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Sharing knowledge with peers: Epistemic displays in collaborative writing of primary school children

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A B S T R A C T

In focus for this study are epistemic displays in peer talk, throughout collaborative writing events in the context of inquiry learning. Conversational data was obtained from small groups of primary school students (aged 8–12 years). By means of Conversation Analysis, we found that epistemic displays are produced as (i) accounts, (ii) responses to a request for information, (iii) other-corrections, and with reference to the propositional content of a previous epistemic display, as (iv) disagreements, and (v) expansions. The occurrence of epistemic displays is related to specific aspects of the writing activity, concerning contexts that require accounting or evoke expansions, and features of the participation framework. Our research contributes to the understanding of how collaborative writing activities establish contexts for sharing and discussing knowledge in peer talk, and are worth taking into account for educational professionals, when designing collaborative writing activities for that purpose.

1. Introduction

This paper explores how collaborative writing, in the context of inquiry learning projects, creates environments for primary school students (8–12 year olds) to display and share knowledge. Previous research has convincingly established how trajectories of joint knowledge building can be observed in peer talk, for instance when writing together, but the fundamental action of *sharing knowledge with each other* has so far been underexposed. Analyzing this aspect of peer talk is important, since understanding how writing together may elicit tacit knowledge or bring to the fore knowledge that would otherwise remain unexpressed, will provide a more profound insight into how processes of learning together come about. The acquisition and demonstration of knowledge by students, is regarded as an important aspect of classroom interaction (Gardner & Mushin, 2017): "Children's displays of knowledge, as well as their prior experiences and interests, are resources for teachers to draw on to facilitate opportunities for children to build new knowledge across curriculum and social aspects of classroom life" (Houen, Danby, Farrell, & Thorpe, 2017, p.57). Houen et al. (2017) showed that the variety of knowledge children bring into the classroom, originates from experiences both within and outside the classroom. A key question then is how opportunities may be facilitated in collaborative work, to create conditions that trigger sharing knowledge among students. To disclose how children share what they know while writing together, we have analyzed, by means of Conversation Analysis (Sacks, Schegloff, & Jefferson, 1974), how epistemic displays are produced in sequences (Schegloff, 2007) of peer talk throughout different writing events. An *epistemic display* is defined as an assertion with which a participant explicitly

demonstrates (Koole, 2010) world-knowledge (Bereiter, 2002), in the course of the interaction. In the following paragraphs, we will present a brief overview of what is known from literature on knowledge building discourse in peer dialogue, in particular regarding collaborative writing and learning, and explicate that a sequential analysis is needed to disclose which contexts make it relevant for children to produce epistemic displays, when talking and writing together.

From a sociocultural perspective on learning (Littleton & Mercer, 2010; Mercer & Howe, 2012; Tynjälä, Mason, & Lonka, 2001), cooperative work, in which students are (increasingly) oriented towards knowledge of others both within and outside the classroom, is understood to be beneficial for learning. Dialogic practices (Alexander, 2008; Kim & Wilkinson, 2019; Vrikki, Wheatley, Howe, Hennessy, & Mercer, 2019; Wegerif, 2011), aiming at these intersubjective orientations, are characterized by meaningful activities with a focus on reaching shared understanding of a task, sharing ideas, and supporting and encouraging each other to contribute and to value all contributions. Education and cognitive development are considered as cultural processes, in which a students' learning means moving to full participation in cultural practice (Bereiter, 2002), whereby meaning and knowledge are 'co-constructed' as joint interactional accomplishments (Rojas-Drummond, Littleton, Hernández, & Zúñiga, 2010). This is in accordance with the fundamental ideas of Vygotsky, who proposed that the zone of proximal development is an essential feature of learning, in which the role of social interaction is indispensable: "learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers" (Vygotsky, 1978, p.40). Knowledge of students within these trajectories of joint reasoning (Littleton & Mercer, 2010; Mercer & Howe, 2012), is not a stable pre-existing state, "since access to knowledge may be granted in the course of an interactive event. Participants' state of knowledge may change from moment to moment when information is produced by other participants or discovered in the surround" (Keevallik, 2011, p.2881). Opportunities for sharing knowledge, may thus be created in collaborative content-based activities, that aim at evoking forms of joint reasoning in peer interaction (Howe, 2010; Littleton & Mercer, 2010; Mercer, 2004; Rojas-Drummond et al., 2010; Wegerif, Mercer, & Dawes, 1999). Bereiter (2002) argues that discovery learning, or inquiry learning (Littleton & Kerawalla, 2012), is a context that is especially suited to prompt knowledge building discourse. Educational psychologists with a dialogic perspective on learning (Alexander, 2008; Mercer & Littleton, 2017; Vrikki et al., 2019), characterize different forms of dialogue in student-student interaction based on Mercer (2004) and Littleton and Mercer (2013), of which so called *exploratory talk* is regarded as the most educationally effective. In this type of discourse, participants engage critically with ideas, reason together, provide arguments and attempt to reach consensus. Another type, to which some educational value is attributed (Vrikki et al., 2019), is *cumulative talk*, in essence characterized as uncritically accepting accumulative ideas. Following a dialogical perspective on learning, trajectories of sharing knowledge in peer talk, are to be considered as embedded in situated, occasioned communicative practices (Knight & Littleton, 2018), like writing together. Previous research has established how collaborative writing may promote joint reasoning, as we will elucidate in the next paragraph, although these studies also did not address specifically how sharing and discussing knowledge is evoked to begin with, when students create one written product together.

Collaborative writing (Bremner, Peirson-Smith, Jones, & Bhatia, 2014; Fernández Dobao & Blum, 2013), in which participants share responsibility for the intended written product, is considered to have an effect on content learning of the participants (Donahue & Lillis, 2014; Klein & Boscolo, 2016; Rojas-Drummond et al., 2017; Van Steendam, 2016). Studies that were conducted in middle and upper grades of primary schools, demonstrate for instance how students were engaged in processes of joint brainstorming and intersubjectivity (Rojas-Drummond, Albarrán, & Littleton, 2008), and build on each other's' ideas in an extending manner (Klein, 2014). The different genres (Hyland, 2007) students worked on in these studies, were narratives and explanatory texts. Other studies report on how the interaction during the joint construction of integrative summaries based on given texts (Rojas-Drummond et al., 2017; Rojas-Drummond et al., 2006), or stories in the context of science education (Ritchie, Tomas, & Tones, 2011) may enhance content learning. Writing activities in these studies are conducted from a functional approach of writing, with an emphasis on content knowledge (Blikstad-Balas, Roe, & Klette, 2018), which corresponds to Writing in the Disciplines, the domain-specific conception of writing-to-learn (Klein & Boscolo, 2016). In a systematic review of 46 studies on writing-to-learn in science education within that tradition, Gere, Limlamai, Wilson, MacDougall Saylor, and Pugh (2019) listed four components of writing tasks as profitable for learning: meaning-making writing tasks, interactive writing processes, clear writing expectations and calling on metacognition. In primary education, the widely used Science Writing Heuristic (see also Keys, 1999a,b), a template that guides the writing together process about a scientific research project, and stimulates interaction extensively at all stages of the writing together-process, proved to be a highly effective tool. Klein and Boscolo (2016) emphasize that the interactive writing processes, including whole-group and small-group discussions, are at the center of the SWH-approach and that may be an important explanation for the success of this tool. Nevertheless, while the available research demonstrates that peer talk during writing together may stimulate learning, no studies in this field have been conducted to uncover the precise nature of how writing together initially evokes sharing knowledge.

To analyze how the occurrence of epistemic displays is embedded in peer talk while writing together, a more fine-grained analysis is needed to uncover how sharing knowledge is elicited in these contexts. This can be realized by analyzing sequences (Schegloff, 2007) of peer talk, as carried out in the tradition of Conversation Analysis, henceforth CA, in which a sequence is regarded as an ordered series of turns through which participants accomplish and coordinate an interactional activity (Mazeland, 2006). Researchers who are aligned with this approach, are primarily concerned with what participants make observable for each other in interaction (Koole & Elbers, 2014): what conversational actions are recognizably being done by a speaker, and what sort of responses are made relevant for the next speaker? The basic methodological principle of CA is that the interactional meaning of an utterance is established retrospectively, in the course of the interaction following that utterance (Gosen & Koole, 2017). Sequences, or series of turns, are therefore analyzed from a participants' perspective "to see what course (s) of action may be being progressively enacted through them, what possible responses may be being made relevant, what outcomes are being pursued, what 'sequences' are being constructed or enacted or projected" (Schegloff, 2007 p.3). Approaching conversational data in this manner, allows a deeper insight into

how actions that involve producing epistemic displays, are made relevant from a participants' perspective. Damşa and Ludvigsen (2016) refer to actions involving knowledge as the epistemic aspect of interaction, ranging from sharing information from sources to generating own knowledge. Enfield (2011) explains how participants demonstrate knowledge through observable actions, by giving reasons and by making inferences to consequences. A few studies have focused on how students demonstrate knowledge in classroom interaction, although these are all focused on teacher-student talk, and not on peer dialogue. Koole (2010) establishes how specific sequential contexts invite claims or displays of knowing, in the context of explanatory discourse units in math education. His study shows in detail how knowledge displays are interactionally established in question-answer sequences, for instance when a teacher invites a display of understanding, with a tag question (*yes*?), at the end of an explanatory discourse unit. Another study from the perspective of teacher-student interaction was conducted by Margutti (2006), who determined different questioning patterns of primary school teachers in instructional activities, to prompt the production of epistemic displays. Hence, applying CA to our data of collaboratively writing students, may add to a more systematic and comprehensive understanding of how students come to share knowledge in sequences of peer talk. Main question is: which sequential contexts make it relevant for the children in our data to show what they know to their peers? Building on insights related to dialogic practices in classroom interaction and joint reasoning in peer talk while writing together, this study aims to uncover how the production of epistemic displays is evoked within different sequential contexts in peer talk.

2. Method

2.1. Context

To understand how epistemic displays are produced and handled in various writing activities, we have used a qualitative approach informed by the methodology of Conversation Analysis (Sacks et al., 1974; Schegloff, 2007). Data for this study was taken from six primary schools in The Netherlands, in the period 2012–2015, who participated in a multiannual project, carried out by the Centre for Discourse and Learning at NHL Stenden University of Applied Sciences. The research project was built on the principles of Educational Design Research (Plomp & Nieveen, 2007; Walker, 2006), and the main goal of the overall project was to acquire more understanding of how face-to-face peer interaction may contribute to both knowledge building and language proficiency, in the context of inquiry learning (Bereiter, 2002; Littleton & Kerawalla, 2012). The study reported in this paper contributes to the main goal of understanding how processes of *joint knowledge building* may emerge in discussions during collaborative writing events, within this pedagogical context of inquiry learning.

The students of grades 2–6 (aged 8 to 12 years) worked in pairs or small groups of different ages, on small-scale projects on their own research questions, for about three weeks in two periods each year. In the intervening periods, specific pedagogical interventions were implemented, with a focus on creating conditions for stimulating exploratory talk (Mercer & Littleton, 2013) in the context of collaborative reading and writing. The children used a format for conducting their research stepwise in five phases, and themes were for instance *Superheroes*, *King's Day*, *Clothing*, *Machines & Appliances* and *Local history*. Whether or not students would write during their project, was dependent on choices made by the individual groups. In the organization of the collaborative work during the research projects at the schools, all participants equally held each other responsible for the outcome of a collaborative writing event, and in all cases (with the exception of one project, represented in excerpt 2), students were producing one written product together. Teachers were not involved and no specific instruction was provided, with the exception of three cases at one school, in which students were encouraged to use an instruction card holding information about the overall structure and the different components of a formal letter.

2.2. Data

In this context outlined above, we have made video recordings of students performing various collaborative writing activities (Bremner et al., 2014), during all stages of their research project. We were able to record writing activities of 38 small groups (in which some students are represented more than once). A total number of 76 different students from middle grades (aged 8–10 years old, 48 participants) and upper grades (aged 10–12 years old, 28 participants) were involved in the writing events in our dataset. The classification 'middle grades' refers to students from grades 2–4, and 'upper grades' refers to students from grades 4–6. The schools used different systems to arrive at a division of the children into groups, and very small schools in rural areas (less than 40 students), combine different grades in one classroom. Table 1 provides an overview of the 38 writing events the students were engaged in, categorized in terms of the intended written products. A *writing event* is regarded as a series of goal-oriented communicative actions to create a text together, which definition is in line with how *speech events* are characterized from an ethnographic perspective on communication (Hymes, 1972).

Total time of the recordings is 7 h and 34 m, with an average of around 11 min for a writing event. In 30 events, written products were created using pen and paper, and in 8 cases students used a word processor or presentation program on a desktop computer: for writing notes (5 events), a report (2 events) and for creating a PowerPoint presentation (1 event). All co-writing activities (Saunders, 1989) displayed the cyclical and iterative cycles of planning, translating and revising (Flower & Hayes, 1980; Hayes, 1996, 2011;

Table 1

Overview dataset.

Written products	Main activity	Number of events
Plan of action	Articulating research questions in learning log	6
Reflection	Reflecting on activities or progress in learning log	3
Mind map	Exploring a new research topic	3
List of questions	Formulating questions for an interview	3
Letter	Writing a letter to collect information	6
Notes	Taking notes while reading (online) source texts	8
Story	Writing a story about research findings	2
Report	Writing an informational text about findings	3
Poster	Writing short texts or captions at pictures	3
PowerPoint	Writing short texts in a presentation	1

Vass, Littleton, Miell, & Jones, 2008), with varying length of these different phases.

2.3. Analysis

The video recordings were transcribed according conventions of Conversation Analysis (Sacks et al., 1974), to enable fine-grained analysis of the interaction; see Appendix A. As a first analytical step, we selected all sequences in which an epistemic display occurred, as a point of departure for further examination. We regard an *epistemic display* as an utterance that demonstrates (Koole, 2010) world-knowledge (Bereiter, 2002). This world-knowledge is referred to as the *propositional content* (Enfield, 2011) of the epistemic display. In our analysis, the term *epistemic display* will be used solely when referring to *on-topic* demonstrations (Koole, 2010) of world knowledge (Bereiter, 2002). For example, in a conversation of two students who are generating interview questions for the owner of a camping annex bar, the utterance *there is also a disco ball* (referring to the dance hall at that location) is regarded as a relevant (on-topic) epistemic display, but the utterance *my hand is a little nail bigger than yours* in the same conversation, is not included in our analysis, since this statement is evidently off-topic. On-topic epistemic displays have a clear connection with the overall research theme or related sub topics and research activity, regardless of the origin or nature of the knowledge. By contrast, off-topic epistemic displays have no connection with the research project, which motivates our choice to exclude these examples from the dataset, since we are primarily interested in how task-relevant content knowledge is shared with peers. The world-knowledge that is represented in the on-topic epistemic displays, is referred to as the *propositional content* (Enfield, 2011) of an epistemic display. The propositional content may include instances of everyday knowledge, that children have appropriated and use in their daily activities in the home and community, and the special subject matter or scientific knowledge that children come in contact with in school (Hedegaard, 2008). The latter type of knowledge can also be characterized as 'school knowledge' (Freebody, 2013), which is explicit, verifiable knowledge that plays a central role in education. A subsequent analysis of the sequential position (Schegloff, 2007) of these epistemic displays, was used to establish what conversational actions (Heritage, 2012; Levinson, 2013) were conducted. This enabled us to create sub collections (Clift & Raymond, 2018; Mazeland, 2006) of sequences in which an epistemic display is produced, each representing a different action. A further sequential analysis then showed us how participants respond to the epistemic displays, which we refer to as the *uptake* (Enfield & Sidnell, 2017) of the actions. For this paper, all uptakes holding epistemic displays were selected for further analysis. Finally, drawn from this exploration, we disclosed how the occurrence of epistemic displays is related to specific features of the writing events the students are engaged in.

3. Epistemic displays in different conversational actions

The systematic analysis of sequences in which epistemic displays occur, enabled us to discern the different conversational actions that are accomplished when producing epistemic displays. The sequential analysis demonstrated that epistemic displays occur in the following categories: (i) accounts (32 instances), (ii) other-corrections (5 instances), and (iii) responses to a request for information (48 instances), and in the *uptake* succeeding epistemic displays occur as (iv) disagreements with previous epistemic displays (46 instances), and (v) expansions on previous epistemic displays (31 instances). Before we discuss our findings in Subsections 3.1 to 3.5, we will briefly consider the nature of the knowledge children share with their peers.

With regard to the propositional content of the epistemic displays, the in this paper presented excerpts provide representative examples of the nature of the world-knowledge that students display in our data. Children express specific content knowledge about research themes, and some of these demonstrations may be characterized as linguistic knowledge concerning word meaning, and knowledge from special subject matter (Hedegaard, 2008), like historical and geographical facts. In addition, students display

knowledge from everyday life or personal experiences, for instance about hobbies or pets, or family activities, related to their research theme. Several examples of this may be drawn from conversations that are represented in the excerpts in this paper. For instance, when talking about general consequences of an earthquake (see excerpt 1), the students discuss the fact that the school building they are in, is quite solid and will probably not collapse in case of such an event. When preparing for the interview with a hammer smith (see excerpt 2), one student shares that he has been to the smithy before with his mother, to get new buttons on a jacket. When the same students are discussing whether or not there may have been a fire at the building of the hammer smith in the past, more abstract ideas about how a professional transfer in a smithy works (*the people who work there now will have heard that information from the people who used to work there*) and knowledge about the route of the fire department through the village (*we would have seen the fire trucks pass by*), contribute equally to this discussion. Likewise, in a conversation of four girls about whether or not a dance teacher can work as a professional dancer at the same time (see excerpt 8), one student brings forward that her cousin was once the national champion of judo, and was teaching judo lessons in that same period, to account for the idea that this combination is indeed possible. The different types of knowledge are to a great extent intertwined, and students constantly swift between knowledge that represent more general or abstract topic knowledge, which may originate from experiences within the classroom, and from personal, everyday life. Overall, the nature of the knowledge is primarily related to the topic under discussion, and not bound to specific writing activities or genres.

3.1. Epistemic displays in accounts

Epistemic displays that function as an account have four main uses: (i) an account for a proposal, (ii) an account for agreement with a proposal from a peer, (iii) an account for rejecting a proposal (almost half of the cases), and (iv) an account for an other-correction. Excerpt 1 provides examples of how epistemic displays function as an *account for a proposal for content* ([1]→), and as an *account for agreement with a proposal* ([2]→). Three students, Alice, Daisy and Sinan, are writing a letter to a Dutch minister about earthquakes due to gas drilling in the north of The Netherlands. At this point, Daisy proposes to ask the minister to stop gas drilling.

(1) Gas drilling

```
49.   Daisy          stoppen,
                      to stop,
50.   Alice          nee ma[ar niet stoppen
                      no [but not to stop
51.   Sinan              [met gas boren.
                         [with gas drilling.
52.                  (1.0)
53.   Alice   ¹→     niet (.) juist niet stoppen gewoon iets minder doen.
                     not (.) just not to stop just do a little less
54.                  wa:nt als ze gaan stoppen dan (.) dan kunnen we toch
                     becau:se if they will stop then (.) then we can't
                     niet leven?
                     live, right?
55.                  (0.5)
56.   Daisy   ¹→     ↑jawel (.) ze halen gewoon ergens anders gas.
                     ↑yes (.) they just get the gas somewhere else.
57.                  (1.0)
58.   Sinan   ²→     hutss dat kan,
                     hutss that's possible,
59.   Alice          ja ma[ar
                      yes [but
60.   Sinan   ²→         [beter voor ons
                         [better for us
61.                  (0.5)
62.   Alice          een beetje uhm:: minder willen ((schrijvend))
                     a little uhm:: want to less ((writing))
```

Alice disagrees with the proposed idea (line 50), and she repeats her rejection of the idea in lines 53–54 accompanied by an alternative proposal: just drill a little less gas. To support her proposal she claims *that we cannot live when there is no more gas drilling,*

formatted as a rhetorical question soliciting agreement. However, Daisy then rejects this idea and accounts for her disagreement by asserting that they (the Dutch government) can get gas elsewhere (line 56), which supports her initial idea. Sinan agrees, by claiming that this is indeed possible (line 58), followed by an account for this agreement, in which he asserts that to stop gas drilling is 'better for us' (line 60). After this, Alice writes down the request to drill less gas, putting aside the objections of her peers.

Excerpt 2 illustrates epistemic displays that *account for rejecting a proposal for text content*. In this example, four students are generating interview questions for a hammer smith. In line 88, Mike proposes to ask the hammer smith if he produces electrical devices.

(2) Hammer smith (part 1)

```
84    Olivia        ik weet 't °niet°(.) weet jij het ↑pAUla ((iedereen
                    I don't °know° (.) do you know one ↑pAUla ((everyone
85                  kijkt naar paula))
                    gazes at paula))
86    Mike          ik wee:t er ee:n (.) deze is echt vet goed
                    I kno:w o:ne (.) this one is really good
87    Paula         oké ↑welke
                    okay which ↑one
88    Mike          maak je °ook°(.) mAken ze ook  elektrische ma[chines
                    do you °also° (.) do they also prodUce electric de[vices
89    Liam    →                                                  [nee::
                                                                 [no::
90                  ((schudt hoofd)) want van vuur kun je geen elektrische
                    ((shakes head)) because from fire you cannot make
91                  machines maken.
                    devices.
```

In lines 90–91, Liam declines the proposal and accounts for this action with the epistemic display that electrical devices cannot be made from fire. This fragment illustrates how epistemic displays function as accounts for rejecting the propositional contents of a proposal. In this case, the proposal is not accepted, which means no new content is written down.

Another way in which an epistemic display functions as an account, is in relation to an *other-correction*. The epistemic display of a student then justifies correcting a previous turn. In excerpt 3, four students are generating sub questions on their research project about the history of Friesland, the region they live in that is situated in the north of The Netherlands. The fragment starts with a proposal for a question by Matt (line 209), followed by the initiation of a correction sequence (line 211) by Yara.

(3) History of Friesland

```
209   Matt          wat was het mooiste deel van friesland?
                    what was the most beautiful part of friesland?
210                 (.)
211   Yara          was?
                    was?
212                 (.)
213   Matt          wat was het mooiste deel van friesland?
                    what was the most beautiful part of friesland?
214                 (.)
215   Yara    →     WAS (.) maar friesland bestaat nog.
                    WAS (.) but friesland stil exists.
216                 (0.6)
```

In line 211 Yara asks *was*? which leads to a repeat of the utterance (line 213) by Matt, indicating that he assumes that Yara did not hear his utterance properly. Then Yara repeats her utterance, but stresses the word 'was', and provides an account for correcting her peer: *but Friesland still exists*.

To sum up, students account for a proposal, agreement with a proposal from a fellow student, rejecting a proposal, and for an other-correction, by producing epistemic displays. Contexts in which accounts are provided in the context of (handling) proposals, were especially observed when students were writing a letter (see also Section 4). Incidentally, in writing events that focus on generating questions for a letter or an interview, students shared little or no substantive knowledge. We observed for instance how the interaction of three boys writing a letter to collect information, focused primarily on the procedural and secretarial aspects of the intended written product (e.g. the address of the school and where to put that in a letter). Rojas-Drummond et al. (2017) observed a

similar phenomenon in cases when students lacked a clear understanding of how to approach their writing task.

Considering the different writing events, we noticed that accounting for proposals and (dis)agreement with proposals of others, are particularly salient in writing events that aim at generating research questions in a plan of action, constructing a list of questions for an interview, or writing a letter to an expert to obtain information about the research theme. Accounts for other-corrections are not bound to any specific writing activities.

3.2. Epistemic displays in responses to a request for information

The second main category of responsive conversational actions that are accomplished by producing an epistemic display, are answers to requests for information. When a student initiates an information request, an answer holding the required information, is a type-conforming response (Koole, 2010; Koole & Verberg, 2017; Raymond, 2003; Schegloff, 2007). This answer then holds an epistemic display, and in our data different sequential contexts were found in which students demonstrate knowledge, treating a variety of actions as a request for information. We found epistemic displays in responses to (i) an explicit request to make a contribution, (ii) a clarification request, (iii) a display of not-knowing by a peer, and (iv) proposed research or interview questions.

A first type of information request that is responded to by producing an epistemic display, is after an explicit request to make a contribution, for instance *What do you know about breakdance*?, in a conversation of three girls creating a mind map together. Another illustration, in which a contribution is evoked with a request for information, is given in excerpt 4. In this fragment of three students creating a mind map about wind energy, two sub topics are addressed: why are people in favour of wind energy, and why are people against wind energy, or more precisely wind mills? In line 41 Toby asks *why are people in favour*?, being an explicit invitation to contribute.

(4) Wind energy

```
41   Toby    →   wat is eh (.) waarom zijn mensen er nog voor,
                 what is uh (.) why are people also in favour
42   Amber        ↓ehm
                 ↓uhm
43   Toby         e:hm
                 u:hm
44   Amber   →   omdat ze geen gas hoeven te betalen,
                 because they don't have to pay gas,
45   Toby         [ja
                 [yes
46   Max          [ja
                 [yes
47               (.)
48   Toby         dat is ↓ook wel weer waar.
                 that is ↓also true.
```

In line 44 Amber produces an epistemic display: *because they don't have to pay for gas*. The other two students confirm this (lines 45–47). A request for new information on the topic, may also be formatted in a more general manner, like: *can you think of anything else*? The responses to these types of invitations, contain epistemic displays. A very similar context that elicit demonstrations of knowledge, is when students write in their learning log, that was used to keep track of the research process. After each working session, the students used pre-given questions to record new discoveries or information, and to plan the next steps in the research process. Main question in the learning log, is *What did we discover*?, which is always read aloud, since not all students have direct access to the text, due to the group arrangement. The question then becomes part of the verbal interaction as a form of reported speech (Nissi, 2015), and students' responses contain demonstrations of knowledge. For instance, when one student read aloud *What did we discover*?, another student replied with: *that Samhain is a Celtic word* (regarding a research project on Halloween). In some cases, students read aloud their research questions from the learning log, in order to check whether or not they have already found the answers. Examples from a conversation between three students writing in their learning log, are: *How was the enclosure dam build*? (read aloud), which is responded to with *Just with volunteers*, followed by *Who has designed the enclosure dam*? (read aloud), which is responded to by *That is Lely*.

The second type of request for information that evokes producing epistemic displays, is formatted as a question for clarification, for instance about word meaning, as exemplified in excerpt 5. Four students are generating research questions on their theme 'farms in former times' and the current topic is agriculture. After Oscar starts to formulate the question 'what is the most suitable', having trouble pronouncing this latter word (line 228), Erin then introduces the word 'crop' in line 232.

(5) Crop

```
228    Oscar      WAT is het geschrikst- het geschrikste e::h
                  WHAT is the most suilt- the suilt u:h
229    Erin       geschikte
                  Suitable
230               (0.4)
231    Oscar      [landbouw
                  [agriculture
232    Erin       [gebouw- geWAS
                  [agrop- CROP
233               (.)
234    Oscar      ja. gewas. (.) dat wou ik ook zeggen
                  yes. crop. (.) I wanted to say that too
235               (.)
236    Rose       >wat is dat gewas?<
                  >what is that crop?<
237               (.)
238    Erin    →  een gewas is een soort groente of zo wat je oogst
                  a crop is a type of vegetable or something that you harvest
239               en[zo
                  and [such
240    Oscar   →    [suikerbieten en zo (.) dat wou ik ook zeggen dus.
                    [sugar beet and such (.) I wanted to say that too.
241               (.)
242    Erin       wat.= ((schrijft))
                  what.= ((writing))
243    Rose       = ja. doe dat.
                  = yes. do that.
```

Rose asks what a crop is (line 236) in an interrogative format and with rising intonation, being a request for clarification as a First Pair Part of a repair sequence. With this action, Rose explicitly takes on a less knowledgeable position relative to her peers (K-initiation; Heritage, 2012), and Erin subsequently provides a response, explaining what a crop is (line 238–239). Oscar immediately elaborates on the given definition with an example: *sugar beets and stuff*, which is also an epistemic display in response to the previous request for information (line 240). When all students have shared epistemic access (Heritage, 2013) on the meaning of the word 'crop', the proposed sentence holding this term, is written down. In line 243 Rose confirms her acceptance of the description and examples, as an adequate explanation of the term, leading to her acceptance of the proposal.

A third type of utterance that is responded to as a request for information, was observed in writing events that aim at generating research questions or questions to an expert. In these contexts, we observed the phenomenon that students treat a proposal for such a question as an information request. This generates producing epistemic displays, because students tend to answer the proposed question, instead of responding to the action of proposing. Excerpt 6 illustrates this phenomenon. Four students of a school in Wornich are generating questions for a letter to children of another school in the village Shelfort, to learn more about the history of that village. In line 313 Julian calls on his fellow students to come up with a new question together.

(6) Big or small

```
313    Julian     nou nou we gaan samen een vraag bedenken ↑toch
                  now now we are going to think of a question together ↑right
314               (.)
315    Devon      Ja
                  Yes
316               (4.0)
317    Devon      is Shelfort klein of groot,
                  is Shelfort small or big,
318    Julian  →  ja dat weten wij ↓al (.) kleiner dan Wornich.
                  yes we know that ↓already (.) smaller than Wornich.
319               (2.3)
320    Julian     uhm
                  uhm
321               (0.5)
322    Carry      we moeten even e:hm
                  we have to u:hm
323    Julian     ligt het in ↑Friesland
                  is het situated in ↑Friesland
```

In line 317, Devon proposes to ask: *Is Wornich small or big?*, but Julian replies with the statement that they already know the answer to that, after which he demonstrates his knowledge: *smaller than Wornich*. The students then move on to generating new ideas, which implies that the initially proposed question is now rejected. Thus, in these specific contexts, agreeing with the propositional

content of the demonstrated knowledge, implies that the proposal for a research or interview question becomes irrelevant (since the question has been answered already), and is therefore rejected (see also Herder, Berenst, De Glopper, & Koole, 2018b).

In this subsection we have addressed the different contexts in which epistemic displays are produced as responses to requests for information. In cases of responses to requests for information about word meaning, hence related to conceptual understanding or clarification of word meaning, no specific relation to the nature of the writing event was observed. However, producing epistemic displays as a response to a proposal for a question, or as a response to an explicit request to share knowledge, were particularly found in specific writing events. Writing activities that aim at generating research questions or questions for an expert, evoke the production of epistemic displays as responses to requests for information, more than other events. This is due to the phenomenon that students treat a proposal for such a question as a request for information, answering it as such by producing an epistemic display. Concerning the explicit invitations to show what you know about a specific topic, resulting in producing epistemic displays, were particularly found when students create a mind map together, or write in their learning log. This appears to be related to the social organization of the writing events, in terms of participation: the different roles, rights and responsibilities students display in their actions. The student who writes down new content (holds the pen), then takes on a role as facilitator (Nissi, 2015), explicitly addressing the fellow students to demonstrate their knowledge. What is particularly striking is that this specific student himself makes considerably fewer contributions (and thus: demonstrates less knowledge) than his fellow students.

3.3. Epistemic displays in other-corrections

The third sequential context in our data in which epistemic displays are produced, is when performing an other-correction. An example is provided in the following fragment (excerpt 7) of two girls who are writing captions on a poster they are creating together about a visit to a polder mill. They have pasted pictures of the excursion on a big paper sheet, and Alison intends to write a caption underneath the first picture, indicating the location of the mill.

(7) Location of the windmill

```
    11   Alison        dit is de ↑poldermolen ((zet pen op papier)) (.)
                       this is the ↑polder mill ((places pen on paper)) (.)
    12                 ↑in Wornich
                       ↑in Wornich
    13   Rebecca   →   van de buitenka- ↑nee: is helemaal niet in Wornich (.)
                       from the outsi- ↑no: is not in Wornich at all (.)
    14                 [’t is in Newlan
                       [it’s in Newlan
    15   Alison        [((begint te schrijven))
                       [((starts writing))
```

In line 13, Rebecca start proposing additional information (*from the outside*), but does not finish this expansion, and instead performs an other-correction concerning the location of the mill: it is situated in Newlan, not in Wornich. In line 15, student B then starts writing down *de Newlandse molen* (the Newlander mill) on the poster, with which she accepts the other-correction (see also Herder, Berenst, De Glopper, & Koole, 2018a). In an earlier study on reflective practices of primary school students writing together (Herder, Berenst, De Glopper, & Koole, 2018b), we established how linguistic knowledge is displayed in other-corrections concerning spelling or grammar issues. Thus, epistemic displays may function as other-corrections, and as the above example has demonstrated, these actions contribute to correctness of information in the text.

The occurrence of epistemic displays in other-corrections concerning the propositional content of an epistemic display of a fellow student, proves to appear in all different writing events. However, these types of epistemic displays are bound to the moment when students are about to write down new ideas (the phase of transcription of generated content; Vass, 2007). Parenthetically, the sequential positioning of this other-correction is different from other-corrections that aim at linguistic issues, which are naturally done only after new content is actually written down.

3.4. Epistemic displays in uptakes that show disagreement

In our data, disagreeing with the propositional content of epistemic displays is exposed in responses to an *account for a proposal*, *account for an other-corrections*, *responses to requests for information*, and especially in *accounts for disagreement with proposals*, that lead to argumentative sequences, in which students demonstrate knowledge to dispute the represented knowledge of their peers. Excerpt 8 (Dance teacher) provides a basic example. Four students are writing a letter to an alleged dance teacher, named Jetty, and generating questions to learn more about her profession. Prior to this fragment, student Jolene (not in transcript) proposed to ask for how long the teacher has been dancing herself and after this, they discuss what Jetty is still capable of, considering her age. In line 74, Caitlin produces an epistemic display, that accounts for agreement with Noa's idea for the question. Caitlin designs her account with the tag question 'right?', soliciting confirmation from her peers (line 74).

(8) Dance Teacher

```
74   Caitlin        ja maar juf ↑Jetty die geeft ↑ook dansles ↑hè
                    yes but teacher ↑Jetty also teaches dance ↑right
75   Jade           ja.tt ((draait ogen weg))
                    yes. tt ((eyeroll))
76   Lara           ↑ECHT?
                    ↑REALLY?
77   Nina      →    >nee nee< alleen turnen [e:n
                    >no no< only gymnastics [a:nd
78   Caitlin                             [nee maar weet je toen met
                                         [no but then you know with
79                  >jullie ook oefening< ehm (.) wist je nog dat
                    >you also exercise< uhm (.) did you remember that
80                  grote ↑spektakel ehm SVW vijfenzestig ↑jaar,
                    big ↑spectacle uhm SVW sixty five ↑year,
```

In line 77 Nina explicitly displays her disagreement with the utterance that teacher Jetty gives dance lessons, by responding with *no no*, and subsequently adding a new epistemic display: *only gymnastics*. Adding an additional demonstration of knowledge, looks inherent to showing disagreement; we have noticed that a plain disagreement (*no*) in actual fact never occurs in our data. Lara asks for confirmation by asking *really*? (line 76), which may have contributed to Nina's response holding the new epistemic display. Note that previous to the response of Nina, Jade agrees with the epistemic display of her peer, by stating a plain *yes* (line 75), which is also uncommon in our data (in most cases, agreement leads to expansions, see Subsection 3.5). The eyeroll of Jade, may express that the idea of Jetty being a dance teacher is too logical or obvious. In line 78 Caitlin starts accounting for her idea by referring to a big festive in which she has seen Jetty dancing.

Another example of how an epistemic display functions as a disagreement with a previous epistemic display, is provided in excerpt 9, that is a continuation of the fragment in the second excerpt of this paper (*Hammer smith*). After Liam declines a previous proposal of Mike, by accounting for his action with an epistemic display (lines 90–91), an argumentative sequence follows in which Mike rejects the previous epistemic display by producing a new one.

(9) Hammer smith (part 2)

```
88   Mike           maak je °ook°(.) mAken ze ook elektrische ma[chines
                    do you °also° (.) do they also prodUce electric de[vices
89   Liam                                                         [nee::
                                                                  [no::
90                  ((schudt hoofd)) want van vuur kun je geen elektrische
                    ((shakes head)) because from fire you cannot make
91                  machines maken.
                    electrical devices.
92   Mike      →    jawel hoor (.) want je kan ook een ketting van een van
                    yes you can (.) because you can also a chain from a from
93                  een elektrische zaag
                    an electric saw
94   Liam      →    ja maar dan heb je ook nog van die gaa:tjes nodig en
                    yes but then you also need those little ho:les and
95                  dat kunnen ze daar niet maken bij een smid.
                    they cannot produce those over there at a blacksmith.
```

In lines 92–93 Mike claims in his account that B's demonstrated knowledge (lines 89–91) is not true, referring to a specific part (the chain) of an example of an electrical device, being the electric saw. Then, in lines 94–95, another example of an epistemic display occurs, when Liam claims that the chains need little holes that cannot be manufactured at a smithy. His disagreement is designed as a nuance (*yes but*) of the propositional content of the previous epistemic display. In these examples, the student makes use of specifications (chain and little holes) of the idea under discussion and logical reasoning (the resulting inability to produce a certain item at a smithy). Students thus produce epistemic displays to dispute a previous epistemic display of a fellow student. In the argumentative sequences that follow, students produce new epistemic displays, that mainly function as fine distinctions or as alternative ideas for the initial epistemic display. These uptakes are particularly observed in writing events that aim at generating research questions in a plan of action, constructing a list of questions for an interview, or writing a letter to an expert to obtain information about the research theme. In all these activities, students are engaged in proffering and discussing new ideas for questions, in which sharing individual knowledge is a key element in the conversation.

3.5. Epistemic displays in uptakes that expand on demonstrated knowledge

Expanding on the epistemic display of a peer, implies acknowledgement of the action and the propositional truth of what was said. The uptake consists of an expansion on the demonstrated knowledge, both by the first speaker (of the initial display) and by other participants. Expanding leads to additional ideas or more elaborated ideas. In our data, students expand on epistemic displays that are produced as: an *account for a proposal, account for agreement, account for disagreement, responses to a request for information*, in which students respond to proposed questions when generating ideas or invitations to share new ideas, and information in *text books*. In an expansion, the utterance builds on what is said, which may be accompanied by referring to what is noticed in an (online) source text by both students. We will provide illustrations based on two fragments from writing events: an example taken from the conversation of students creating a mind map together, and a second example from students who are taking notes from a text book.

Excerpt 10 exemplifies how expanding on a request for information may lead to more elaborated ideas for the text. Three students are creating a mind map on horse riding. The fragment starts when Lauren stops writing, and asks her peers: *can you think of one more*?, inviting them to share their knowledge on horse riding. In line 63, Megan proposes to write down the favourite food of a horse.

(10) Carrots and apples

```
59              (7.0) ((Lauren schrijft en stopt dan))
                (7.0) ((Lauren is writing and then stops))
60   Lauren     eh hebben jullie nog één,
                uh can you think of one more,
61   Megan      e:[:h
                u:[:h
62   Ivy          [e:h
                   [u:h
63   Megan      ze ete- het lievelingseten van een paard.
                they ea- the favorite food of a horse.
64   Ivy        ehm ((steekt vinger omhoog))
                uhm ((raises her finger))
65   Megan      da's wortels
                that's carrots
66   Ivy        nee een appel.
                no an apple.
67   Megan      ja dat (.) [wortels en appels
                yes that (.) [carrots and apples
68   Lauren              [((zet een streep))
                         [((draws a line))
69   Ivy        Ja
                Yes
70   Megan      [(               )
                [(               )
71   Lauren     [((schrijft))
                [((writing))
72   Ivy    →   [wortel e:n appel. (.) >lievelingseten< wortel
                [carrot a:nd apple. (.) >favorite food< carrot
73   Lauren     [((schrijft))

74   Ivy        en appel.((kijkt op papier))
                and apple. [((gazes on sheet))
```

When Megan says that carrots are what a horse prefers to eat (line 65), answering the question herself, Ivy rejects the idea, by saying 'no' and claiming that apples are the favourite food (line 66), thus performing an other-correction (Jefferson, 1987). However, Megan does not treat the utterance of Ivy as such, but rather adopts the utterance as an expansion on her own idea. Lines 67 and 72–74 then display how Ivy accepts this, and starts repeating and dictating the new ideas to Lauren, who has already started to add both suggestions to the mind map, by drawing a line (line 68) and writing down the suggestions (lines 71 and further). A second illustration of how epistemic displays may lead to producing subsequent ones, is provided in the next example. Excerpt 11 shows a fragment of two students who are working on their research project on sluices and are now taking notes from a text book. They point out different elements and examples of sluices on the images. Prior to this excerpt, Polly writes down text that is read aloud or dictated by Wesley from the text book. In lines 179–180, Polly gazes in the textbook and calls Wesley's attention to a specific spot in the textbook. She then reads aloud the words *an example of old sluice heads* (line 179) (or lock heads) and produces an epistemic display referring to the image.

(11) Sluices

```
179   Polly      ↑hé kijk! een voorbeeld van oude sluishoofden (.) OH
                 ↑they look! an example of old sluice heads (.) OH
180          →   en [dat is dus zo'n e:h sluis ((wijst aan))
                 and [so that is such u:h sluice ((points out))
181   Wesley        [((kijkt in het boek))
                    [((gazes in the text book))
182              (0.6)
183   Wesley →   ja. dat is zo'n blokding
                 yes. that is such a block thing
184              (.)
185   Polly      ↑heu een blokding
                 ↑huw a block thing
186              (0.5)
187   Wesley →   maar er zijn verschillende soorten (.) je kunt er zo'n
                 but there are different types (.) you can such a
188              soort (.) deze is met zo'n deur ((wijst plaatje aan
                 type (.) this one is with such a door ((points out
189              op de voorkant van het boek))
                 image on the cover of the book))
190              (0.4)
191   Polly  →  oh dat is met zo'n omhoog en omlaag ((beweegt hand op
                 oh that is with such an up and down ((moves hand up
192              en neer))
                 and down))
193              (.)
194   Wesley →  JA (.) dat is een soort brug of niet,
                 YES (.) that is a kind of bridge isn't it,
195              (2.0) ((leerlingen lachen))
                 (2.0) ((students are laughing))
```

Lines 179–180 display how Polly makes an inference (Enfield, 2011) when she demonstrates her knowledge. Her epistemic display concerning 'such a sluice', builds on what she has first seen in the text book. Subsequently, in line 183, Wesley confirms this and adds the epistemic display that the sluice that is pointed out by Polly, is a 'block thing'. In line 187, Wesley elaborates on the given information by asserting that there are different types of sluices. Here, he successively demonstrates his knowledge by explaining that the one on the picture has a door, and Polly then demonstrates her understanding by imitating the proposed movement of that sluice door (line 191–192), adding the epistemic display: *that is with such an up and down*. At that point, Wesley asserts that the image represents a kind of bridge, using the tag question "or not" in line 194, inviting confirmation with his epistemic display. After reading aloud fragments of information and discussing images in the text book, one student starts dictating sentences, while the other student writes them down. The examples of how students expand on given knowledge (both from peers or from texts), are representative for the different kinds of expansions that can be found in our data.

Expansions on previous epistemic displays holding new demonstrations of knowledge, are apparent in all different writing events, although writing events in which students use (online) textual sources, or create mind maps, seem to enhance this type of uptake. When students use (online) resources, like a textbook or webpages, they tend to share knowledge that builds on what is read of seen. The source, for instance an image or a heading on a news page, then functions as a trigger to display associated knowledge on the topic. An example of how epistemic displays are produced and expanded upon, was provided in excerpt 10 (Sluices). The sentence *an example of old sluice heads*, together with images in the text book, offers grounds to share knowledge about (types of) sluices and further build on these utterances. This is illustrative for how this occurs in our dataset. For example, in another writing event, two girls are taking notes from a text book about sports, and read about what 'cooling down' is. One student expands on the given information, by referring to her own habit of running more and more slowly after her sports activity, and subsequently adds that this also applies to horses after riding. Likewise, in another note-taking event, a student states that the Dutch gymnast Epke Zonderland has become the world champion, after gazing at his image when scrolling on the internet.

To recapitulate, Subsections 3.1 to 3.5 have demonstrated how different sequential contexts in (specific) writing events prompt the production of epistemic displays. We have shown how these utterances are initially produced as *accounts*, as *responses to different types of requests for information*, and as *other-corrections*, and in uptakes as *disagreements with* or *expansions on* previous epistemic displays of peers. We have also explained how producing epistemic displays is to some extent related to specific writing events. In short, the joint construction of lists of research or interview questions and a letter to an expert (generating accounts and argumentative uptakes) and use of textual sources (generating expansions on given information) have proven to provide profitable conditions for sharing knowledge. Additionally, we noticed in our data how creating a mind map together, may lead to explicitly inviting peers to produce epistemic displays.

4. Discussion

Previous research has disclosed that collaborative writing activities that are embedded in the content areas, may be beneficial for learning. This implies that participants share individual knowledge, accomplished as epistemic displays, which then becomes a source for further exploration and discussion. However, up till now, no studies were conducted to reveal how writing together evokes sharing knowledge with peers, which we aimed to disclose in this paper, by a functional analysis of the production of epistemic

displays. Our study has demonstrated, from interactional data of primary school students, that participants mainly display their knowledge in responsive sequential positions, while performing different conversational actions. Enfield (2011) distinguishes between a justifying and clarifying function of assertions, and the same two central functions of epistemic displays can be discerned in our data.

Epistemic displays that are produced as *accounts* for a proposal or *(dis)agreement with a proposal or a previous display of knowledge* (in accounts or responses to requests for information), have a *justifying function*. In similar sequential contexts, students may nuance an initial idea or proffer an alternative idea, by displaying their own knowledge. These findings provide a more detailed insight into how episodes of expressing or inviting ideas in collaborative writing (Rojas-Drummond et al., 2017), may evoke trajectories of collaborative reasoning (Littleton & Mercer, 2010; Rojas-Drummond et al., 2008; Rojas-Drummond et al., 2006), generally characterized as *exploratory talk* (Mercer, 1995; Mercer & Littleton, 2007). Contexts in which students generate questions together, have proven to be particularly advantageous for evoking patterns of discussing epistemic displays in extended proposal sequences. Sharing knowledge is evoked when students defend or discuss proposals for content, which may then lead to subsequent displays of knowledge in argumentative positions. Both accounts and argumentative uptakes are less likely to appear in other writing events in our dataset. This latter outcome may be attributable to the fact that these genres, except for the mind map, aim at writing down information that is (to a great extent) in the domain of shared epistemic access (Heritage, 2012). This means that the students are writing about information that was gathered collaboratively, based on shared experiences, for instance from a field trip, or about given information in (online) sources that is accessible to all participants. This is fundamentally different from situations where students have to share individual knowledge with each other, in order to arrive at shared ideas, that must be agreed upon by all participants. As concerns the mind maps, argumentative sequences are limited to debating the relevance of each other's contributions (see also Herder, Berenst, De Glopper, & Koole, 2018b), but this does hardly provoke extended discourse on the propositional content of the epistemic displays. The fact that only loose words or short sentences may be added to a mind map, in combination with the underlying possibility to expand endlessly (which is not the case in other genres), may also be a reason that accountability is not an issue.

In our data, epistemic displays with a *clarifying function* (Enfield, 2011), are responses to requests for information, other-corrections, and expansions on previous displays of knowledge. Patterns that occur when students produce epistemic displays in a *response to requests for information*, resemble the different types of question-answer sequences in teacher-student interaction (Koole, 2010; Margutti, 2006). *Other-corrections* are also produced in a responsive position, after an epistemic display of a fellow student, that appears to be holding incorrect information. *Expansions* on given information, being a previous epistemic display or for instance information in a text book, demonstrate a progression from unelaborated statements to more elaborated facts and explanations (Zhang, Scardamalia, Reeve, & Messina, 2009). Considering these findings from the perspective of collaborative writing-to-learn, the analysis of how subsequent demonstrations of knowledge are produced in expansions, indicates how building on each other' ideas (Klein, 2014; Vass et al., 2008) is sequentially brought into being. Expanding on the epistemic display of another student, implies acknowledgement of the propositional truth of what was said by a peer, or what is read in (textual) resources, a context in which producing subsequent epistemic displays is particularly prompted. Additionally, a similar type of talk was observed when students create a mind map together: demonstrations of topic knowledge are produced extensively as consecutive contributions to the mind map. Uptakes of epistemic displays that consist of expansions with new ideas, exemplify how so called *cumulative talk* (Mercer & Littleton, 2013) emerges sequentially, in which joint chains of associations (Vass et al., 2008) can be discerned. Our data shows how valuable for learning this form of peer talk is as well, since students explore a research theme from various wide-ranging perspectives, and, as they continue to build on each other's knowledge, draw on and connect different sources of knowledge.

A noticeable phenomenon in events in which students created mind maps, was the fact that individual students tended to take on a role as facilitator (Nissi, 2015), explicitly inviting peers to show what they know. In Conversation Analysis, the notion 'participation' (Goffman, 1981) is used to refer to "actions demonstrating forms of involvement performed by parties within evolving structures of talk" (Goodwin & Goodwin, 2004, p.222), and provides a framework for the analysis of action that takes into account the multiple resources (e.g. talk, gesture, gaze, etc.) used by participants in situated activities (Melander, 2012). We have noticed that when students create a mind map together, a specific participation framework occurs. The student who adopts a facilitators' role then asks for instance *can you think of one more*?, allocating turns by gazing at one of his peers, or *what should I add*?, with which he places responsibility for new contributions with his fellow students. Use of the personal pronoun *I*, instead of *we* (emphasizing mutual responsibility), seems to mark this specific, individual role as a facilitator. Thus, when creating a mind map, students are not only explicitly invited to promptly show knowledge, but it is also apparent that the student who invites the fellow students to do so, does not or hardly produce epistemic displays himself. In our dataset, this specific way to socially organize (Goodwin & Goodwin, 2004) the writing together, may be driven by the fact that students worked in mixed age groups during their research projects. In our cases, we observed how the oldest student often adopts the facilitators' role.

Regarding the *propositional content* of the epistemic displays produces by the 8–12 year old's, our data illustrate how students share both knowledge from personal, everyday life, and knowledge that children may have acquired in the school context, or more specifically during the current research projects. The ways in which students continuously switch between knowledge that originates from experiences both within and outside the classroom (Houen et al., 2017), shows how all these aspects of knowledge are to a great extent intertwined, indicating the manifestation of dialogic spaces (Alexander, 2008; Wegerif, 2011), in which students transcend the immediate here and now. In addition, from the perspective of inquiry learning, our study confirms how this didactic approach may stimulate making connections between the everyday and the scientific (Littleton & Kerawalla, 2012). As follows, the use of joint, functional writing tasks in the context of inquiry based learning, or framed more broadly in content-based areas, is an adequate tool that evokes children to share, build on and discuss their knowledge with each other. Teachers may employ different types of writing

activities as described in our dataset for these purposes.

A phenomenon that we have addressed only on the side in our paper, is how students position themselves in terms of epistemic stance (Heritage, 2012), which includes degrees of certainty of knowledge, and degrees of commitment to the truth of propositions. Participants may use certain sequential, linguistic, prosodic and non-verbal features of a turn to modulate their epistemic stance on an axis from *not knowing* to *knowing* (Morek, 2015). This may play a role in how producing epistemic displays in the context of collaborative writing, brings about processes of individual and shared knowledge building (see for instance Jakonen & Morton, 2015; Kämäräinen, Björn, Eronen, & Kärnä, 2019). As Enfield puts it: "an individual's knowledge is grounded in access, and is measured by authority" (Enfield, 2011, pp.302–303). Further analysis of our data, may well explore how (dealing with) epistemic stance of participants plays a part in processes of sharing and discussing knowledge, which is significant for our increased understanding of epistemics in conversations of collaboratively writing children.

5. Conclusion

In this study, we have demonstrated how epistemic displays are made relevant in particular sequential contexts in an ongoing writing activity of primary school students (aged 8 to 12 years). Our Conversation Analytic exploration of the conversational data, first disclosed how producing epistemic displays accomplishes different actions: (i) accounts (for a proposal, agreement with a proposal, rejecting a proposal or for an other-correction), (ii) responses to different types of requests for information, (iii) other-corrections, and in the uptake of previous epistemic displays: (iv) disagreeing and (iv) expanding. The analysis provides a detailed account of how collaborative writing evokes sharing knowledge, and how subsequent processes of joint reasoning and expanding are realized in the uptake of epistemic displays. As an additional step, we explored how producing epistemic displays may be related to different writing activities. Notwithstanding the relatively limited sample, we found that specific features of writing activities, may influence the extent to which epistemic displays are produced and discussed. Defining characteristics are: the necessity of producing accounts in proposal sequences, the use of (online) textual sources which provokes expansions, and the appearance of a specific participation framework, in which students explicitly invite peers to produce epistemic displays. The nature of the knowledge that students share, ranges from personal, everyday knowledge to special subject knowledge, that originates from both within and outside the school context. Our findings may support teachers' decisions on how to employ collaborative writing activities in the context of content-based activities, when sharing and discussing world-knowledge is the focal point of that activity. Further research could usefully explore in more detail the ways in which epistemic stance of students may play a part in sharing and discussing knowledge.

Acknowledgement

Appendix A. Transcript notation, based on (Have ten, 2007; Jefferson, 1984)

[text	overlapping speech; point at which an ongoing utterance is joined by another
[text	utterance
text =	break and subsequent continuation of contiguous utterances
= text	
(0.4)	pause (in seconds)
(.)	micro pause (less than 0.2 s)
.	stopping fall in tone (not necessarily at the end of a sentence)
,	continuing intonation (not necessarily between clauses of sentences)
?	rising inflection (not necessarily a question)
!	animated tone (not necessarily an exclamation)
↓	marked falling shift in intonation
↑	marked rising shift in intonation
°	talk that is quieter than surrounding talk
TEXT	talk that is louder than surrounding talk
<u>text</u>	emphasis
:	extension of the sound that follows (0.2 s for every colon)
> text <	speech is delivered at a quicker pace than surrounding talk
< text >	speech is delivered at a slower pace than surrounding talk
(text)	transcriber is in doubt about the accuracy of the transcribed stretch of talk
( )	transcriber could not achieve a hearing for the stretch of talk
((*text*))	description of a phenomenon, a non-verbal action, or of details of the conversational scene or other characterizations of talk

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