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Two secondary teachers' understanding and classroom practice of dialogic teaching: a case study

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ABSTRACT

Dialogic Teaching (DT) is effective in fostering student learning; yet, it is hard to implement. Little research focused on secondary teachers' learning of DT and on the link between teachers' understanding and practices, although these two are usually strongly intertwined. Using a wide range of evidence, this case study systematically investigated and compared two secondary teachers' understanding and practice of DT during their participation in a continuing professional development programme (CPDP). The CPDP appeared effective to some extent. The History teacher's understanding of DT, i.e. being a co-learner, appeared highly effective in implementing DT, whereas the Mathematics teacher's understanding of DT, i.e. creating a democratic learning environment, seemed only effective to some extent. Focusing on both teachers' understanding and practice when developing DT seemed fruitful in explaining differences in practice. Future research could further explore to what extent understanding DT as being a co-learner facilitates professional development.

1. Introduction

Much attention has been paid in the last decades to dialogic teaching (DT), an approach to classroom communication in which teacher and students, through purposeful classroom talk, engage in a continual process of co-construction of knowledge (Alexander, 2008; Mercer and Littleton 2007; Wegerif 2010). Alexander's principles of DT have been widely used and acknowledged (Alexander 2004). These principles that describe talk in DT are valuable as shared terms of reference, in order to generate discourse about dialogue and help to distinguish regular classroom conversation from dialogue as described by DT. First, the talk is *collective*: learning takes place in a social setting, and tasks are addressed as a group. Second, the talk is *supportive*: there is a safe atmosphere and all contributions are valued and respected by all participants. Third, the talk is *reciprocal*: participants react to one another. Fourth, the talk is *cumulative:* participants build on each other's contributions so that a coherent line of reasoning between

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participants develops. Finally, the talk is *purposeful*: the teacher has a certain goal in mind with the conversation. Furthermore, DT is also based on distinctive ethical and epistemological stances. Dialogue requires a form of relationship where, despite any differences in role and seniority, participants respond to the other believing that their perspective and exploring differences between perspectives has intrinsic and shared value (Higham 2016). In addition, meanings are not rooted in static sources, but continually emerge from the process of interaction between different perspectives (Bakhtin 1982). Dialogue is thus understood not as a synonym for talk, but as a form of humane shared engagement and enquiry (Kazepides 2012).

Last decade's research, conducted mainly in primary education, shows that dialogic pedagogies are effective in promoting the general quality of classroom talk and students' academic achievement (Alexander 2001; Applebee et al. 2003; Mercer and Littleton 2007; Wegerif 2007). However, a more monologic approach in which the teacher predominates conversations is still the most common form of classroom communication in primary and secondary schools (e.g. Alexander 2008; Hennessey, Mercer, and Warwick 2011; Teo 2016). Changing communication structures in classrooms towards a more dialogical one appears difficult, due to deeply rooted power structures implying that the teacher has to take a controlling role in discussion (Alexander 2004; Lyle and Thomas-Williams 2011; Wolfe and Alexander 2008). Few effective professional development programmes for promoting DT exist, especially in secondary education (Higham, Brindley, and van de Pol 2014[1]). And those available often focus on changing teachers' practices, and to a lesser extent on changing and measuring teachers' beliefs or understanding of DT. However, changing teachers' understanding is pivotal to establish substantive changes in practice (Hamre et al. 2012; Hart 2002). Therefore, we designed and tested a new continuing professional development programme (CPDP) in which we focus on both teachers' practices and understanding (i.e. the teachers' interpretation of Alexander's principles of DT). The goals of the current study were to: (1) describe the two teachers' understanding and practice of DT while participating in the CPDP and (2) compare the understanding and practice both between and within teachers.

Linking these teachers' understanding to their practices gave us the unique opportunity to gain deep insight into how teachers of different subjects give shape to Alexander's dialogic principles and the extent to which their understanding is related to the degree to which they succeed in implementing the different principles into their practices. Findings might be useful for improving teacher professional development regarding DT in different subject disciplines.

The current study is part of a larger project called The CamTalk project, developed at the University of Cambridge. This project explores the role of DT and learning in secondary education while developing a nationally available CPDP, based on Alexander's principles. The study described here is based on a case study, focusing on two motivated teachers who participated in the CPDP. Because dialogic approaches are relatively new in secondary education and the CPDP with which the teachers have been working is also new, we adopted a so-called "phase 1" approach (Borko, Jacobs, and Koellner 2010). In a phase 1 approach, studies are relatively small and single-sited, focusing on teacher learning and providing initial evidence on new approaches.

1.1. Promoting DT

Most research on promoting DT in the classroom via interventions took place in primary education. Alexander (2004), for example, reported on the "Talk for Learning Project" in which 34 primary schools participated. He concluded that many classrooms moved towards DT,

however, the effects were not similar for all schools, and specifically the characteristics of "purposefulness" and "cumulation" were absent in many classrooms.

Hargreaves et al. (2010) studied the implementation of *interactive teaching* which is similar to DT in that the students are stimulated to participate actively through dialogue. In this study, 15 focus teachers participated in video-stimulated reflective dialogue activities, whereas 15 comparison teachers did not undertake these activities. Few differences were observed between the groups. The lessons of the focus teachers had only become interactive in a surface sense; the teachers asked more questions and did fewer statements. However, the classroom talk was still heavily teacher-dominated, and thus not *collective*. It was not always clear to the teachers what interactive teaching meant. It thus seems that the teachers needed further opportunities to *understand* and *practice* interactive teaching.

Only few studies focused on the implementation of DT in secondary education. Jones and Tanner (2002) investigated how eight secondary mathematics teachers implemented interactive teaching as proposed by the national numeracy strategy. The teachers formed a discussion group with the researchers; there was no course or intervention. Each teacher changed his/her classroom practice, especially with regard to the degree to which teachers encouraged their students to reflect on their mathematical knowledge.

Lehesvuori, Viiri, and Rasku-Puttonen (2011) studied the implementation of the *communicative approach* in initial teacher education while focusing on the dialogic aspect of this approach. The communicative approach (Scott, Mortimer, and Aguiar 2006) consists of four classes of communication along the two dimensions authoritative/dialogic and interactive/non-interactive. Twelve science teachers participated and of those, 7 showed dialogic episodes in their lessons. However, these consisted mainly of collecting students' viewpoints in a non-evaluative way without exploring these. In Alexander's terms, the episodes might not have been *cumulative*.

Ruthven et al. (2016) implemented a DT approach in 31 secondary Science and Mathematics classrooms. Two of their DT markers, i.e. teacher solicitation (e.g. of explanations) and student articulation (e.g. of reasons), occurred to a relative high extent ($M = 38.25\%$). Other DT markers, that are more parallel to Alexander's principles, occurred to a lower extent. Three or more students taking up another student's idea (amongst others) – which is parallel to Alexander's principle of cumulative – occurred only in 17.33% of the observational units (on average over teaching modules). Teachers collecting at least two student views without evaluation, corresponding to Alexander's principle of supportive – occurred in 15% of the observational units. Teachers putting a student's idea/question to the whole class to listen to or respond to – corresponding to Alexander's principle of reciprocal – occurred in 8.33% of the observational units.

Primary and secondary teachers have thus mainly been able to collect students' viewpoints in a non-evaluative way which could be seen as an indicator of *supportiveness* (i.e. showing interest in students' ideas). However, other DT behaviours (cumulation, reciprocity, purposefulness and collectiveness) did not increase in most classrooms. The principle of cumulation especially appeared to be difficult to implement. Therefore, further research into how DT can be promoted effectively is needed.

1.2. The present study

In the present study, two secondary teachers' learning processes during their participation in the CPDP are analysed. These two teachers are part of a first cohort of teachers who participated in The CamTalk project at the University of Cambridge programme. The CamTalk

project at the University of Cambridge programme has an interest in the commonalities and distinctiveness of dialogue across subject disciplines in secondary education, to which the current study is a first investigation. The two teachers taught two very different subjects (Mathematics and History) which enabled us to, in an exploratory way, flesh out commonalities and distinctiveness in different subjects regarding teachers' understanding and practices of DT. As pointed out as crucial by, e.g. Healey (2000), the curricular context is taken into account in interpreting the results, which is often lacking in previous research according to Howe and Abedin (2013). Moreover, we link the teachers' understanding to their practices, which is also scarce in previous research that mostly focused on describing classroom practices (Howe and Abedin 2013). Finally, as the review of Howe and Abedin (2013) shows, hardly any research has yet been conducted in the humanities such as History; most research has been conducted in internationally prioritised STEM subjects such as Mathematics (e.g. Clarke, Xu, and Wan 2010) and Science (e.g. Mercer, Dawes, and Staarman 2009). With the current study, we sought to answer the following research questions:

(1) To what extent did each teacher understand (1a) and practice (1b) DT and what did it look like?
(2) In what ways were the two teachers' understanding (2a) and practices (2b) of DT similar and different?
(3) To what extent is each teacher's understanding of DT consistent with their own practice?

When describing the teachers' *practices*, we also focused on how the teachers developed their DT practices throughout the year the CPDP took place. However, we did not focus directly on the development of teachers' *understandings* of DT because DT is a complex pedagogical construct that is difficult to capture in one simple assignment. We therefore elicited the teachers' understanding in different types of assignments and interviews at different time points and deduced their understanding from all these data sources.

2. Method

2.1. Participants

Both teachers showed enthusiasm in participating in the year-long CPDP, which was principally why these teachers were selected for this study. Mitchell is a mathematics teacher at a large community comprehensive school and had 10 years of teaching experience. He selected year 9 (levels 6–8; 18 boys/4 girls) to implement DT in the first academic year. In this year, he recorded his first lesson. In the second academic year, he selected year 7 (levels 3–6; 17 boys/16 girls) and recorded his second and third lesson (cf. Table 1).

Alice is a history teacher at a large foundation trust comprehensive school and had five years of teaching experience. In the first academic year, she selected year 13 (mixed ability) to record lessons 1–3 in (cf. Table 1). The class of lesson 1 consisted of five boys and seven girls. The class of lessons 2 and 3 consisted of six boys and six girls.

2.2. Materials

2.2.1. The CPDP

The CPDP was based on characteristics that are known to be effective in stimulating teachers' professional development, namely: (1) using a central conceptual framework (i.e. Alexander's

Table 1. Teachers' scores per indicator of each dialogic teaching principle.

Teacher	Lesson	Lesson part	Collective	Supportive		Reciprocal		Cumulative	
			Student contributions[c]	Authentic questions teacher[a]	Questions students[b]	Student responds to student[d]	Student responds via teacher[d]	Student uptake[d]	Teacher uptake[d]
Mitchell	1. Ratios	1.1 What comes to mind with "ratio"?	27%	63%	9%	18%	0%	9%	42%
	2. Multiplying	1.2 Solving sums involving ratio	33%	47%	3%	0%	60%	42%	33%
		2.1 Discussion why calculators are good/bad	35%	91%	0%	4%	15%	33%	37%
		2.2 Solving sums/enquiry methods	43%	63%	4%	13%	12%	37%	8%
		2.3 Enquiry method preference	37%	100%	0%	4%	4%	8%	38%
		2.4 solving sums	40%	50%	5%	3%	0%	38%	14%
	3. Equations	3.1 What comes to mind when hearing the word "equations"?	39%	69%	10%	3%	6%	14%	35%
		3.2 Discussing/solving sums	41%	0%	14%	6%	0%	35%	10%
Alice	1. Collapse Weimar	1.1 Explaining historical sources	47%	100%	1%	22%	5%	34%	61%
		1.2 Whole-class discussion controversy	56%	90%	2%	52%	9%	72%	54%
		1.3 Whole-class discussion on purpose of discussions	56%	100%	0%	48%	9%	73%	69%
	2. Popularity Nazi's	2.1 Whole class discussion popularity Nazi's	46%	100%	0%	9%	30%	63%	65%
		2.2 Summarising/explaining sources	39%	100%	2%	35%	25%	47%	57%
		2.3 Coming up with joint quality checklist	43%	100%	6%	38%	19%	76%	78%
	3. Consensus dictatorship	3.1 Lesson recap previous lesson	40%	67%	0%	0%	17%	33%	63%
		3.2 First round debate	32%	100%	0%	9%	9%	57%	60%
		3.3 Second round debate	50%	100%	0%	47%	20%	50%	46%
		3.4 Third round debate	50%	100%	3%	33%	20%	93%	80%

[a]% of all teacher questions.
[b]% of all student contributions.
[c]% of all contributions.
[d]% of all turns.

principles), (2) reflecting on own practice (in this case using video) and (3) practitioner research (Borko et al. 2008; Ponte et al. 2004; Timperley 2007; Van Veen, Zwart, and Meirink 2012).

The year-long CPDP embodied face-to-face meetings (*N* = 3) and an four-module online programme with two chat sessions in groups of teachers of different subjects with a supervisor. Each of the modules had its own theme: (1) exploring DT, (2) understanding impact in the classroom including videotaping "lesson 1", (3) DT and assessment and (4) setting up a research project, including videotaping "lesson 2" and "lesson 3". The modules consisted of theory and videos that contained DT examples. Throughout the modules, teachers kept a learning journal receiving specific reflective activities to work out in their journals (*N* = 18). An example of such an activity is: "Please read chapter 3 of Alexander (2008) and answer the following question: What issues might arise for each of the principles when implementing these in your classroom?"

2.2.2. Analysis of teachers' understanding

We used the following data sources: teachers' learning journal assignments (*N* = 18 per teacher), general and lesson reflection interviews including teachers' written reflections (*N* = 4 per teacher), chat logs of online discussions (*N* = 2 per teacher) and the teachers' practitioner research projects (*N* = 1 per teacher). To determine the teachers' understanding, we used a multi-phased bottom-up and top-down approach, using metamatrices (Miles and Huberman 1994). We also included elements of grounded theory, that is, open coding (unitising and labelling units using in vivo and constructed codes), axial coding (condensing codes) and selective coding (determining core categories) (Glaser and Strauss 1967).

2.2.2.1. Phase 1 – unitising.   We imported transcribed data sources in Atlas-ti and unitised all transcripts according to units of meaning (Krippendorff 2013). Units were mostly whole answers to an interview question or turns in a chat session, unless it addressed more than one theme. We distinguished 1051 units; 529 for Mitchell and 522 for Alice. An example of a unit is: "Students were invited to comment on their own and other students' thoughts".

2.2.2.2. Phase 2 – top-down coding.   When teachers explicitly referred to one of Alexander's principles, we labelled a unit with that principle. If it did not contain a reference, descriptions per principle were used to allocate code(s) (based on Alexander's definitions enriched with additional descriptions, cf. Rojas-Drummond et al. 2013). We labelled the unit "students were invited to comment on their own and other students' understanding", for example, as *reciprocal*. Twenty per cent of the data was double coded by an independent coder; disagreements were discussed until agreement on all units was reached.

2.2.2.3. Phase 3 – bottom-up coding.   We gathered all coded units in a metamatrix (Miles and Huberman 1994) in which the columns represented the DT principles and the rows the data source. From each coded unit, we extracted a short key theme. The extracted theme of the unit "students were invited to comment on their own and other students' understanding", for example, was "comment on understanding". When determining the extent to which teachers understood DT, we compared the teachers' understanding to Alexander's principles.

2.2.2.4. Phase 4 – condensing and summarising themes. Per teacher, we gathered all key themes in a new metamatrix (Miles and Huberman 1994) in which the columns represented the data source and the row represented each principle. Per principle, we identified common themes and relations between themes over data sources to arrive at a list of themes per principle. We grouped the key themes "Involve all students" and "Involvement of larger proportion of students", for example, under one common theme: "All students are (encouraged to (be)) involved/contribute/larger proportion participates". In a summarised metamatrix, we gathered the condensed themes for both teachers (Table 2). We used this summarised metamatrix to identify teachers' understanding (RQ1).

2.2.3. Analyses of teachers' practice

We analysed the lesson videos using predefined coding categories based on existing coding schemes (Nystrand et al. 2003; Snell and Lefstein 2011). Tables 3 and 4 in section 3.2.6 contain coded examples. Firstly, we defined whether a turn was enacted by a teacher or a student. The distribution of the actors indicated whether teacher and students addressed the learning task together (=*collective*).

Secondly, we determined the turn type: question ("any utterance which seeks an answer" (Galton, Croll, and Simon 1980, 85, 86) or "other" (e.g. a remark, response, or call-out). Students' questions indicate a *supportive* environment with an atmosphere that feels safe for students to express themselves.

Thirdly, we determined the focus of the turn: subject matter (substantive), procedural (e.g. organisational) or task (e.g. introducing a new task). This was not seen as an indicator for a principle, but the distinction was needed for the fourth and sixth coding category.

Fourthly, we coded all substantive questions as authentic or non-authentic questions. Authentic questions (questions without predetermined right/wrong answer) indicate *supportiveness* as they show interest in other people's ideas.

Fifthly, we defined whether the actor responded to a student, the teacher or to a student via the teacher. Students responding directly or via the teacher to another student's idea indicated *reciprocity* (listening to each other). Finally, we also coded substantive turns as uptake (using other people's ideas) or no uptake. Uptake indicates *cumulation* (building on each other's ideas). Two coders coded 10 per cent of the data independently. Cohen's Kappa was between .61 and .73, which was substantial (Landis and Koch 1977).

3. Results

3.1. Teachers' understanding (RQ1a and 2a)

Overall, we saw similarities rather than differences between the teachers' interpretations of the principles and Alexander's definitions of the principles and their understanding was, in most respects, similar to the principles as formulated by Alexander (2008) (Table 2). The most apparent difference was that both teachers showed a different emphasis when describing DT (core categories): Alice emphasised being a *co-learner* and Mitchell emphasised the notion of *democracy*. A further explanation of these results follows below, first discussing the teachers' understanding per principle and then giving a general idea of the teachers' understanding of DT.

Table 2. Summarised metamatrix containing key themes of coded units per dialogic principle.

Defined by Alexander (2008)	Interpretations Alice	Interpretations Mitchell
Collective "Teachers and children address learning tasks together"	Student-centred/teacher role: Teacher is facilitator students' learn from each other (25^3) Teacher is a co-learner/participant -> equal footing (50^{14}) Students have responsibility (1^1) Withholding feedback (5^2) Working in small groups (8^3) Collective as basis for reciprocal and cumulative (2^2)	Teacher role: Teacher is a facilitator/students learn from each other/work together (72^7) Opening up oneself/teacher learns from students/relying on students (10^1) Principles are connected (2^2) Relationship between students (1^1)
Supportive "Children articulate their ideas freely, without fear of embarrassment over 'wrong' answers; and they help each other to reach common understandings"	Safe environment to share ideas: Respect each other's ideas/not judgemental (20^{15}) Have/gain confidence to express ideas freely/No fear of embarrassment of getting things wrong/It's okay to make mistakes (34^8) Create groups with friends (2^0) Participation of students: all students are (encouraged to (be)) involved/contribute/Larger proportion participates (31^4) Supportive as basis for reciprocal and cumulative (2^2)	Safe environment to share ideas: Gain/give students confidence (e.g. by taking them seriously, by making students' contributions explicit; showing genuine interest; using ground rules) (11^9) No fear of embarrassment of getting things wrong (no right/wrong answers)/Not judgemental/being supportive of each other (19^{13}) Help each other to reach common understanding (9^7) Good teacher–student relationship (2^0) Participation of students: involve students/Encourage all students to take part (3^0) Enjoyment/enthusiasm (7^1) Quiet students speak/active participation (3^1) Supportive principle is most important/crucial for DT (2^2) Supportive and reciprocal are similar (2^2) Positive learning atmosphere (2^0) Humour (1^0) Expose students to viewpoints (2^0) Move away from fixed viewpoints (3^0) Listen to each other (1^1)
Reciprocal "Teachers and children listen to each other, share ideas and consider alternative viewpoints"	Sharing ideas and explain thinking (28^1) Consider and challenge viewpoints (7^2) Listening & responding (61^{14}) Students respond to each other/Not commenting as a teacher	*Democracy*: Expose students to ideas (e.g. (mini) whiteboard/invoke ideas/make ideas available/explain thinking (68^9) Consider and compare viewpoints (24^8) Listen to each other (7^6) *Democracy*: Reshape thinking/changing viewpoint optionally (if no change, they still learn) (35^5) Reciprocal is favourite/most important principle (2^2) Principles are interconnected (5^1)

Cumulative "Teachers and children build on their own and each other's ideas and chain them into coherent lines of thinking and enquiry"	Building on each other's ideas (46^{22}) Listen to each other (1^{1}) Stimulates student-centeredness (2^{2})	Building on own and other's ideas (41^{23}) Chain ideas into coherent lines of thinking (20^{14}) Diagnose prior knowledge (3^{0}) Consider alternative methods (3^{3}) Expose students to new ideas (1^{0}) Quality of responses is important for cumulation (1^{0}) Get the debate going (1^{1})
Purposeful "Teachers plan and steer classroom talk with specific educational goals in view"	Make aim of the lesson or of talk clear to students (7^{3}) Keep goals in mind/direction maintenance (17^{2}) Talk as a means for understanding (12^{2}) Talk as an end/life skill (3^{1}) Making links/authenticity (4^{0})	Having dialogic goals (e.g. reaching common understanding, encourage children to move away from fixed approach, invite students to build on each other etc.) (25^{7}) Having subject-specific goals (e.g. understanding of ratio) (13^{3}) Having a plan/goal in mind (4^{3}) Talk/dialogue as an end in itself/life skill (2^{0}) Principles are interconnected (1^{1})

Notes: Numbers in brackets: number of times a theme was mentioned. Superscript number: number of times the principle was explicitly mentioned in the unit by the teacher.

Table 3. Lesson excerpt Mitchell (2.3).

	Actor	Type	Focus	Responds to	Authenticity questions	Uptake
1	Mitchell (M): those who work using grid method, is anyone thinking of changing from using grid method to column method? If no one is, it's fine	S	Q	S	S	A	NU
2	Luke: (puts up his hand)	T	O	P	T		
3	M: Luke, you are thinking of changing from grid method: Why?	S	Q	P	S		
4	Luke: (inaudible) split the numbers	T	O	S	T		NU
5	M: he is changing to column method because he thinks it's quicker (writes that down) and no splitting up of numbers. So Luke quite enjoys that	S	O	S	S		U

Notes: Actor: T = teacher, S = student; Type: Q = question, O = other; Focus: S = substantial, P = procedural; Responds to: S = responds to student, T = responds to teacher, SvT = responds to student via teacher; Authenticity questions: A = authentic; Uptake: U = uptake, NU = no uptake.

Table 4. Lesson excerpt Alice (1.3).

	Actor	Type	Focus	Responds to	Authen-ticity questions	Uptake
1	A (Alice): do you agree though with what (inaudible) and (inaudible) say (points at what is on the board)	T	Q	S	S	A	U
2	Chelsey: I think […] you can't really be sure. Like everything that happened in Russia with Stalin. We don't really know how many people were killed there. There's no record. So there is no concrete evidence	S	O	S	SvT		U
3	Harold: like with North-Korea and China. We don't know exactly what is going on. There is no way you could get any evidence	S	O	S	S		U
4	A:/please bare that in mind. When we look at popularity, don't accept what they are saying because you don't know	T	O	S	S		U
5	Ann: but then (points at the board) it says an independent opinion did not exist but it did exist, but we can't know what it was	S	O	S	S		U
6	A: why?	T	Q	S	S		U
7	Ann: Because the only way to find out what it was would be by talking to the opinion of someone who was actually there	S	O	S	T	A	U
8	A: (writes on the board) Is that what you were saying Geraldine?	T	O	S	S		U
9	Geraldine: yeah (inaudible)	S	O	S	T		U
10	A: thank you very much, it's been fantastic. It made me think really	T	O	P	S		U

Notes: Actor: T = teacher, S = student; Type: Q = question, O = other; Focus: S = substantial, P = procedural; Responds to: S = responds to student, T = responds to teacher, SvT = responds to student via teacher; Authenticity questions: A = authentic; Uptake: U = uptake, NU = no uptake.

3.1.1. Collective

When describing collective talk, both teachers addressed the teachers' role (Table 2). Yet, Mitchell mostly focused on the teacher becoming a *facilitator* of dialogue, orchestrating the dialogue: "Instead of me commenting or explaining what certain students meant I 'got' other students to explain and build on what was said so that we as a class all learnt together and I was just a facilitator" and "I want to 'teach' as little as possible. My role must be that of a guide and facilitator".

Alice, in contrast, emphasised becoming a *co-learner*: "It's a way of moving to student-centred learning so placing yourself – rather than the imparter of knowledge – placing yourself within the discussion for the talk". When describing her third lesson, she said:

> I then end by saying "Correct me if I'm wrong" summing up what the students had said. This was an attempt to place myself within the learning environment and therefore become part of the debate rather than a judge myself, literally just offering a summary.

For Alice, this notion of being a co-learner links to the nature of the subject of History, as she describes here:

> The student in the centre […]. And also […] that you can question ideas, and that there is no, often in history no right or wrong answer and that dialogue is a way of questioning each other […] without […] always looking to the teacher for that correct answer.

The teachers' understanding focused more concretely on the teacher's role than Alexander's definition.

3.1.2. Supportive

The teachers' understanding of this principle was quite similar (Table 2). They interpreted supportive talk as: (1) talk that happens within a safe environment and (2) the basis for dialogue, as Mitchell indicates here:

> I would say that supportive talk […] is the most important one. Because it's where children don't have fear of giving their ideas […] and then you will get these amazing answers. […] if you don't have the supportive talk of learners being supportive of each other, then you won't get that dialogic approach.

In addition, both teachers agreed that supportive talk is talk in which *all* students can participate, as Mitchell described: "Where I feel I'm getting better at […] is supportive talk. Because now children are putting up their hands, giving out answers where normally that would not have happened".

Both Alexander and the teachers emphasised a safe classroom environment. In addition, however, the teachers emphasised active participation of students, which is closer to Alexander's definition of collective than supportive.

3.1.3. Reciprocal

Both teachers addressed: (1) considering different viewpoints and (2) listening to each other, when describing reciprocal talk. Alice strongly focused on the listening aspect: "It's getting much, much stronger in terms of reciprocal. So listening and therefore responding to not just stating a point of view". Mitchell focused mainly on the idea of democracy. By democracy he meant that information should be made available to everyone, and every student has the freedom to express their own views and to choose whatever problem-solving method he/she wants: "Good means to achieve a democracy. No-one's being told what to vote for, but they'll sort of be given all the facts and then they have to choose for themselves".

Especially, when talking about the reciprocity, Mitchell referred to the nature of his subject:

> With maths it's definitely to do with methods. Because there is only one right answer and there are so many different ways of getting there and if those learners can be exposed to all those ways of getting there, they can then choose then for themselves the one that works best for them.

The listening and responding aspect also stands central in Alexander's definition of reciprocal. Mitchell's focus on democracy is not explicit in Alexander's principles.

3.1.4. Cumulative

Both teachers connected the idea of cumulation to building on each other's ideas. In addition, Mitchell talked about chaining those ideas into coherent lines of thinking as well. "I would combine different students' thoughts into coherent lines of enquiry and thought processes". The teachers' interpretations were in line with Alexander's definitions.

3.1.5. Purposeful

The teachers' understanding of purposeful was also quite similar. They mainly addressed having aims in mind and making those clear to students. Mitchell often referred to *dialogic* goals he had, in contrast to subject-specific goals. The teachers' understanding of purposeful corresponded to Alexander's definition.

Summarising, Mitchell interpreted DT as dialogue within a safe environment in which all students dare to speak (supportive). He was the facilitator of dialogue (collective) while making sure that all information is made available to everyone (reciprocal; democracy) and that students build on each other's ideas (cumulative). Specifically, to mathematics, he thought that in DT, every student should be free to choose whatever problem-solving method he/she prefers (reciprocal; democracy). He pursued both subject matter and dialogic goals (purposeful).

Alice interpreted supportive and purposeful similarly to Mitchell. Yet, students listening carefully to each other (reciprocal) were pivotal for her; she saw herself as an active participant within the dialogue (collective), not as the orchestrator of dialogue. The fact that, in Alice's view, in historical discussions there are often no right or wrong answers seemed to foster Alice's interpretation of DT in general and collectiveness in particular.

3.2. DT practices (RQ1b and 2b)

Alice showed overall high and stable levels of all indicators during the different lesson activities that she chose to focus upon, whereas for Mitchell, the degrees of supportiveness and cumulation in the selected lessons highly depended on the lesson activity and the degrees of collectiveness and reciprocity were relatively low (Table 1). These findings are further discussed below. First, we describe the teachers' practices for each principle and we compare the teachers' practices and illustrate their practices with lesson excerpts.

3.2.1. Collective

Mitchell was the main contributor in all lesson parts (Table 1). Yet, the relative degree of student contribution increased over lessons, up to 41% in lesson 3.3. Alice showed higher levels of collectiveness than Mitchell. The distribution of turns in Alice's lessons was between 60/40 (teacher/student) and 50/50 in most of the lesson parts.

3.2.2. Supportive–authenticity

The authenticity of Mitchell's questions over the lesson parts fluctuated. Interestingly, it was lowest when solving sums; probably because there were right and wrong answers which makes posing authentic questions difficult (but not impossible, see e.g. Ruthven and Hofmann 2016). In his reflections, Mitchell pointed lesson 3.3 out as quite non-dialogic. He wanted the students to learn to use the mantra: "if the number swaps sides, it swaps signs" and he did this in a directive way, so he described. This resonates with what we see in Table 1. In more open-ended activities such as discussing which method students prefer for solving multiplications (lesson 2.3), the level of authenticity was extremely high. In this part, he discussed which multiplying method students preferred and why. Overall, it was mainly the type of activity that seemed to play a major role in determining the degree of authenticity.

For Alice, all lesson parts contained high amounts of authentic questions and she thus had higher levels of authenticity than Mitchell. Almost all lesson parts concerned discussion of historical sources and in most activities, there were no right or wrong answers which might have facilitated the use of authentic questions. The lesson part where her questions were least authentic (lesson 3.1) concerned a lesson recap of what was discussed in a previous lesson and concerned right and wrong answers which might explain the lower level of authenticity.

3.2.3. Supportive–turn type

In Mitchell's lessons, the relative amount of student questions increased, indicating increased active student participation. For Alice, the relative degree of student questioning stayed quite low and was often lower than Mitchell. This might be due to the nature of the activities (discussions) in which students mostly respond to each other instead of asking questions. This was confirmed when looking at the distribution of the actors' contributions (indicating collectiveness).

3.2.4. Reciprocal

For Mitchell, both responding directly to each other and via the teacher decreased over the lessons with quite low levels of both in lesson 3. In the majority of the cases, students responded to the teacher directly. For Alice, the degree to which students responded directly to each other was higher than the degree to which students responded to each other via the teacher; her level of reciprocity was thus higher than for Mitchell.

3.2.5. Cumulative

For Mitchell, the degree of *student* uptake was relatively high when solving sums and discussing different methods. When discussing personal preferences regarding methods (1.1, 2.3 and 3.1), the degree of student uptake was much lower; students merely shared their preference. When solving sums (except in 1.2) and enquiring about different methods (2.2), the degree of *teacher* uptake was relatively low. In the other parts, Mitchell took up student ideas to a considerable extent.

For Alice, the degree of student and teacher uptake was relatively high in all lesson parts and overall higher than Mitchell. For her, the degree of cumulation was related to a lesser extent than for Mitchell to the lesson activity.

3.2.6. Illustration of DT practices

Overall, in the particular teaching contexts on which the teachers chose to focus, Alice showed higher degrees of DT than Mitchell. For Mitchell, more than for Alice, the extent to which the indicators occurred seemed to be dependent on the lesson activity. For Mitchell, high degrees of different indicators did not necessarily co-occur within one lesson part, whereas this was the case for Alice.[2] It seems that some lesson activities enabled him more to focus on authenticity and uptake, for example (e.g. lesson 2.3), whereas in other activities, other indicators such as students' uptake and students' responding to other students via the teacher (lesson 1.2) were more present. The degree of authenticity (supportiveness) and teacher uptake (cumulation), for example, was relatively high in lesson 2.3 and an excerpt can be found in Table 3. This excerpt nicely illustrates that even in Mathematics, in which generally answers are correct or incorrect, high degrees of authenticity *can* occur, depending on the lesson activity. In this activity, Mitchell had the students try different methods and afterwards they discussed whether or not they wanted to swap methods. As was also seen in his ideas about democracy, he stressed in line 1 that students do not *have to* change method. Therefore, as there was no right or wrong answer, Mitchell's questions were authentic and his genuine interest in reasons for students to (not) swap was evident.

In Alice's lessons 1.3 and 3.4, high amounts of supportiveness, collectiveness, reciprocity and cumulation occurred. In Table 4, an excerpt of lesson 1.3, where the class discussed the value of historical discussions, can be found. All teacher questions were authentic (supportiveness), students contributed greatly (collectiveness), students responded to each other directly (reciprocity) and students and teacher took up each other's points (cumulation). Alice's made her role of co-learner explicit in her last turn, where she indicated that what the students had said made her think.

3.3. Consistency understanding and practice (RQ3)

Now, that we have seen how the teachers understood and practiced DT, we explore to what extent each teacher's understanding was consistent with their own practice.

Mitchell's understanding and practice was closely intertwined. For the indicators where Mitchell's understanding was in line with Alexander's principles (i.e. cumulative/supportive), he showed improvement in his practice. For the indicators where Mitchell's understanding deviated from Alexander's principles (i.e. collective/reciprocal), he showed low levels in his practice. Nevertheless, his (deviating) understanding was still closely linked to his classroom practice. His understanding of collective, focusing on being the facilitator of dialogue, was closely related to his practice in which Mitchell was the main contributor. Furthermore, in describing reciprocity, he stressed the notion of democracy. In order for this to happen (expose students to all viewpoints), he took up a leading role and therefore showed low levels of reciprocity as the students mainly responded to him, not to each other.

Alice's understanding of all principles (except collective) were in line with Alexander's definitions and in her practice, she showed consistent and high levels. Her understanding of collectiveness deviated from Alexander's definition; she stressed the notion of being a co-learner. This interpretation, however, may actually have boosted not only her levels of collectiveness (i.e. all students contribute), but also her levels of supportiveness (if the teacher is a co-learner, he/she is also learning to and there may be less embarrassment to speak out),

and of reciprocity (the teacher is only one of the co-learners, so it may become more natural to respond to each other).

4. Discussion

The results of this exploratory study showed that the CPDP was effective to some extent. The teachers' *understanding* of the principles, though teaching completely different subjects, was relatively similar. The main difference was that Mitchell stressed the notion of "democracy" (information being made available for everyone and being free to choose any method), whereas Alice stressed the notion of being a "co-learner". These two core ideas that underlie these teachers' understanding of DT were also exactly what differentiated their understanding from Alexander's definitions. In addition, these interpretations seemed to be grounded in the different subject natures; Alice linked being a co-learner strongly to the fact that in History, there is often no right or wrong answer so for her it made sense to be a co-participant in the conversations. But even in the lesson activities where there were right and wrong answers, Alice also had high DT levels. This understanding of being a co-learner may have boosted her high levels of several indicators in her practice.

Mitchell, however, stressed that in Mathematics there often *is* a correct answer but there are different ways of getting to that answer: this is what he uses DT for. Yet, in contrast to Alice, Mitchell sees himself as facilitating dialogue, making ideas available to students (democracy), which may have been less helpful in implementing DT.

This corresponds to the findings of the study of Lindblom-Ylänne et al. (2006), who found a more student-focused teaching approach in "soft" disciplines and a more teacher-focused approach in "hard" disciplines such as Mathematics.

Although some understandings of DT may be more appropriate for some subjects than for others, being a co-learner seemed very effective in implementing DT, connecting to the viewpoint that dialogue requires a form of relationship where participants, regardless of seniority, believe that their perspective has intrinsic and shared value (Higham 2016). Future research could explore to what extent this understanding could also work in other subjects.

When looking at the teachers' *practices* of DT, we see that overall, in the particular teaching contexts on which the teachers chose to focus, Alice's lessons were more dialogic than Mitchell's lessons. It was especially noteworthy that Alice had high levels of cumulation as this was proven difficult in previous studies (Lehesvuori, Viiri, and Rasku-Puttonen 2011; Ruthven et al. 2016). One possible explanation for the difference between Alice and Mitchell could be the age of the students; as Alice's students were 17–18-year olds they may have been more capable of engaging in dialogue through building on each others' ideas. Against this, however, is evidence from the field of primary school students doing so effectively, albeit through less complex language (e.g. Mercer, Wegerif, and Dawes 1999). A more plausible explanation is that Alice's conception of DT as being a co-learner was highly effective in implementing DT.

Yet, although implementing DT was the goal of the CPDP, this does not mean that every lesson part necessarily needs to be dialogic; this might depend on the goal a teacher is pursuing. Having both monologic and dialogic episodes, as is the case for Mitchell, is, according to Scott, Mortimer, and Aguiar (2006), necessary to create purposeful dialogue. Alexander also stresses that teachers can draw on the full repertoire of approaches, even rote learning

where appropriate, as long as they are all directed towards facilitating greater dialogue subsequently (2008, 31).

Some complicating factors should be taken into account when interpreting the results of this study. First, which students contributed to the classroom dialogue is not considered in our analysis; some degree of distribution seems to be preferable instead of a few students speaking all the time (e.g. Ruthven et al. 2016). Furthermore, both teachers taught different classes in lesson 1, compared to lessons 2 and 3. DT involves changing the classroom culture, which takes time. Although the classes were not the same, we still think it is valuable to use the observations of lesson 1 to observe how teachers initially worked on implementing DT in their classrooms while linking their understanding and practice. However, when interpreting the results, it is important to keep in mind that we only analysed the understanding and practices of two teachers who differed regarding several aspects (subject area, student age, class size and educational level).

This study revealed new issues for future research. First, into developing and validating these indicators as a way of evaluating DT practices. One way of further validating the indicator structure would be to work closely together with teachers of different subjects while asking them about their perceptions of certain lesson clips in terms of the principles and to involve them in the coding process.

Second, the indicators we proposed in this study did not fully cover the five principles. In fact, it may be impossible to measure the occurrence of the principles fully by using such observational indicators only (cf. Boyd and Markarian 2011) as DT is a highly dynamic process. However, we still think that the categories we introduced here can be *indicative* for certain principles and it might be useful to develop more indicators in the future. There are also other coding systems for classroom dialogue in development that may assist evaluation (Hennessy et al. 2016).

To conclude, this study suggests that the specific focus on the DT principles, rather than solely on techniques, prompted attitudinal changes in the teachers that became visible in their pedagogical approaches. Theoretically, we may need to explore whether being a co-learner should be part of the Dialogic Teaching pedagogy. Empirical research in which the use of this conception for a wide array of subjects is investigated could be helpful in this endeavour.

Notes

1. See for an exception the study of Ruthven et al. (2016).
2. The two highest occurrences per indicator are taken as a cut-off criterion.

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