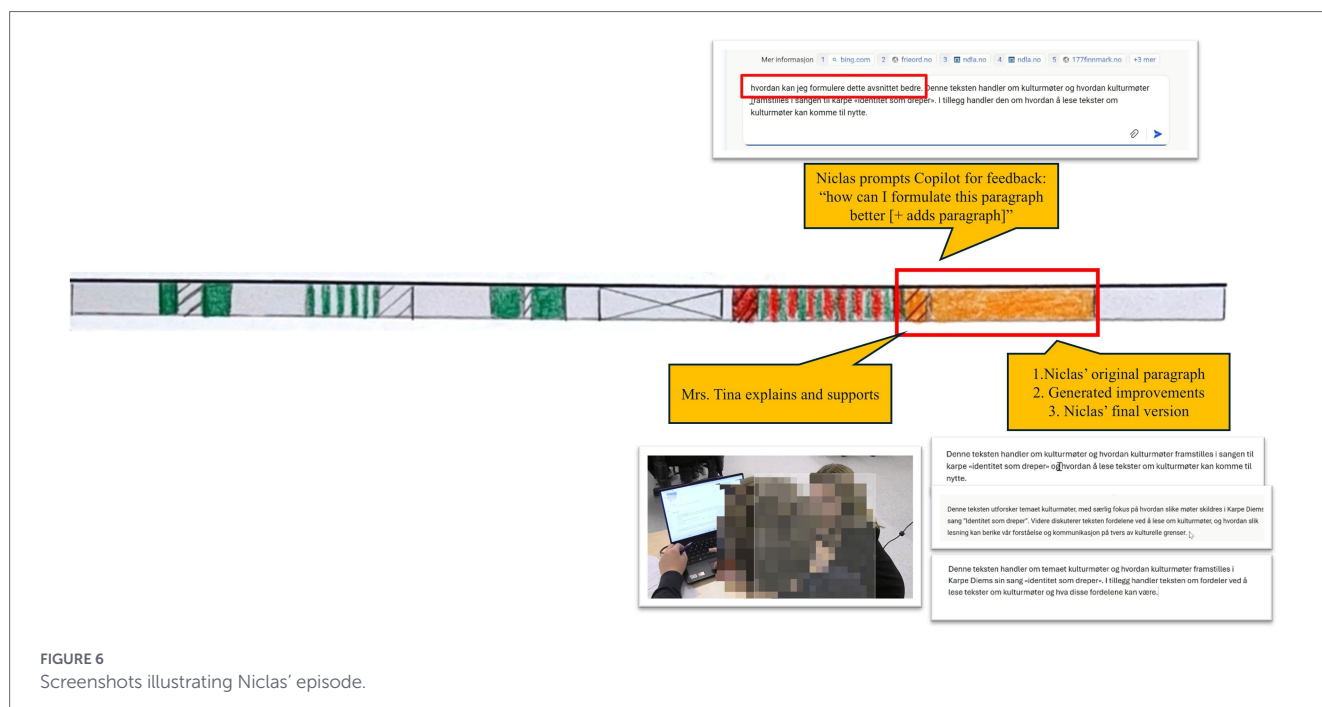


FIGURE 6
Screenshots illustrating Niclas' episode.

context of the classroom, the writing task, and her students and how to guide and support them to find answers. The generative AI tool does not have such in-built contextual understanding or pedagogical competencies, making the teacher-feedback qualitatively different from the chatbot.

5.2.3 Theme 3: navigating academic integrity

This third theme comprises how students grapple, through actions or words, with challenges of disclosing and referencing chatbot use. Most of the students' thematic timelines include episodes of unclarity and confusion around academic integrity. These are often connected to practices of integrating generated text (Theme 1).

Issues of how to navigate academic integrity includes when students discuss with teachers or peers about where the line goes between being inspired by, get ideas from or use "one's own words" versus "chatbot words." It also includes acts or expressions that suggest fear of being accused of cheating. The uncertainty of how to act responsibly when using chatbots often means having to navigate and make sense of the teachers' ambiguous advice. Some students look at web resources for explanations on how to reference chatbot content or solve the issue by referencing more acknowledged websites, like encyclopedias or subject-specific websites, to avoid claiming chatbot use altogether. The overall impression, however, is that students are not trying to hide misuse, but rather seek advice on how to address this correctly. The following episodes illustrate how teachers and students struggle to navigate what academic integrity in chatbot-mediated writing means in practice.

5.2.3.1 Episode I: Ingrid, Iman and Mr. Thomas

[episode starts]

Ingrid and Iman have both worked on-task using various resources, including variations of integrating generated text. Now, Iman turns to Ingrid and asks if she knows how to reference ChatGPT. "Am I just going to write it there?" She points to a paragraph

in her text. "Or should it be added to the list of references at the end?" Ingrid has no idea and Iman shows her the hand-out: "It says here that it's supposed to be referenced both in the text and in a list of references at the end." Ingrid reads too and exclaims: "But that won't work. Like, it's not possible to write which author and stuff, because there are no authors of the generated text. And you're supposed to write the author's name and when the text was written...and that's just impossible." Iman concludes that she can add a few sentences at the end explaining her chatbot use. Ingrid nods but says they should ask the teacher.

A few minutes later they stop Mr. Thomas to ask about their dilemma and what to do if they have used content from the chatbot. Mr. Thomas sits down next to them, hesitates, saying it depends and suggest they could document the chatbot use in the self-evaluation form they are going to hand in. He also recommends trying to replace it with other, more proper sources. "If the chatbot has provided you with a definition of something, for example what a cultural encounter is, then it's really better to see if you can find similar information in other sources, like encyclopedias. And then reference *them* instead, because there are really no good ways of referencing chatbots," he continues.

Ingrid agrees but still has questions about using words or ideas. "I haven't written exactly what the chatbot has written. I've only, kind of...for example here," she stops and points at a passage in her text. "I think I only wrote three of the examples from the chatbot. Well, not really the examples either, I only wrote about these three words here." Mr. Thomas nods. "Right... Well, I guess if one is to do this properly one has to state something like 'these three examples have been taken from ChatGPT'..." The class is getting noisy, so Mr. Thomas gets up to calm them down, leaving Iman and Ingrid. The girls continue working. Right before handing in her essay, Iman deletes the paragraph disclosing her chatbot use.

[episode ends]

Here we see how new writing tools create new writing practices that do not concur with established standards. This leaves students and

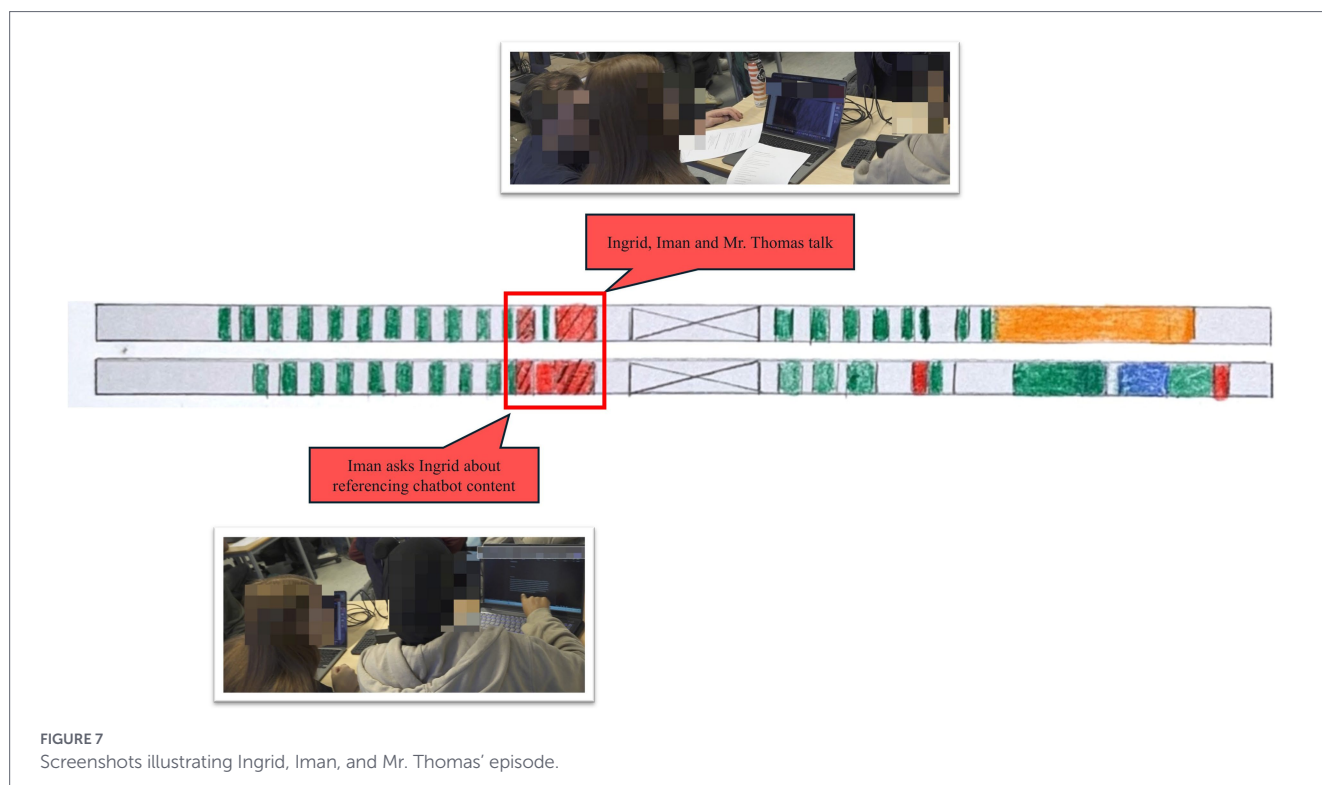


FIGURE 7
Screenshots illustrating Ingrid, Iman, and Mr. Thomas' episode.

teachers to make improvised judgments about how to navigate academic integrity. The chatbot output challenges existing academic conventions, for example by having no known author to refer to, which leaves the students unsure of how and when to be transparent. It also illustrates the challenge of knowing when one has used “too much” of the chatbot output and when one has only picked a few words or ideas.

Additionally, the teacher’s advice to look for alternative sources reflects how the generated text per se is deemed unreliable, leaving the girls to find alternatives that are traditionally seen as reliable sources. Overall, it suggests that the importance lies in making the text appear properly sourced, rather than reflecting the actual flow of the writing process (Figure 7).

5.2.3.2 Episode II: Aron

[episode starts]

Aron is on-task and off-task and his writing is slow. He has used ChatGPT during the process, but mostly to get explanations or ideas and phrases that he has integrated into his text. He tells Arman that he “is struggling big time” with writing, yet he struggles on. At one point he sees Arman copying content from the chatbot. “What if the teacher catches you?” He half-jokingly, half-seriously asks, giving the impression he would not try the same.

Aron continues to toggle between generating and reading chatbot text. Although it is slow and not a lot, he implements some of it and writes some independently. At a moment when ChatGPT is on his screen, Mr. Thomas arrives. He sees the generated text and quietly reads what it says before whispering: “There are many words here, which you wouldn’t use, right?” Aron, who has not noticed the teacher, pulls an Airpod out of his ear. When Mr. Thomas repeats the question, Aron quickly insists that he is not copying and pasting it, opening his Word document to show him. Mr. Thomas says he did not think so either, yet it seems that this is how Aron understood his

comment. “I just wanted to understand the message in the lyrics,” Aron continues, “to get a proper understanding of what it’s about.” Mr. Thomas nods reassuringly and then moves on to Arman.

Aron, who has in fact not copied directly from the chatbot, seems a bit startled. A few minutes later he finds an online AI detector tool and pastes his draft in it. When the AI detector says his text has a 71% probability of being generated Aron gasps. Arman looks over and Aron quietly exclaims: “I promise, I didn’t even use AI”. The next minutes Aron spends checking his text again and again, with varying results, in other detector tools.

[episode ends]

Aron’s fear of being accused of cheating resonates questions of where the line goes between being inspired by versus using the chatbot dishonestly. Additionally, the episode shows how the relationship between students and teachers might be affected. Even though Mr. Thomas’ tells Aron that he does not suspect him of cheating, Aron appears to interpret the teacher’s comment as a sign of doubt. His decision to paste the text into an AI detector suggests that Aron anticipates teachers to use such tools to evaluate authenticity and he wants to check what such systems might say about his text (Figure 8).

5.2.3.3 Analytical summary

The findings in this theme underline how chatbots as new mediational tools challenge and exceed the established standards for source use and authorship. It demonstrates central dilemmas the students, as well as teachers, face, when the norms for academic integrity have been developed for a different technological reality that does not always align with the ways chatbot text is produced or used by the students. Despite clear instructions from the teachers to always reference sources, including chatbots, neither the students nor the teachers themselves display stable routines concerning how to do so.

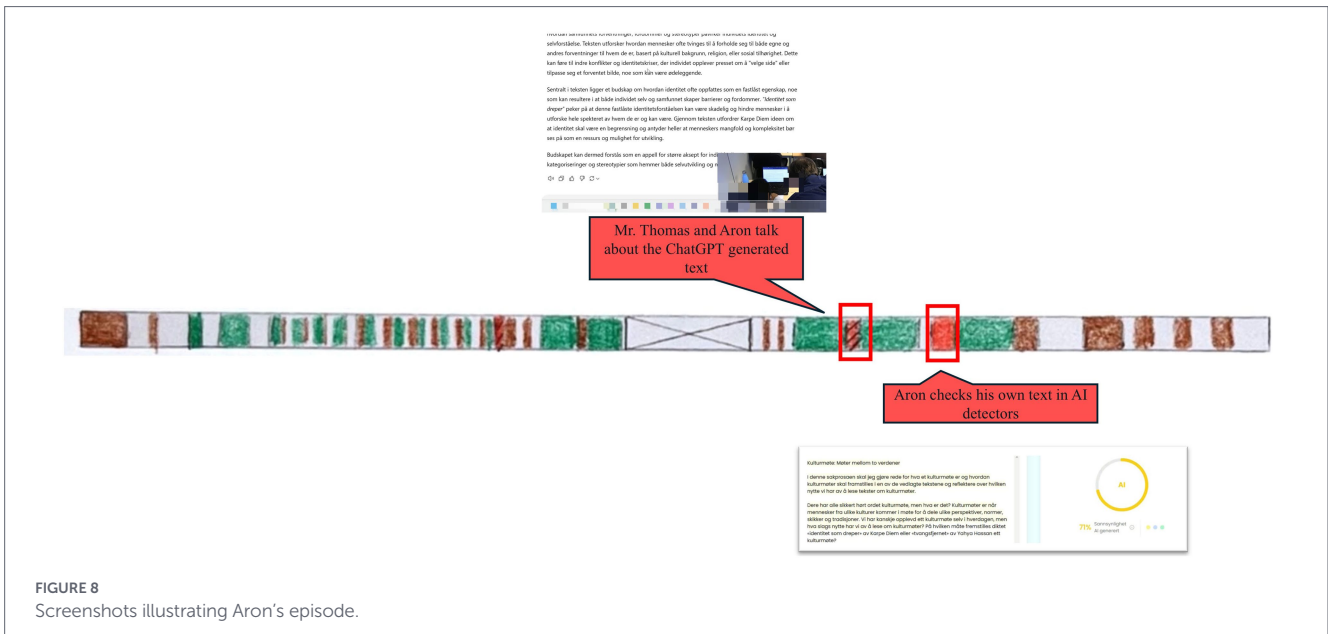


FIGURE 8 Screenshots illustrating Aron's episode.

Acting responsibly becomes even more difficult when the tool dif-fuses the line between what is general knowledge or student ideas that do not need to be referenced and what is specific knowledge that requires referencing. This produces tensions that shape the students' actions and writing practices in consequential ways. In sum, it illustrates how ques-tions of academic integrity in chatbot-mediated writing is far from context-free, but very much related to institutional norms and what is perceived as legitimate and valued writing practices in school-writing.

5.2.4 Theme 4: outsourcing and humanizing the writing work

In this theme students outsource parts of or the entire writing to chatbots and then use specific tools or other techniques to make their text appear more “human” and less AI-detectable. The students' actions in this theme are characterized by a seeming intention to out-source the writing to the technology to avoid writing themselves. Subsequently they make an effort to mask that this has been done. These acts set this theme apart from Theme 1 (Variations of integrat-ing generated text), where students incorporate or adapt generated text, and Theme 3 (Navigating academic integrity), where students grapple with referencing norms.

Commonly students first prompt the chatbot to produce full para-graphs or entire essays, for example: “write a short paragraph about reflecting on cultural encounters in Karpe’s text ‘identity that kills’” (Mina) or “write the main body where you give a subject-based explana-tion of [...] what a cultural encounter is and how it is portrayed in this text [+ paste the Karpe lyrics]” (Ravi). Secondly, the students use tech-niques or online humanizer tools to make the text undetectable as AI generated.

Like the other themes, this also varies greatly. Five students (Ingrid, Niclas, Nora, Arman, and Aron) do not engage in or discuss outsourcing or humanizing at all. Iman outsources only a short seg-ment near the end of the session, without further humanization. Ravi and Mina engage in various on-task activities and only outsource and humanize parts of their texts. While for Miriam and Ronald the out-sourcing and humanizing practices constitute nearly all their writing. What the five students have in common, however, is that they keep

their actions tacit and away from the teachers. Mina and Miriam show how peers introduce these practices to each other and Ronald’s dis-plays how he develops his skills in using the mediational tool to avoid writing.

5.2.4.1 Episode I: Miriam and Mina

[episode starts]

Miriam and Mina sit next to each other. The writing process has been slow, but Mina has so far mostly engaged in on-task activities. Miriam, however, has been unmotivated, complaining about being cold, hungry, tired, and how she has forgotten how to write an essay.

After forty minutes, Miriam’s document is still fairly empty when she prompts ChatGPT to write an essay about cultural encounters including the Yahya Hassan poem. She copies the task description, the poem and assessment criteria into the prompt. Seconds later, ChatGPT has generated a seemingly well-structured essay, which Miriam skims through before pasting it into her document.

Minutes later Mina notices Miriam’s generated text. Jokingly Miriam says: “Why not use the chance, when I’ve got the chance?” Mina leans closer and suggests that Miriam can “use one of those human AI things which makes the text look more human.” Miriam has not heard about this and googles “human ai.” Mina helps her search for humanizer services, finds one and explains how to paste the generated text and click the “humanize” button.

The girls sit, tete-a-tete, looking at Miriam’s screen. Mina is eager to see how it works, explaining she has heard about humanizers but never tried them. “Do people really use this?” Miriam asks. “Yes,” Mina insists and then jokingly continues, “At my old school people used it all the time. Well, except for me. I wasn’t that kind of chatbot person.”

The girls continue talking about when they were first introduced to chatbots. Miriam tests several services only to discover they require pay-ment for longer texts. She finds a workaround by copying one paragraph at a time, keeping the number of words below the limit. After humanizing each paragraph, she pastes them back into Word, occasionally making a few more edits, occasionally not. Nor does she read the humanized text to notice the errors and strange outputs that occur.

For example, the humanizer service constantly includes nonsensical expressions. Words that originally made sense, like *splittende* [divisive] is changed to an irrelevant word *vedkjempende* [persistent]. The phrase “[A] young boy, is forcefully removed from his home” turns into “[A] young boy, is parents taken from the home”. And a paragraph referring to the poem which describes a Danish meal with *eple- og sviskefyll* [apple and prune stuffing] turns into the non-existing phrase *aple- og sine borerger*. Nevertheless, the humanizing service claims that this text now has a 99.96% human score. And Miriam copies and pastes. When she has finished, she spends the remaining time on non-task related activities.

Despite claiming to never have used such services herself, Mina too begins outsourcing and humanizing parts of her text. She spends quite some time searching for and testing various services, many of which either reproduce the generated text with minimal changes or alters it in ways that reduce the quality. The result is that Mina now must take a stance toward the different outputs, rather than engaging with writing the assignment itself as she initially did.

[episode ends]

Here, outsourcing and humanizing emerges as socially as well as technologically mediated actions, as they enter the activity through peer-engagement. Miriam starts the outsourcing process herself, but her writing trajectory changes when Mina introduces her to the new humanizer tools. Mina’s engagement with Miriam then changes her own way of writing as she now adopts the new practices. Although the girls quickly find out how to practically master using the tools, they then face more generated texts which challenge their competencies of writing, subject matter knowledge, and digital judgment. The new mediational tool promises opportunities to avoid doing tedious or challenging writing work, but the final product becomes more obviously an AI generated output that teachers more likely will detect (Figure 9).

5.2.4.2 Episode II: Ronald

[episode starts]

As soon as Mrs. Tina tells the class to begin, Ronald opens ChatGPT. He skims the handout and copies the task description into the chatbot: “Write an essay in which you account for what a cultural encounter is and how such an encounter is portrayed in one of the attached lyrics and reflect on how reading about cultural encounters may be useful to us”. The essay is generated while he checks his phone. When returning to the PC he prompts: “simplify the text”.

This becomes Ronald’s modus operandi: Not reading the output but repeatedly prompting and regenerating adjusted versions. Within seven minutes he has prompted eight times, including “make this text seem written by an intelligent 16-year-old upper secondary student”, “add a few mistakes” or “create a list of references like a 12-year-old would”. After eleven minutes, he has generated what looks like a complete essay. What Ronald does not notice, however, is that his first prompt to include “one of the attached lyrics” has made the chatbot confabulate and write about an English novel that is not at all included in the assignment.

With the essay “finished”, Ronald moves on to google AI detectors. When he finds one, he pastes the essay in it and the result says it is probably 100% AI-generated. Ronald finds a humanizer site, humanizes the essay, and runs it through the detector again. The percentage drops a bit but still reports 94% AI content. As if to test whether the problem lies within the humanizer or the AI detection tool, Ronald writes a sentence himself in the detector. It returns as 0% AI generated, probably making Ronald conclude that the AI detection tool is accurate and the humanizer web sites are not. At least he moves on to ChatGPT to explore other techniques of humanizing and avoiding detection.



For minutes he switches between ChatGPT and detection tools, prompting the chatbot to “*make this text impossible to be detected by AI detectors*”. Nothing works, however, and the essay keeps rating as more than 90% AI generated. Growing frustrated, Ronald googles “*how does zerogpt work*”. He finds a Reddit post explaining the logic behind the detectors and how human-written text tends to be more random and less structured.

With this new knowledge Ronald shifts his strategy. He prompts ChatGPT to make the essay “*more random*,” “*go off topic*” or “*add informal language and slang*”. After each revision he checks the AI detector. And it works. The detection rate drops. Ronald’s tenth prompt nails it: “*make the text more random, more human and more naturally flowing and random. Don’t talk like a machine, be all over the place*”. The essay is now rated 0% AI generated. Ronald has succeeded in classifying the text as human, even if it is 100% AI generated.

The problem is that the essay is too informal with little task-relevance and refers to a confabulated novel. Ronald, however, seems pleased and asks ChatGPT to grade it. When he includes the assessment criteria in the prompt, the chatbot points out that the text is now far off.

For the first time, Ronald reads the task description carefully and notices the assigned Yahya Hassan and Karpe Diem lyrics. Although he does not notice that they should use *either* the Karpe or Hassan lyrics, he prompts ChatGPT to “*create a formal essay using what you have already generated and include stuff from ‘Identity that kills’ by Karpe and ‘Forcefully removed’ by Yahya Hassan*”. The new essay is then rated as 95% AI generated. Ronald resumes his humanizing techniques.

Having understood the importance of context, he prompts: “*do more with the text while you keep it formal and use subject matter terminology*” or “*now the AI detector says 76%, better than the last one, but worse than the first. Try harder*”. He even translates the essay to English and prompts ChatGPT, in English, to “*be less machine like, be more human like*”.

After several rounds, Zerogpt still assesses the text 57% AI generated. Ronald, perhaps losing his patience, searches for alternative detectors and finds one which classifies the essay as human. Finally, he asks ChatPGT to grade the essay, receiving the equivalent to a B. Ronald’s AI detecting ends and he replies: “*Thank you ChatGPT!*”, “*You are my only friend!!!: 3*”.

Within forty minutes, Ronald has written 36 prompts, refining, detecting, and regenerating the essay. The prompts constitute all the writing he has done. He pastes the final version into a Google Doc and spends most of the remaining time composing digital music.

[episode ends]

This episode shows that Ronald’s agentic capacities, rather than revolving around the writing assignment itself, are directed toward composing an essay by manipulating tools, prompts and detectors. Although his actions are well qualified for cheating, and he is not developing the academic writing skills the task asks for, the episode interestingly does show how he becomes increasingly skilled at prompting and understanding the logic of the tools he uses. In a way he moves from mastering the tool to appropriating it and making the writing actions personally valuable for him. His motivation and persistence to avoid writing the essay himself promotes the development of another type of writing skill (Figure 10).

5.2.4.3 Analytical summary

Taken together, this theme shows how the outsourcing and humanizing practices form a distinctive strand of chatbot-mediated writing. The students who engage in these practices spend time and energy not on developing their independent essay writing skills, but rather on shaping and disguising the outputs of one generative AI tool (i.e., the chatbot) using other generative AI tools or techniques. The practices are introduced socially and informally between peers and seems a kind of “underground” digital culture that remains hidden from the teachers, likely because the students know that this is considered cheating.

Outsourcing and humanizing the writing work on the one hand points to a grave lack of academic integrity but it also introduces new problems for the students. To succeed in their endeavors, they need to understand the tools themselves but also have sufficient subject matter knowledge and writing skills to be able to make judgements about the quality of the output. In this study’s material, the humanizing and regenerating often deteriorates the texts and, probably, makes the teacher more susceptible to think AI has been involved, than not.

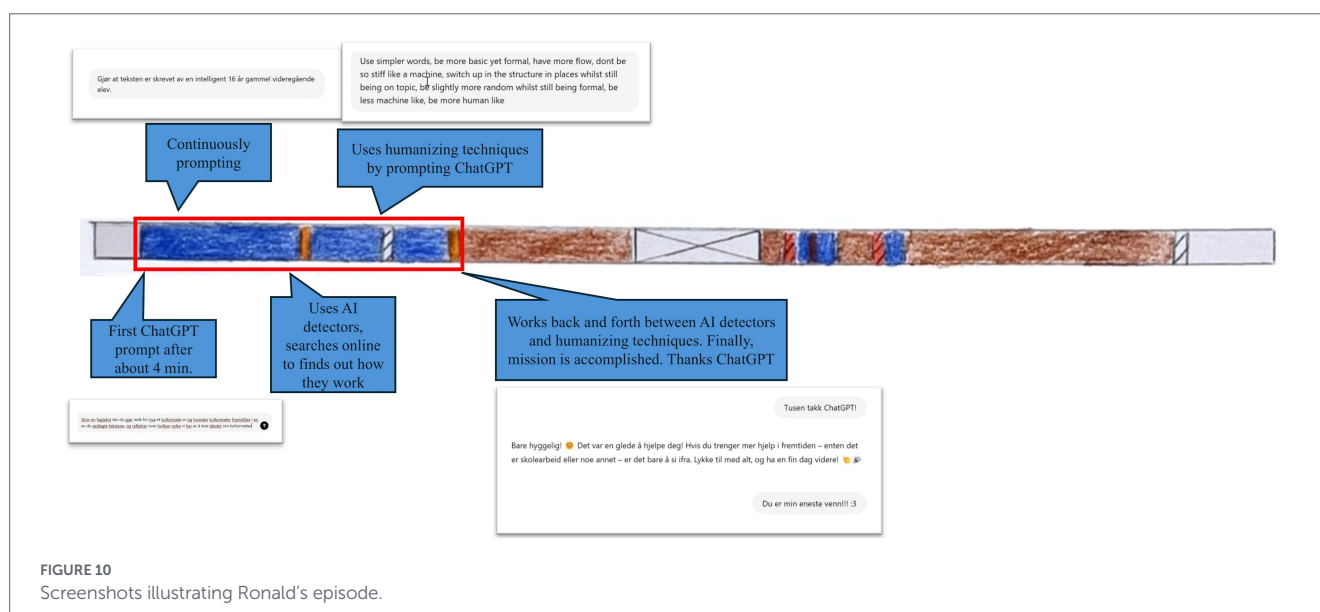


FIGURE 10
Screenshots illustrating Ronald’s episode.

At the same time, the stories interestingly make visible student agency, mastery and appropriation and how different types of writing skills are developed, even if these are directed to beating system and avoid engaging in the actual writing assignment.

6 Discussion

The findings in this study provide empirical knowledge of how upper secondary students use chatbots as mediating tools when writing essays in contemporary Norwegian classrooms. It has conceptualized writing with chatbots as a form of mediated and situated action and explored what characterizes such writing acts.

Overall, findings align with existing research showing that chatbots have become a substantial part of students' writing practices (see, e.g., Boillos and Idoiaga, 2025; Bueie et al., 2025) and that they use them in various ways as one of several resources (Guo et al., 2024; Svenlin, 2025; Wang et al., 2024). What this study adds is a more fine-grained and process-oriented understanding of how students' chatbot-mediated writing unfolds over time.

A key contribution in this regard is the developed timelines. Even if previous research point to substantial and diverse chatbot use, the timelines are novel in illustrating the students' individual writing processes as they unfold temporally, thematically and sequentially. Together with the themes and episodes, the current research adds situated understandings of how school-aged students act when writing with chatbots, the contextual dilemmas they face and how they appropriate the tool and develop specific chatbot-mediated writing practices.

Previous research has identified perspectives specifically connected to (1) understanding chatbots' potential benefits for writing, (2) concerns and consequences for academic integrity, as well as (3) questions of human control and voice in writing. These issues are also central in this study. By examining students' actions as they occur it shows how they are negotiated in practice.

6.1 Outsourcing and humanizing as a qualitatively new form of mediated action

A finding that stands out as particularly novel and connects to issues of human voices and academic integrity, is the outsourcing and humanizing practices. Even if researchers like Barrett and Pack (2023) or Yan (2023) discuss students' perceptions of automating writing processes, this specific practice of outsourcing and then using AI detectors and humanizer techniques to conceal it has not, to my knowledge, been documented empirically. This practice was also unexpected, as neither students nor teachers referred to it in discussions I conducted with them before or after the session. In the video data these practices also appeared tacit and circulating between peers, rather than being part of explicit classroom knowledge.

Analytically, outsourcing and humanizing constitute one of the clearest examples of how new mediational tools transform mediated actions into a qualitatively new form (Wertsch, 1998). Here students' efforts are redirected toward making the text appear authored by them, which is a possibility afforded by the new AI tools. Ironically, the texts were often of poor quality, included confabulations, or were too advanced for the students' level. These aspects likely increased the teacher suspecting chatbot use, even if the goal was the opposite.

From an institutional perspective, these actions are not academically justifiable, nor do they lead to development of the intended writing and subject specific skills. However, from a sociocultural perspective it is interesting to see how the students displayed notable agency in their actions. Through peer-engagement, experimentation and problem-solving strategies, they begin to master and appropriate the tools. Echoing Rajala et al.'s (2016) notion of student agency, they display the skill, will and opportunity to transform a circumstance in their school life. Their agentic capacities are redirected toward avoiding writing about cultural encounters yet still attain a finished text that might secure a good grade. The video data, particularly Ronald's episode, further show how prompting skills develop through interaction and emerge as a new form of writing skill. These competencies are interesting and important to recognize and discuss, even if they are in this case, mobilized toward problematic ends.

Although set within a different, cognitivist paradigm researchers of generative AI like de Souza et al. (2024) offer a complementary understanding of chatbot-mediated writing as a qualitatively new form of mediated action. By introducing the term *Sophotechnic Mediation*, they conceptualize human mental activities, such as writing, as a distributed and synergistic collaboration between human actors and AI systems (de Souza et al., 2024). From this perspective, the writer collaborates with a repository of human-produced linguistic patterns and writing increasingly involves knowing how to instruct or prompt the model as well as critically curate the generated outputs rather than writing every sentence from scratch. This resonates, not only with Ronald's episode, but with the present findings overall.

6.2 Between established notions of writing and new writing practices

While outsourcing and humanizing represent more extreme forms of chatbot-mediated writing, the remaining findings provide nuanced insights into how students, and teachers, stand at the crossroads between established notions of writing and emerging writing practices. On the one hand, the writing process is still a recognizable situated classroom practice shaped by various interactions, cycles of writing, feedback, employment of tools and institutional expectations (Berge et al., 2016; Dysthe et al., 1993). On the other hand, by foregrounding the mediational aspect, the study shows how chatbots shape the process as more than mere new writing tools. Students' writing actions have become oriented toward managing, evaluating, and reshaping algorithmically generated language rather than, or as well as, producing text independently. This also challenges the teacher's role as writing instructor because the feedback, guidance and evaluation of the writing process must account for these chatbot-mediated actions.

Previous research on chatbots has pointed to how students perceive them as beneficial for understanding tasks, generating ideas, retrieving information and supporting writing (see, e.g., Boillos and Idoiaga, 2025; Yan, 2023). Others discuss how students form co-writing partnerships (Guo et al., 2024; Svenlin, 2025) and engage in hybrid writing practices (Hutson et al., 2024). These patterns are also evident in the present study research. What the current analysis further nuances, however, are the individual students' varying abilities to make situated choices

about how and when to engage with, adapt or disregard chatbot output. Across the material, students spent substantial time generating content that they then had to evaluate and integrate according to their existing writing skills, subject knowledge, and motivation for writing. This is particularly visible in themes concerning variations of integrating generated text and getting feedback from the chatbot. The challenges can be understood in terms of Mishra (2025) “the novice’s dilemma” (Mishra, 2025). Students are learners, not subject experts. Therefore, they may lack both the disciplinary knowledge required to assess the output as well as a deep understanding of what generative AI tools afford or not.

Empirically, this was reflected in students’ prompts which often resembled regular internet searches rather than advanced attempts to customize specific output or engage in dialogue with the generated content. Instead, students often treated output like static websites. In this sense, making use of generated output resembles how students have integrated digital content in their writing for years (see, e.g., Furberg and Rasmussen, 2012; Skaar, 2015). The crucial difference, however, is that generative AI introduces new questions about trustworthiness and academic integrity.

6.3 Academic integrity, human control, and voice

Concerns about academic integrity, cheating and plagiarism are well documented in existing research (Yan, 2023; Zhao et al., 2024). Also, lack of regulations and guidelines have been addressed (Barrett and Pack, 2023; Bueie et al., 2025) as well as calls to reconceptualize plagiarism and responsible use (Yan, 2023). Challenges of academic integrity are also prominent in the current study. Students’ and teachers’ actions and conversations reflect a view of writing as an individual endeavor where using their own words is crucial and others’ words must be documented and referenced. Students are allowed to use chatbots but at the same time chatbot use is contested and one runs the risk of being accused of cheating. The uncertainty of where legitimate support ends and cheating starts, leads to tacit practices of trying to camouflage or superficially comply with expectations regarding chatbot use.

What this study contributes to is not a resolution, but an empirical demonstration of how difficult these questions are to navigate for both students and teachers. Established notions of plagiarism or referencing do not necessarily align with how chatbot-generated text is produced, revised, or integrated during writing processes.

Questions of responsible use are also related to concerns of maintaining human control and voice when writing. Previous research has found that students value writing texts that reflect their own words, thoughts and personalities, and fear losing ownership and agency (Hutson et al., 2024; Wang et al., 2024). The present study adds nuances to such findings by making visible concrete acts where students attempt to maintain control by integrating generated text purposefully, expressing that chatbot suggestions do not fit their style or deliberately using words that have not been suggested by the chatbot. While Levine et al. (2024) found that students rarely copied content in the early phases, the thematic timelines nuance show that integration occurs throughout the process and that copying can also function as asserting control, like Nora’s example. Also, in contrast to Levine et al. (2024), Ingrid and Niclas demonstrate resistance when selectively accepting or integrating feedback during revision.

The considerable variations across the material, and the recurring challenge of establishing what counts as one’s own words or voice in chatbot-mediated writing, makes it difficult to determine when students deliberately try to maintain human control and voice and when they do not. From a sociocultural perspective these variations underscore questions of agency. Even with access to the same mediational tools, their abilities, motivations, and opportunities to negotiate, resist or appropriate chatbot affordances differ and shapes how agency is enacted in practice.

6.4 Who – or what – is writing now?

Overall, findings from this study contribute to the field by making visible how upper secondary students’ chatbot-mediated writing practices unfold as diverse, complex and at times contradictory actions as they integrate generated content, get chatbot feedback, navigate academic integrity or even outsource and humanize the writing work.

In a research field still dominated by HE students’ perceptions, the study also contributes methodologically through video-based analysis of school-aged students’ interactions with the emerging technologies. Chatbot-mediated writing is not a uniform or established practice and there is no canon of use that students, or teachers, draw on. Instead, the timelines, themes and episodes make visible how the students try to navigate and make sense of contemporary writing realities.

Finally, the title of this paper, and section, alludes to questions both of what writing is, or becomes, when chatbots are introduced but also questions of the human-tool relationship. Findings in this research not only explore writing as a phenomenon but may also contribute to moving established sociocultural conceptions of mediated action and humans as masters of technology. Conversational chatbots are and must on the one hand be understood as text-generating tools built on statistics, without consciousness or other human traits. On the other hand, however, they are built on human language and generate signs that we, as humans, can make sense of. This dual nature blurs the distinction between tools and sign, raising questions about the relationship between human agency and the technologies mediating their actions. In the current study the data displays how student agency not only involves mastering and appropriating the tools, but also how the chatbots exert a type of agentic influence on the students’ writing. If writing with chatbots simultaneously involves both human and artificial voices, whose voice, so to say, speaks the loudest and holds authority? I believe this interplay not only calls for empirical answers, but also a renewed theoretical attention to agency and writing as mediated actions in the context of generative AI.

7 Concluding remarks and future research

The findings demonstrate that chatbot-mediated writing is not about adding new tools to existing practices. Instead, it challenges and changes notions of authorship, academic integrity and the nature of writing and writing instruction. This points to several implications for teachers, teacher educators, policy makers, researchers, and other stakeholders.

First is the importance of making chatbot-mediated writing practices visible and talked about in the classrooms. By facilitating meta-conversations, teachers can help students critically reflect on the

varying purposes of writing, both with and without the chatbots and support them to make conscious decisions. Open conversations can likewise help teachers understand students' new writing practices and nuance their own notions of writing with generative AI. Findings from this study can be used as cases to start conversations in schools and teacher education.

Second, contemporary writing instruction should foster competencies connected to the identified chatbot practices. At the core of this is supporting students to develop profound understandings of the technology, including how text is generated, prompting skills and critical assessment of the output. Importantly, it also means revitalizing established and enduring aspects of writing instruction in light of the new technology. This includes teaching the students metacognitive skills to monitor their writing process and facilitating (human) dialogue and feedback, and promoting the notion of writing as a recursive activity where the process itself, not just the finished product is valuable. To achieve this, teachers themselves need to learn about and practice using chatbots in their own writing to develop a deep mastery of the technology. Mastery does not imply uncritical appropriation or endorsement of chatbot technologies. Instead, it enables professional agency and the competencies necessary to support students' critical awareness of writing with chatbots. Opportunities for continuing professional development for in-service teachers thus become vital, and pre-service teachers need quality training in their education. Teacher educators can play key roles by offering quality research-based courses, trainings and continuing professional development programs. School leaders can support in-service teachers by facilitating collaboration and allocate time in the professional community.

Third, the findings make visible the challenges of contemporary writing and instruction versus established assessment practices on local and national policy levels. They underline the need to revise curriculum and develop nuanced guidelines that not only regulate, as in forbid, but also include current practices. Responsible use involves transparency, ethical responsibility and emphasize that students are intellectually and practically accountable for their products.

The aim of this study was to describe and interpret students' mediated actions when writing in an authentic classroom setting. It is based on ten participants and does not seek to draw generalized conclusions, but rather understand the particular, in-depth. As such, the study offers analytical insights that might be transferable to similar educational contexts. Other patterns of chatbot-mediated writing may have been developed in studies involving a larger or differently composed group of students. Because the students wrote a subject-specific, formal essay, the genre might have shaped the chatbot-mediated practices. Future research could therefore examine whether other genres produce different patterns of mediation. Also, this study did not assess the quality of students' choices, the transfer to their final essays or how chatbot use relates to their writing skills, academic achievements or second language backgrounds. Such relationships could be further investigated through designs that for example, included knowledge post-test or comparisons of students' final text with their chatbot logs. Future studies could also conduct in-depth analysis of specific practices identified here, such as outsourcing and humanizing the writing work. Longitudinal designs that follow the same students would provide insights into how chatbot-mediated writing and instruction develop over time. Finally, research should attend further to teachers' roles and classroom actions in shaping students' chatbot-mediated writing practices.

Data availability statement

The raw datasets presented in this article are not readily available to be shared, as they are from minors under 18. Requests to access the datasets should be directed to stine.m.brynildsen@hiof.no.

Ethics statement

The studies involving humans were approved by the Norwegian Agency for Shared Services in Education and Research. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

SB: Writing – original draft, Writing – review & editing.

Funding

The author(s) declared that financial support was not received for this work and/or its publication.

Acknowledgments

I wish to thank Professor Ingeborg Krange and Associate Professor Maja Michelsen for the many readings, insightful comments and valuable support which have significantly improved my work. I also thank my research community in particular at Østfold University of Applied Sciences for valuable discussions and feedback during the process.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Generative AI statement

The author(s) declared that Generative AI was used in the creation of this manuscript. Generative AI (Copilot and ChatGPT) has been used as part of writing the manuscript, for language refinement (such as proof-reading, shortening text and sentences) and editorial assistance (such as helping improve clarity, structure and coherence). All AI suggestions have been carefully assessed by the author and

implemented or refused accordingly. I take full responsibility, both ethically and intellectually.

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