

Dialogic spaces in divergent and convergent collaborative learning tasks

Dialogic
spaces

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Abstract

Purpose – The purpose of this study is to examine how dialogic spaces were co-constituted (opened, broadened and deepened) between students engaged in divergent and convergent collaborative learning tasks, orchestrated by teachers in Finnish primary and secondary schools. The concept of dialogic space refers to a dynamic, shared resource of ideas in dialogue and has come to represent an ideal form of educational interaction, in the contexts of collaborative learning, joint creative work and shared knowledge-building.

Design/methodology/approach – A socio-cultural discourse analysis of video-observed classroom dialogue, entailing the development of a new analytic typology, was undertaken to explore the co-constitution of dialogic space. The data are derived from two qualitative studies, one examining dialogue to co-create fictive video stories in primary-school classrooms (divergent task), the other investigating collaborative knowledge building in secondary-school health education (convergent task).

Findings – Dialogic spaces were opened through group settings and by the students' selection of topics. In the divergent task, the broadening of dialogic space derived from the heterogeneous group settings, whereas in the convergent task, from the multiple and various information sources involved. As regards the deepening of dialogic space, explicit reflective talk remained scarce; instead the norms deriving from the school-context tasks and requirements guided the group dialogue.

Originality/value – This study lays the groundwork for subsequent research regarding the orchestration of dialogic space in divergent and convergent tasks by offering a typology to operationalise dialogic space for further, more systematic, comparisons and aiding the understandings of the processes

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implicated in intercreating and interthinking. This in turn is of significance for the development of dialogic pedagogies.

Keywords Collaboration, Interthinking, Convergent tasks, Dialogic space, Divergent tasks, Intercreating, Teacher orchestration

Paper type Research paper

Introduction

Contemporary research emphasises the significance of effective classroom dialogue; participation in collaborative discussions that encourage learners to think together has been found to contribute positively to the quality of the learning process (Barnes, 2008; Littleton and Mercer, 2013; Mercer and Littleton, 2007). Concepts such as “interthinking” (Mercer, 2000; Littleton and Mercer, 2013) and “dialogic space” (Wegerif, 2007) have come to represent “ideal” forms of educational interaction (Littleton and Mercer, 2013). Interthinking refers to higher-order collaboration [1], where people use talk collectively and creatively to link individual minds to form a powerful problem-solving tool (Littleton and Mercer, 2013). Allied to this, the Bakhtinian notion of dialogic space can be characterised as a shared resource of ideas in a dialogue, the space: “where multiple meanings can be explored and developed” (Jesson *et al.*, 2016, p. 156).

The difference between voices offering multiple perspectives is the driving force within dialogic space (Jesson *et al.*, 2016; Moate *et al.*, 2019; Wegerif, 2007). Dialogic space is not limited to social interaction among those present, but also can entail the voices of *texts*, allowing interpretation, re-interpretation and exploration (Anagnostopoulos *et al.*, 2008; Jesson *et al.*, 2016). Moreover, holding incommensurate perspectives together engenders creative tension (Wegerif and Yang, 2011), enabling “possibility thinking” (Craft, 2011). Previous research, regarding group problem-solving among children, indicates that the extent to which learners are able to open up the dialogic space of reflection, thereby enabling creative solutions to emerge, is key to task success (Wegerif, 2005).

Despite educational researchers’ and teachers’ increasing advocacy of dialogic pedagogies, traditional, authoritative classroom discourse often prevails, entailing an orientation towards teacher-predetermined answers (Hirvonen and Palmgren-Neuvonen, 2019; Jesson *et al.*, 2016) rather than the shared exploration of ideas and concepts. Recent socio-technical developments have challenged traditional classroom practices, calling for an authentic variety of multiple voices and offering affordances for becoming more open to dialogue “with others and with otherness” (Wegerif and Yang, 2011). Besides the voices of learners and the teacher, this includes the seeking and use of information resources, beyond the immediate context, to invite additional voices to be heard and enter into and shape the emergent process of knowledge building (Hirvonen and Palmgren-Neuvonen, 2019). While print texts (e.g. textbooks) are often seen as representations of truth and traditionally establish monologic authority within the formal education systems, the use of various online sources is likely to prompt critical thinking (Wegerif, 2013). The Internet, carries the dialogue within which truths emerge as fallible insights within a never-ending process of inquiry (Wegerif, 2013). Collaborative information seeking, in particular, has been recognised to open up possibilities for sites where learners “search to learn” collectively (Knight *et al.*, 2017).

In dialogic classrooms the teacher plays a crucial role, as an “orchestrator of learning” (Salomon, 1992), generating rich opportunities for talk about shared tasks and enabling and managing dialogic spaces (Jesson *et al.*, 2016). The multi-dimensional concept of teacher orchestration involves pre-session and real-time activities (“orchestration design” and “dynamic orchestration”, Sharples and Anastopoulou, 2012) to enable effective dialogue in face-to-face and network-supported activities and in both whole-class and group settings (Dillenbourg, 2013;

Tchounikine, 2013). The quality of these activities has been evidenced to impact group talk (Hämäläinen and Vähäsantanen, 2011). There is also evidence to suggest that task genre influences the nature and quality of group interaction (Rojas-Drummond *et al.*, 2010). Convergent tasks, with more exact solutions, are typically associated with explicit reasoning-in-talk and *interthinking* (Mercer, 2000). Divergent, open-ended and more creative tasks imply infinite solutions (Littleton and Mercer, 2013) and support meaning-making using affirmative “co-constructive talk” (Rojas-Drummond *et al.*, 2010) to *intercreate* (Palmgren-Neuvonen *et al.*, 2017).

Research on dialogic pedagogy has, at times, been criticised for its idealistic nature (Lefstein, 2006). There is thus a pressing need for the empirical work designed to understand the notion of dialogic space, to engage with the complexities and realities of classroom-life. There is a developing body of work, for example, investigating the co-construction of dialogic space in classroom settings, that is focussed on the ways in which purpose-built technological artefacts are utilised in creating these spaces (see Hennessy, 2011; Pifarre and Kleine Staarman, 2011; Kerawalla, 2015; Wegerif and Yang, 2011; Rooke, 2016 for discussion). This study contributes to the emerging understanding of dialogic space, in both divergent and convergent tasks, by examining its co-constitution empirically in naturalistic settings, during group-based learning projects in Finnish primary and secondary schools. The work reported offers researchers an analytic typology and has implications for practical pedagogies of dialogic space. The settings enable: the exploration of the co-constitution of dialogic space, along with the characteristic nature of tasks of different genres, and reflections regarding how teacher orchestration can prompt and support its unfolding. Moreover, without focussing on specific technological artefacts, the study offers reflections on the ways that the seeking and use of information sources, mediate dialogue (see Wegerif, 2007). By doing this, the study contributes to the relatively scarce research literature on information seeking practices in group-based learning settings (Ndumbaro and Mutula, 2019). While recognising the importance of exploring non-presentational modes of meaning-making (e.g. dance and drama) and the multimodal co-construction of meanings (Vass and Deszpot, 2017), this study focuses on spoken language transacting meaning between speakers (Maine, 2015).

Theoretical approach

What follows is a brief review of the key concepts most pertinent to this study, namely, dialogic space, interthinking and intercreating emerging in convergent and divergent tasks. Moreover, teacher orchestration to foster dialogic space is discussed.

Dialogic space

Wegerif (2007) defined dialogic space as a space of dialogue, opened and driven by creative tension between different viewpoints, always opening up an unlimited space of potential perspectives. He criticised the argument (presented by e.g. Vygotsky, Wertsch and Mercer) suggesting that ways of using language serve as *tools* for thinking. Instead, Wegerif (2007, p. 79) claimed that it is the indirect influence of the use of language that opens up: “a dialogic space between people in which creative thought and reflection can occur”, thereby enabling “possibility thinking”. Possibility thinking, referring to possibilities for creativity (Craft, 2011), involves a continuum of thinking strategies from “what does this do” to “what can I do with this?” at the other end of the continuum (Craft, 2002, p. 113).

Dialogic space is co-constituted in a linguistic process that engages the participants in the iterative negotiation of shared meanings and maintenance of intersubjectivity, namely, entailing an other-orientation and trust (Littleton and Mercer, 2013; Wegerif, 2005). Intersubjectivity, regarded as a key characteristic and prerequisite of dialogic space (Wegerif, 2005), constitutes reciprocal interconnections between speaker(s) and listener(s),

both anticipating each other's utterances that shape, in turn, what will be said or written (Bakhtin, 1986; Staarman and Mercer, 2010). In this process of "mutual attunement" and resonance of ideas, Wegerif (2007, 2013) views dialogue not only as a means to an end, but as an end in itself. More important than the quality of what the participants construct is "the quality of the space within which they construct" and "the quality of the educational dialogues through which they construct" (Wegerif, 2013, p. 5).

Wegerif (2013) suggests that dialogic space entails three moves, namely, *opening* to enable a shared space of possibilities, *broadening* (alternatively expanding or widening) to bring in new voices with multiple perspectives and *deepening* to invite shared reflection of those perspectives and to challenge the participants' assumptions. Despite its invisible and transcendental nature, dialogic space is also empirical: the three moves have a direct effect on the visible world in ways that can be indirectly measured, for instance, deduced or abduced from transcriptions of talk (Wegerif and Yang, 2011; see Method section).

To *open* dialogic space, learners need the kind of spaces that support dialogic learning involving, for instance, well-designed group tasks, tools, ground rules and prompts such as fruitful questions (Wegerif, 2013). Furthermore, technology can help learners, children specifically, to interact "dialogically" around a shared screen, sitting and negotiating side-by-side, (Wegerif, 2007) that is likely to prompt collaboration (Eteläpelto and Lahti, 2008). However, an emergent dialogic space tends to close down if using tasks or technological tools that allow too little time, promote solitary work (Wegerif, 2010) or tend not to prompt reflection (Wegerif, 2007). Learners need time to think and compose their responses and contributions, be it with the teacher or technology.

Dialogic space is *broadened* by increasing the constitutive dialogic gap or degree of difference between voices and inviting perspectives by asking (collectively) questions such as "Are there any other views about this?" (Wegerif, 2007, p. 290). Rather than the number of transacts, the number of alternative perspectives discussed before decision-making indicates the quality of group talk (Wegerif, 2007). Besides the group members' ideas, other information sources may be used to invite new voices into the discussion (Hirvonen and Palmgren-Neuvonen, 2019; Anagnostopoulos *et al.*, 2008; Jesson *et al.*, 2016). The concept of dialogic space thus offers a new perspective on the role, significance and possible consequences of information-seeking during classroom-based educational tasks. The use of interactive online environments, in particular, enables access to practically infinite information sources that can enhance dialogue between different perspectives (Wegerif, 2007, 2013).

Dialogic space can be *deepened* by promoting collaborative reflection on perspectives being voiced, or by tools, to make thinking visible, allied to appropriate face-to-face practices. Group members are encouraged to think deeply about the assumptions and grounds of their own thinking and their shared task, topic and processes. These assumptions can significantly impact group interactions, decision-making and responsibility taking and resonate with mutual trust, engagement and motivation (Wegerif, 2013).

Convergent and divergent tasks – interthinking and intercreating

Task genre is found to largely give direction to the quality of group talk. Convergent tasks refer to tasks with more exact solutions and are typically associated with explicit reasoning-in-talk and interthinking (Mercer, 2000). To interthink, people use talk collectively and creatively over time, linking individual minds and enabling them to achieve more than solitary work would enable (Littleton and Mercer, 2013). Thus, interthinking can effectively contribute to learning and problem-solving (Dawes, 2017), specifically in subject-specific tasks that aim to find an explicit solution to logical "closed" problem solving, typical of science education (Rojas-Drummond *et al.*, 2010).

Divergent tasks are open-ended and more creative, implying infinite solutions (Littleton and Mercer, 2013) and support meaning-making using affirmative “co-constructive talk” (Rojas-Drummond *et al.*, 2010) to “intercreate” (Palmgren-Neuvonen *et al.*, 2017). Divergent tasks can be abstract and challenging, providing little common ground for discussion. To intercreate, the participants need to co-construct an initial conception of the open-ended task and content, develop strategies and (re)negotiate constraints and norms (Vass *et al.*, 2014). Although the process can engender tensions, the shared endeavour to manage the initial phases has been evidenced to develop intersubjectivity between the members (Palmgren-Neuvonen *et al.*, 2017) and enable creativity among them (Palmgren-Neuvonen *et al.*, 2017 and Littleton and Mercer, 2013).

Table 1 summarises the different nature of convergent and divergent tasks. The tabulated characterisation is not intended to create artificial dichotomies between the types of tasks but, rather, to facilitate an understanding of the nature of the task contexts salient to this study.

Typically, convergent tasks support exploratory talk [2] (Mercer and Littleton, 2007) with perspective-taking group negotiations involving arguments and counter-arguments as well as explanations, explicit reasoning and justifications (Littleton and Mercer, 2013). Divergent tasks, in turn, typically engender co-constructive talk with participants chaining, integrating and reformulating each other’s contributions (Rojas-Drummond *et al.*, 2010).

However, Wegerif (2007) claimed that more important for successful group work than explicit reasoning is participants’ interresonating talk, “reflective dialogue”, going beyond the task-specific necessities. Irrespective of the genre, collaborators need to develop not only a shared understanding of the topic, but also an appropriate strategy for joint working (Eteläpelto and Lahti, 2008). Collaborative processes are regulated by logic and reason (Vass, 2004) whereby collaborators cyclically generate and review content (Rojas-Drummond *et al.*, 2010), moving forwards and backwards continuously between the emergent content space, i.e. what has been jointly generated and a rhetorical space to plan the document structure (Scardamalia and Bereiter, 1986). Whereas novices follow a linear “knowledge telling” strategy without much reflection, advanced collaborators employ sophisticated strategies to create and co-regulate activities (Scardamalia and Bereiter, 1986), recursively using types of talk that instantiate divergent creative and convergent reflective thinking (Middup *et al.*, 2010). Wegerif (2007) called the latter “critical” thinking, as opposed to “creative” thinking, to select the good ideas from the bad (Lipman, 2003).

Both critical and creative thinking are needed beyond task-specific necessities; convergent tasks related to physics, medicine and technology, for instance, require creative thinking (Craft, 2002) while divergent tasks benefit from critical, reflective thinking (Palmgren-Neuvonen *et al.*, 2017). By balancing between these types of thinking,

	Convergent	Divergent
Context	Information seeking, source-based collaborative knowledge-building (e.g. science education)	Collaborative storytelling (e.g. native language education)
Nature	Closed-ended	Open-ended
Content	Factual, informational	Imaginative, abstract
Type of talk	Exploratory	Co-constructive, cumulative (disputational)
Dialogic space	Interthinking	Intercreating
Solution	More exact	Infinite

Table 1.
Characterising
convergent and
divergent task genres

both needed to work together in problem-solving (Middup *et al.*, 2010), the collaborators satisfy external (e.g. set topic, instructions or guidelines) and internal constraints (participants' existing concepts and schemas) (Vass *et al.*, 2014), both limiting and resourcing the process (Sharples, 1996). Conscious analytic talk and explicit reasoning, reflecting evaluation and critical thinking are likely to serve as convergent moves (Vass *et al.*, 2014) that tend to close conversation (Maine, 2015) offering little affordance for continued co-construction.

Teacher orchestration to foster dialogic space

While dialogic space is a complex intermental space, the teacher can play a key role in its co-constitution through both pre-session and real-time orchestration in which: “the focus of attention is channelled towards a specific aspect of an ongoing activity – there being shifts between what is fore-grounded and what is back-grounded, taking into consideration the contributions of the learners” (Littleton *et al.*, 2012, p. 1). Acknowledging that there is often ambiguity, within the research literature, regarding the concept of teacher orchestration and that this concept is very often associated with technology-supported learning (see e.g. Strauß and Rummel, 2020), we adapt it, such that it pertains to face-to-face settings and define, in what follows, teacher orchestration as we understand it in the context of our study.

Although dialogic learning and problem-solving, entailing the emergence of dialogic space, cannot be designed for directly, the teacher can enable its co-constitution by creating circumstances that would support it, namely, through creating: spaces, contexts and resources (Wegerif, 2007). Besides the task that would necessitate collaboration, the teacher designs learning situations that are likely to foster interaction among the learners (Kumpulainen and Wray, 2002) and guide them what and how to “play” (Tchounikine, 2013). In real-time, the teacher is needed to provide timely group scaffolding to promote dialogue in collaborative tasks, reflectively support the development of intersubjectivity and a positive interdependence (Johnson and Johnson, 2009; Strauß and Rummel, 2020) and manage group workflow (Hämäläinen and Vähäsantanen, 2011).

Indicating that real thinking and learning occur in an improvisational manner, Wegerif (2007) suggested introducing social ground rules to empower the learners to open and maintain dialogic space. Creating the rules of talking and thinking together in a shared negotiation process is likely to strengthen their agency and engagement (Mercer and Littleton, 2007) and thus, decrease the need for real-time contributions such as scaffolding.

Scaffolding (Bruner, 1978) initially referred to the gradual fading of adaptive temporal guidance to assist an *individual* learner's progress. However, in group settings, the teacher is needed to support the development of thinking together, understanding and learning among the members (Dawes, 2017), leading them to gradually take more responsibility for their learning (*contingency*, Hennessy *et al.*, 2005). This type of “implicit” scaffolding refers to the teacher supporting interdependent group work in a process-oriented manner, that is, by monitoring the group workflow and intervening only if needed to ask questions to be able to appropriately help the group to make progress (Chiu, 2004). In a dialogic approach to teaching-learning, the teacher is encouraged to give the floor to student voices. Mercer and Littleton (2007) recommend that the teacher be conceived as a discourse guide for learners, modelling exploratory ways of talking to address problems and create a collaborative culture of reciprocal respect. Overall, proactive and responsive teacher strategies such as encouraging collaboration and greater reflection among learners and integrating the use of various resources are needed (Hennessy *et al.*, 2005).

Aim and research questions

This study is informed by a holistic analysis of the interaction processes within two learning communities. The aim is to examine how dialogic spaces are constituted within classroom dialogue in different task contexts to identify similarities and differences between talk emerging during the co-creation of video stories (divergent task) in primary-school literacy education and that emerging during collaborative knowledge building (convergent task) in secondary-school health education. The research questions are:

- RQ1.* How were dialogic spaces co-constituted (opened, broadened and deepened) in the collaborative learning tasks of divergent and convergent nature?
- RQ2.* How did the teachers orchestrate the co-constitution of dialogic spaces?

Method

Our study adopts a qualitative case-study approach (Stake, 1995) and draws upon the well-established analytic method “sociocultural discourse analysis” (SCDA) (e.g. Mercer, 2004) – which was specifically conceived in order to analyse the ways in which shared understanding is negotiated and developed in social context. In addition to looking at the classroom dialogue – identifying intersubjectivity, perspective-seeking and interresonance among emergent ideas referring to dialogic space (Wegerif, 2005), we take into account mediational means (e.g. information resources and non-verbal means) that were used by the participants to interpret and negotiate information and elaborate a shared understanding over time in their intermental processes. Additionally, the teachers’ orchestration was examined by observing their classroom behaviour, instructions and scaffolding for the learners.

Two different video-observation datasets were selected from two larger research projects concerning group-based content-production. These datasets were collected in Finnish schools in 2010 (Study A) and in 2017 (Study B).

The context of Study A was a primary school where a video production project was implemented in a Grade 4 class, involving two teachers and 22 students aged 10 years. The group task focussed on making imaginative video stories. The lead teacher assigned learners to heterogeneous groups (in terms of gender and ability) of five students. The groups planned their shared artefacts in sessions with the following tangible sub-goals: Session 1, selecting three photos to outline the storyline; Session 2, writing the synopsis; and Session 3, writing/drawing the storyboard. They filmed and edited their material in Sessions 4–7 and reviewed the videos in Session 8. The timeline of the task was three weeks in total, two to three lessons per week.

The context of Study B was secondary-school health education lessons where two content production projects were implemented in Grade 8 classes (Case 1 and Case 2), involving two teachers and 43 students aged 14–15 years. In the projects, the group task was focussed on producing a shared artefact, regarding the following themes included in the subject curriculum: Case 1, poster about special diet and Case 2, PowerPoint presentation about disease. Each project involved three lessons to seek information and build knowledge in groups, as well as whole-class reviews for sharing and discussing the groups’ completed work. The timeline was three to four weeks, the groups working for one or two 45-min lessons per week. The dataset consists of approximately 15 h of video-recordings.

In all projects, the group sessions typically started with a short introduction by the teacher. Our focus in this article is on Sessions 1–3, taking into account teacher-led whole-class reviews. The focal sessions are indicated in bold in [Table 2](#).

The researchers had a pre-project meeting with each of the participating teachers to discuss mutual expectations regarding collaborative settings and dialogue though encouraging them to implement their project according to their established, on-going classroom practices. Thus, the settings can be considered naturalistic.

Analysis

The first author was responsible for data processing and analysis using QSR NVivo. The data collection, undertaken at different times and in different settings using observation and video-recording (involving three video cameras) as methods, contributed to both data and method triangulation. In addition, the credibility and trustworthiness of this qualitative study were ensured through researcher and theoretical triangulation (Twining *et al.*, 2017); the analysis of Study A involved two educational science researchers, whereas four researchers (two with expertise in educational science and two with expertise in information science) participated in the data collection and analysis in Study B as described below. Across the long-term processes of the larger research projects, theoretical framing arising from the two fields were considered to examine the phenomenon in a holistic multidisciplinary manner: dialogic teaching and dialogic space (educational sciences) and their salience for collaborative information seeking (information sciences). The data collection team discussed the classroom events after each lesson and the analyses were frequently reviewed in the joint data meetings. The iterative phases were as follows:

- The video data, transcribed ‘roughly’, were annotated and notated with non-verbal aspects in terms of the nature of dialogue, degree of collaboration and other potentially relevant information about the events and teacher orchestration, in a data-driven analysis adapting constant comparative method (Strauss and Corbin, 1990).
- The data involving task-oriented discussions and the instantiating of pre-arrangement or real-time teacher orchestration were subjected to a detailed verbatim transcription per individual speaker to allow examination of each participant’s contribution.
- In Study A, one group was selected, by agreement of the two researchers, for detailed examination due to its vibrant interaction and prominent development in collaboration across the three planning sessions, ranging from 22 to 33 min long. Furthermore, the teacher-led introduction and recap to review the outcomes of Session 1 were also taken into account, returning 110 min of video-recordings in total.
- In Study B, the focus was, as agreed by the four researchers, on two groups in Case 2 due to their task-oriented dialogue and the teacher’s contributions, returning 175 min of video-recordings.

Table 2.
Structure of the projects and the focussed sessions (written in bold)

Session study	1	2	3	4	5	6	7	8
A	Thought shower	Synopsis	Storyboard	Filming	Filming	Editing	Editing	Review
B: C1	CIS and CKB	CIS and CKB	CIS and CKB	Review	Review	Review		
B: C2	CIS and CKB	CIS and CKB	CIS and CKB	Review	Review			

Notes: CIS = collaborative information seeking; CKB = collaborative knowledge building

- Informed by a thorough investigation of the data and literature, an analytic typology to help the operationalisation of dialogic space was developed collaboratively by the two educational science researchers (Table 3). The typology facilitated the identification of co-constitution of dialogic spaces at two levels: a micro analysis of dialogic encounters, instantiating the participants' striving for intersubjectivity or representing the moves of dialogic space and a larger examination of cross-data phenomena in terms of pedagogical arrangements.

In accordance with Wegerif's (2017) ideas, the aim was not to categorise the interaction and activities in the classrooms, but to examine and interpret the use of language as a social mode of thinking, based on a sociocultural perspective on the nature and functions of language, thinking and social interaction. By using the analysis drawing upon SCDA (Mercer, 2004), we wished to maintain the contextualised, dynamic nature of talk and make sense of the variety of talk in relation to our research questions.

All extracts presented for consideration within this paper have thus been selected specifically to exemplify those patterns that were manifest within this rigorous analytic process.

Analytic typology to identify dialogic space

Although the literature describes the moves of dialogic space in various ways, they can be hard to distinguish, specifically the moves of broadening and deepening (Wegerif, 2007). As current literature lacks a clear characterisation of each move, an analytic typology for the purposes of this study was compiled, informed by the work of Wegerif (2007, 2010, 2013)

Move	Feature	Reference
Opening	Using group tasks to support dialogic learning	Wegerif (2007): 140, 210, 348, (2013): 143
	Using shared tools to prompt collaboration	Wegerif (2007): 140, (2013): 143
	Tension between different perspectives	Wegerif (2007): 12, 15, 185, (2013): 151
	Introducing ground rules of dialogic talk	Wegerif (2007): 180, (2010): 348
	Asking open reflective questions	Wegerif (2007): 140, (2013): 33
	Other-orientation, responsiveness: speaking and listening	Wegerif (2007): 144
	Asking for ideas and arguments	Scott <i>et al.</i> (2010): 299
	Elaborating together upon what people are saying	Scott <i>et al.</i> (2010): 299
Broadening	Acknowledging and valuing others' contributions and views outside the accepted	Scott <i>et al.</i> (2010): 299
	Proposing (collective) questions to invite new voices	Wegerif (2007): 321, (2013): 33, Scott <i>et al.</i> (2010): 300
	Using (interactive, online) information sources to invite multiple perspectives	Wegerif (2013): 3, 144
	Increasing degree of difference between perspectives and thinking	Wegerif (2010): 349
Deepening	(Using awareness tools) prompting collaborative reflection	Wegerif (2007): 321, (2013): 33, 144
	Using why?-questions	Wegerif (2007): 322
	Collaboratively/collectively reflecting on the task, topic and processes of dialogue	Wegerif (2010): 349, (2013): 144
	Reflecting on participants' own thinking	Wegerif (2010): 349
	Challenging participants' assumptions	Wegerif (2007): 211, 291

Table 3. Teacher's pre-task and participants' real-time contributions characterising the moves of dialogic space

and Scott *et al.*'s (2010) underpinnings and practical instantiations of dialogic space (Table 3). These characterisations, operationalising the three moves, can be broadly identified from transcriptions of talk (Wegerif and Yang, 2011).

Due to the dynamic nature of the three moves, a rigid temporal linearity in respect of these is not asserted. Rather, Wegerif's consciousness of multi-functionality of utterances and his descriptors of dialogic space are acknowledged not as categorisations, but rather, as characterisations of the moves of dialogic space. The typology was employed to address the research questions.

Ethical considerations

The study was conducted in accordance with guidelines for research ethics in empirical research (regarding refusal, withdrawal and confidentiality in data protection and reporting) along with the consent procedures in the humanities, social and behavioural sciences (Finnish Advisory Board on Research Integrity, 2012). Securing the informed consent from each student and their guardians also acknowledged the students' agency and strengthened their engagement with each project. In all reports, pseudonyms are used for both teachers and students.

The findings are exemplified by a number of data extracts that were found to manifest and confirm the suggested finding in the strongest manner. The extracts exemplify the diversity of the repertoires and demonstrate the richness of the data at the various moves of dialogic space. To inform the reader about the location in the data, each extract is indicated with a caption or label (Study/Case, Session, e.g. C2, S1) to enable transparent and, thus, more reliable considerations about prevailing aspects.

Findings

This section reports the key findings by characterising how the opening, broadening and deepening of dialogic space unfolded in the divergent and convergent task contexts. Both research questions are simultaneously reflected on via the exploration of the teachers' contributions, in terms of pre-planning and real-time scaffolding instantiated in the constitution of dialogic spaces. As the projects implied small-group work where the teacher is encouraged to give floor to student voices and scaffold groups on demand only, the contribution of the teacher is present in the form of pre-planning and orchestration (e.g. environment, tools, groups) of the task.

Opening up: enabling and developing dialogic space

In Study A, implemented in the context of primary-school literacy education, the teacher assigned students in advance to groups, heterogeneous in terms of gender, ability and character, justifying this by suggesting that this provides an important opportunity for them to learn how to collaborate with acquaintances. To address some students' objections to working in mixed-gender groups, the teacher said to the learners: "Well, we can't think this'll be a girls' film or boys' film, can we? We need to learn to collaborate with anybody, be they boys or girls or our best friends". The teacher supported collaboration within groups by ensuring concise task design involving time-limited group sessions with subtasks; the first subtask was, using a shared laptop, to find three photos from the Internet to inspire negotiations to outline the storyline of the group's collaborative video. The shared process provided frequent opportunities and prompted the group to discuss the storyline more so than if the group had worked with several laptops. However, in the focal group, comprising three girls and two boys, the learners (specifically one girl, giving ideas such as dolls and grannies and one boy, suggesting drugs and shooting) defended their

suggestions to the group in a contentious manner. Their various dialectic discourses represented their different cultural and social life worlds obviously somewhat mediated by the different genders. The teacher supervised and reflectively scaffolded the group, encouraging consensus in respect of the group decision. These contributions proved to enable the opening of dialogic space and to support group members to overcome their initial tensions, although the development of intersubjectivity required time.

Whereas the group task served to open dialogic space, the setting of heterogeneous groups simultaneously provided a variety of perspectives. Likewise, the shared laptop to collaboratively seek and select the photos afforded an excellent potential basis for opening up dialogic space, whereas the extensive online photo libraries afforded infinite perspectives and possibilities. These findings pinpointed how very swiftly transitions between the moves can occur. Moreover, they indicated ways that information seeking can contribute to opening up dialogic space.

In Study B, implemented in the context of secondary-school health education, Case 1 provided evidence of interesting practices that initiated the work of the first group session. The teacher encouraged the students to form groups of up to three members and, although designating special diets as the higher-level theme, to select their topic (a special diet, e.g. gluten-free or low-carbohydrate diet). He invited the groups to explore grounds for following the particular diet, its harmful health impacts such as undersupply of vitamins and how to prevent or manage them, for instance, asking “What kinds of health benefits and side effects may connect to the particular special diet?” (C1, S1). The teacher recommended the groups to use web-based information sources that they considered credible and suggested hand-written posters as the easiest output mode although PowerPoint and videos were also options. Whilst the students were allowed to work individually, most of them selected to work in groups, usually with one or two friend(s). The purpose of the phase obviously was to enhance learner engagement, but the opportunity to make selections also opened a dialogic space around tablets and smartphones within the groups as demonstrated in Excerpt 1.

Excerpt 1. Study B, C1, S1: Multiple student-selections opens dialogic space.

Minna: Let’s study other diets too. What is kosher?

Kati: Or halal? Or Mediterranean [. . .]

Minna: I could work with you if you don’t want someone else.

Kati: No problem.

Minna: Let’s start. It doesn’t matter which diet we’ll select.

Kati: I’m not interested in religious diets. How about fruitarian?

The excerpt shows the mutual attunement and empathy between the participants, asking each other’s opinions and being open to comply with each other’s decision. The phase, carefully designed by the teacher to necessitate multiple joint selections once again exemplifies the power of information seeking to open up dialogic space, prompted the information-seeking students, simultaneously probing the possibility of forming a group, to explore and discuss together several diets in order to select one that would be of interest to all members.

In Case 2, the teacher pre-selected three-member groups, their topics (one of the chronic or infectious diseases typical of Finnish population) and information sources for the particular

disease: a set of brochures and list of links to recommended websites of health authorities that she found credible. The task was to seek information, using tablets and personal smartphones and a shared laptop, to create a joint PowerPoint presentation about the group topic presenting facts such as the symptoms, epidemiology and treatment. Our analysis indicated that the collaboration around rich information sources emerging in most of the groups, opened up dialogic space. Each member in turn took a scribe role on the laptop while the others sought information. All members contributed to the joint dialogue by sharing ideas taken from different online information sources for joint consideration, aiming to understand complex information by asking questions and listening to each other. However, when exploring the difference between the mechanisms of lactose intolerance and milk allergy, topic group Allergies resorted to the teacher due to the complexity of the information content as Excerpt 2 exemplifies.

Excerpt 2. Study B, C2, S1: Sense-making of complex information opens dialogic space.

Anna: Is lactose intolerance an allergy as well?

Emma: No, it isn't.

Tiina: It's not an allergy.

Teacher: But milk allergy is.

Emma: I know because I have it.

Teacher: Lactose intolerance is kind of inability to digest lactose but milk allergy is an allergy.

Anna: (reads aloud) That [lactose intolerance] is due to the lack of enzyme lactase.

Teacher: - against those proteins. That's different.

Although revealing evidence of explicit scaffolding, instead of support for the development of interthinking, the excerpt demonstrates how each participant offered a suggested view to facilitate shared meaning making. Emma, for instance, shared a personal experience, while Anna confirmed the teacher's explanation by reading aloud from a brochure. Apparently, using multiple ICT tools to seek information, instead of a shared one, was not the determinant whether the group collaborated or not, but rather, they simply found that collaboration was the best way of coming to understand the complex health-related terms. In contrast, two groups decided to divide their task, for instance "Tickborne diseases" into sub-topics (borreliosis and Lyme disease). Their co-operation resulted in individual work, each member seeking information and writing an individual PowerPoint slide on their personal laptops. It can be argued that individual studying does not necessarily prompt critical thinking and elaboration as much as collaboration, entailing the participants to reflect and negotiate the ideas brought into discussion. This kind of co-operation closed down dialogic space, despite their positive task-orientation. Information seeking can thus contribute to the opening of dialogic space, but collaboration (rather than co-operation) is needed for that to happen.

Interestingly, none of the participant teachers appeared to explicitly induct their students into the ways of talking and working together associated with productive intercreating or information content – either at the beginning or during the projects. Nevertheless, most of the students seemed to be familiar with group work, as at least two groups in all classrooms worked in a collaborative manner. The group tasks inherently invited the members to participate and contribute to the joint dialogue around a shared table and ICT tools, either to

thought shower an imaginative video story that would settle all members' ideas (Study A) or to build knowledge on a health-related topic (Study B).

Broadening: from monologic to multivoiced

Dialogic space can be broadened in classrooms by ordinary and simple practices. Study A involved a whole-class review, mediated by a whiteboard presentation of each groups' three photos (collaboratively selected in Session 1). The teacher invited all the learners to narrate a storyline on the photos, saying: "Photo one, two and three: baby, bomb, shark. We'd like to hear three suggestions from the audience on what happens in these photos. Anne? [...] Lotta? [...] Well, can someone propose a totally different storyline? What happens in the last photo?" (Study A, Session 1)

The teacher modelled exploratory ways of talking by proposing open-ended questions and encouraging all learners to talk freely. Not only did the particular group encounter more perspectives, of relevance to their video story, but the practice undoubtedly facilitated all groups to elaborate their storylines. After the review, all students were encouraged to write down particularly exciting ideas and to suggest up to eight propositions for the group's movie. The individual practice encouraged new voices to contribute to the storyline, enabling each participant's own voice to be heard and prompting passive members to participate. In each group, the ideas suggested by the members were evaluated in Session 2 whether to employ or abandon them.

Study A also foregrounded some of the challenges than can derive from a broadened dialogic space. The mixed-group arrangement, inviting multiple perspectives, initially resulted in tensions in the focal group between the members' different imaginative ideas. The tensions engendered frequent conflicts and disputational talk that instantiated a lack of intersubjectivity. The group was poised between the moves of opening and closing dialogic space, due to their transient interpersonal conflicts, which prevented constructive explorations of the differences between their perspectives. To open dialogic space and take advantage of the multiple perspectives, the group needed to follow the teacher's supportive recommendation to reach consensual agreement in respect of group decision-making.

In Study B, a variety of information sources provided different perspectives to broaden dialogic space in the groups. Interestingly in Case 2, the teacher provided a set of formal brochures and handouts on articles related to each topic, saying: "These articles were written by health-care professionals, so they should be good". Although the aim of providing pre-selected material was to facilitate task implementation, it also narrowed the perspectives and "diluted" negotiations concerning the evaluation of the credibility of information sources. However, besides the printed material, ICT tools ensured access to online sources affording wide perspectives regarding health-related information.

Health-related information appeared as complex undoubtedly promoting meaning making in groups, for instance as stated by a member of topic group Allergies: "We should understand everything to be able to explain them" (C2, S1). Their shared challenge necessitated collaborative endeavours. Every now and then, some topic groups, Allergies particularly, were challenged by confusing and conflicting information from different sources calling for the teacher's help (Excerpt 3).

Excerpt 3. Study B, C2, S1: Conflicting information from different sources broadens dialogic space.

Tiina: What about atopy then? It's an allergy, isn't it?

Emma: What is the difference between atopy and allergy?

Anna: Indeed!

Emma: This source claims that atopy is a somewhat narrower concept.

Tiina: This [brochure] says that it's inherited.

Anna: (writing) A nar-ro-wer con-cept of allergy that is inherited [. . .]

Teacher: I would understand atopy to be some kinda mild allergy.

Accordingly, the multiple sources provided contradictory information that increased the degree of difference between perspectives and thus, broadened dialogic space. This made the group explore those differences, however, the scribe ended up formulating a sentence without really understanding its meaning. The gap between the descriptions of the complex concepts and student understanding of scientific language invited the teacher to interpret and translate information content into everyday vocabulary although the concepts seemed to challenge even the teacher's knowledge.

Informal online forums and blogs appeared to afford voices from "experts-by-experience", that is, affected people's stories and practices. In Case 1 specifically, all groups used information about diets from these sources although they seemed to acknowledge the nature of the forums "where anyone can write anything". Besides the online forums, doubtlessly affording valuable perspectives to discuss, the students frequently drew upon their own health-related experiences and those of people close to them. The students seemed eager to share this type of knowledge on diseases such as influenza and allergies as evidenced in Excerpt 4.

Excerpt 4. Study B, C2, whole-class review: Experiences broaden dialogic space.

Emma: What does urticaria look like?

Tiina: Do you remember my face two weeks ago? My face was full of small [. . .] like [. . .]

Anna: It reminds a nettle burn!

Teacher: Small red, raised rash, rather than big lumps.

The excerpt indicates that personal experiences not only effectively opened up dialogic space but simultaneously broadened the perspectives within a learning community. As for involving students from different groups, the excerpt also pinpoints the salience of whole-class dialogue for reflection on health-related issues with peers and teachers, presumably contributing to their developing understanding. Furthermore, whole-class settings appeared to afford an opportunity to discuss contradictory understandings that derived from the multiple sources and enabled the teacher to repair potential misunderstandings, enhancing the pedagogical value of the source-based learning.

Deepening: norms prompting reflection and convergent thinking

In Study A, disagreement regarding the content between two of the group members was addressed by the teacher by prompting the group to reflect their own ideas and thinking. The requirement for consensus, calling for collaboration, engendered implicit negotiations regarding the appropriateness of the suggestions and agreement upon some norms related to school-context tasks in terms of themes and ideas involved in their joint video story. With the exception of Jani, the group members considered themes of death and violence to be inappropriate in such a context, going far beyond the norm, as evidenced in Excerpt 5.

Excerpt 5. Study A, S3. Negotiating school-based task norms deepens dialogic space.

Jani: [. . .] who then dies!

Anu: No, he doesn't die!

Vilma: He must not die.

Jani: Ok, he'll be run over by car.

Anu: He mustn't die, can't you understand!

Vilma: This is a school task, so we won't accept dying.

The dialogue presented in the excerpt instantiates convergent thinking in order to select the good/appropriate ideas from the bad/inappropriate. Interestingly, the norm served as prompts not only for opening and broadening, but also for deepening dialogic space to reflect the content to comply with the school-based task. Although entailing a long-term development process, working to reach a consensus encouraged the group members to listen with care to each other's suggestions, indicative of emergent intersubjectivity. They finally managed to overcome the conflicts deriving from the difference between the girls' and boys' ideas and integrate opposing ideas within the storyline using co-constructive talk. Their cumulative dialogue, instantiating emergent empathy rather than critical denial and simply saying "no", indicated a release in the tensions between their different perspectives. Although the converging perspectives transiently resulted in the loss of multivoicedness, deepening dialogic space through reflective group talk enabled a process of intercreating in which robbers and grannies were both incorporated within their video story, indicating the creation of a tactful and well-intentioned type of action-movie that conformed to the school context.

Also in Study B, the teacher-designated shared artefact and norms deriving from the school-based task requirements appeared to deepen dialogic space. Information-seeking from multiple sources, websites specifically, afforded a number of perspectives and viewpoints to explore and question. However, despite the collaborative meaning-making in most of the groups supported by the teachers, their talk appeared somewhat cumulative and uncritical in terms of credibility evaluation; explicit reflective talk concerning information sources and content and their credibility remained uncommon, be they informal forums (Case 1) or teacher-recommended authoritative web pages (Case 2). Instead, in many groups, the dialogue concerned implicitly negotiated evaluative forms of talk, linking to information-use, appearance and the spelling of words within their collaboratively composed texts, needed to elaborate the text in terms of quality and quantity. For instance, topic group Influenza aimed to avoid direct citations, one member reading aloud: "Main symptoms are [. . .] fever that rises fairly quickly [. . .]" and Oona reformulating the cited text: "I'll write fairly quickly rising fever" [C2, S2]. The excerpt indicates that the students were aware that they should not write the citation directly word for word from the source. They took into account a similar norm when planning the prospective presentation, aiming not to merely read aloud the written texts. Topic group Allergies intended to explain the content in longer sentences: "Ok, just write nasal and eye symptoms and (in the presentation) we'll put them in other words. We'll remember to mention nose leaking, itching and red eyes" (C2, S3).

Although the teachers in Study B were invited to scaffold the groups relatively infrequently, they did raise up issues and fed some of the findings, emerging within the group talk, into the whole-class discussion. In Case 1, the teacher discussed the ground rules of credibility evaluation of online information, asking: "When you seek information from the

Web, what kind of features [demonstrating credibility] do you check?" (C1, S1). Being responsive, he acknowledged and valued students' talk as in a dialogue on the emerging mechanism of celiac disease illustrated in Excerpt 6.

Excerpt 6. Study B, C1, whole-class review: Responsive teacher opens dialogic space.

Teacher: So, what is gluten in crop products?

Vilma: Wheat, barley, rye.

Teacher: Well, I mean what part is it. If lactose is a sugar in milk [. . .] what's gluten in crop products?

Inka: I think it's similar.

Teacher: Yeah, you're right but what is it?

Inka: I can't find it (from the poster) but it's some kinda protein, isn't it?

Teacher: Yes, it's the protein in crop products. Further, you referred to diabetes in your poster. Your expression suggests to me that gluten causes diabetes, as well.

Inka: No, it doesn't!

Teacher: Ok, but the sentence caused me to understand it that way. Obviously you mean that the mechanism is the same and they both are autoimmune illnesses? (Inka nods) That's correct, well done.

At the same time, the excerpt here underscores the importance of the teacher's role as a discourse guide, asking for and listening to the students' arguments and justifications to invite elaborations upon the meaning of arguments in the group presentations and, furthermore, repairing emerging misunderstandings.

Deeper analysis of the collaborating groups' interactions in Case 2 revealed aspects of more critical reflection around collaborative knowledge building. Norms related to the credibility evaluation of the sought and employed information sources were implicitly discussed and addressed by source triangulation to find confirmative coherence between different sources as indicated in topic group Influenza: "Should we look at other sources to see if there are similar statements?" (C2, S1). Furthermore, information was tacitly evaluated in terms of feasibility in relation to the topic. For instance, in topic group Allergies Anna asked other members' opinion: "What shall we write about transmission area and frequency?" Tiina replied, indicating advanced reflection ability: "No, you can't talk about transmission in the connection of allergies" (C2, S3).

An additional norm related to necessity was evident in the reference to expectations with respect to the task requirements, whether information is essential and crucial in the examined phenomenon. This was instantiated by topic group Influenza in their dialogue demonstrating reflective evaluation: "This source claims that type A transforms to A/H1N1 [. . .] We don't need this?" "No, let's write only the most important points" (C2, S1). Their discourse can also be interpreted as evidence of their intention to avoid presenting – or exploring – too complex terms and concepts. The norm of addressing all task requirements suggested that the students knew the teacher to expect particular facts as a response to the task of closed-ended nature.

Discussion

This study aimed to examine the co-constitution of dialogic space in the context of group-based learning tasks of divergent and convergent nature. This entailed an exploration of classroom dialogue and teacher orchestration with respect to the moves of opening, broadening and deepening of dialogic space. Table 4 summarises the key findings, as salient for this discussion, of this qualitative empirical study implemented in different contexts.

The observed technology-enhanced projects provided the participants with a sociocultural context supporting their engagement with each other's ideas through: talking together, in a face-to-face setting, around technology (smartphones, tablets and laptops) enabling access to the internet; and supporting the shared creation of and reflection on, their joint artefact. Designed to inspire and facilitate effective educational dialogue, the projects proved to offer fruitful opportunities for the emergence of dialogic spaces.

Opening, broadening and deepening dialogic spaces

The various group tasks, and ICT deployed, served as mediational means for opening dialogic space (see also Wegerif, 2007) by enabling the group members to discuss and reflect collaboratively whilst working around the shared screen to elaborate their joint artefact. The devices also ensured access to multiple perspectives available online, thereby augmenting dialogues. Interestingly, the findings of this study highlighted a valuable common feature implicated in the opening, fostering and maintaining of dialogic space, namely, consensus in terms of ideas regarding the jointly produced video, as in Study A, or the shared topic, as in Study B. Consensus was encouraged by the teachers and engendered intrinsically within the groups. Excluding this dialogue norm (Hofmann and Ruthven, 2018), evidence of the explicit introduction or creation of ground rules for classroom dialogue were not observed in these naturalistic settings, although Wegerif (2010) regarded the ground rules as being a prerequisite for the opening of dialogic space.

The findings indicate that dialogic space can be *broadened* by employing heterogeneous grouping strategies and deploying the use of multiple information sources, including the Web-based ones, to increase the differences between perspectives (Wegerif, 2007, 2013). The

Moves	Tasks	
	Convergent	Divergent
Opening	Student-selection of the group, topic, output mode; collaborative information seeking to enable source-based knowledge building	Consensus in heterogeneous groups; imaginative task; collaborative information seeking (selecting photos) to inspire negotiations
Broadening	Use of multiple sources and experts-by-experience both from the web and classroom; contradictory and complex information to bring in new perspectives	Whole-class review to invite new perspectives on the storylines presented in the three photos; new ideas from other students to bring in new perspectives
Deepening	Norms deriving from the guidelines to seek information and make presentation; teacher assessment criteria and curriculum; shared artefacts (tools and product) to prompt collaborative reflection on the content and process	Norms deriving from school-based task context to lose multivoices; shared artefacts (tools and product) to prompt collaborative reflection on the content and process

Table 4. Key findings in terms of moves of dialogic spaces in convergent and divergent tasks

study suggests that this move links to divergent creative thinking and talk (Middup *et al.*, 2010). In the divergent task, this appeared to derive from the heterogeneity of the participants, whereas in the convergent task, from the multiple and various sources involved.

As regards to *deepening* dialogic space, explicit reflective talk appeared to be scarce and somewhat superficial. This finding accords with work by Cook *et al.* (2019) who reported superficial verbal forms of elaboration in group work among young learners. Like Wegerif (2010), they call for group reflections on the assumptions that the participants carry with them into dialogues. Nevertheless, the analysis did identify norms that connected strongly to the deepening of dialogic space, appearing as implicit reflection in respect of the external constraints (Vass *et al.*, 2014). In both task contexts, they were implicitly present in the group talk, while explicit norm talk was scarce. These kinds of dialogues, aimed at the evaluation of the shared work undertaken so far in relation to expectations, can be regarded as an instantiation of the deepening of dialogic space. In the divergent task, the cultural and institutional norms were used as justifications to evaluate and abandon topics such as extreme violence or drugs that were deemed unacceptable for a school-based task. Taking into account these norms notably released the tensions between the members' differing perspectives, but at the same time, resulted in a loss of multivoicedness – temporarily impairing the crucial driver within dialogic space (Wegerif, 2013). However, this was a prerequisite for group development that subsequently enabled even more fruitful shared intercreating.

In the convergent task, the norms instantiating external constraints (Vass *et al.*, 2014), drawing on the curriculum and teacher, guided group dialogue, while shared internalised norms for information use guided the co-creation of the shared artefact. Furthermore, the use of various sources inherently prompted negotiation of norms related to the credibility and appropriateness of information and sources to deepen dialogic space. Although explicit credibility negotiations appeared scarce, it is possible to identify analytic talk that occurred in cycles, entailing the generation and reviewing of content, as described by Rojas-Drummond *et al.* (2010), or moving forwards and backwards continuously between the emergent content space and rhetorical space to plan and organise the document structure, something which is typical of advanced collaborators (Scardamalia and Bereiter, 1986). Therefore, the findings underline that deepening dialogic space links to convergent thinking (Middup *et al.*, 2010) and that convergent thinking is required also in divergent tasks. Likewise, divergent thinking is needed in convergent tasks, inviting new perspectives to solve problems, entailing “possibility thinking” (Craft, 2011). However, tensions may appear in terms of the overarching aims of these two facets of interthinking (one working towards unity of thought and homogenous thinking – sharing, competing and identifying one single solution – the other working towards the polyphony of voices, which are fused and intertwined, with a “unity in difference”). Regardless of task genre, both types of thinking are needed and the need for interresonance in dialogue is apparent and this study underlines the salience of collaboration as a crucial prerequisite for dialogic space.

Teacher orchestration supporting the co-constitution of dialogic spaces

By enabling and enhancing collaboration, teacher orchestration (pre-session and real-time) supported groups to co-constitute dialogic space (Wegerif, 2007). For instance, successful intercreating (Study A) or interthinking (Study B) occurred in the groups that worked using one shared tool (or artefact) to bring together the different perspectives – all members participating and contributing to the creation of the shared artefact. The setting prompted – and necessitated – dialogue and the development of intersubjectivity to create a shared

dialogic space. The participant teachers addressed Barnes's (2008) pedagogically oriented call for the appropriate preparation, guidance and supervision of group work. They appeared to play a crucial role in providing and inviting multiple perspectives and by requiring and supporting collaborative endeavours as recommended by Hämäläinen and Vähäsantanen (2011). To open dialogic space, the learners were invited to select their group partner(s) and a volitional topic which was likely to create positive interdependence within the group (Strauß and Rummel, 2020). To broaden dialogic space, the learners were assigned to groups heterogeneous in terms of abilities, gender and characters, and they were introduced to using – and cross checking – various information sources (Tanni, 2013).

The different task contexts provided a fruitful opportunity to shed light on the processes implicated in the co-constitution of dialogic space. Divergent open-ended tasks appeared to afford space for multiple perspectives, to foster processes of intercreating, learners' creativity and participation in meaning-making dialogues. Convergent tasks clearly prompted the students to make sense of complex and contradictory information, which doubtlessly had a positive impact on their shared interthinking and collaborative learning processes (Barnes, 2008; Dawes, 2017). The findings of the study are congruent with earlier research claiming that convergent tasks support exploratory talk to co-create a dialogic space of interthinking (Rojas-Drummond *et al.*, 2010) while divergent tasks support co-constructive talk to create a dialogic space of intercreating (Palmgren-Neuvonen *et al.*, 2017).

Strengths and limitations

This qualitative study is predicated upon a dataset from two larger research projects. However, the aim here was not to exhaustively report the entire data set, but rather, to highlight meaningful extracts drawn from the classroom dialogue. The data discussed are powerful exemplifications of the broader patterns how the co-constitution of dialogic space was instantiated in both task contexts. Indicating the extracts with a caption or label enables transparency regarding interpretation of the data and allows the reader to consider alternative interpretations (Graneheim and Lundman, 2004). The purpose was not to generalise the findings, but instead, to understand the challenges associated with the pedagogies entailed in the orchestration and the co-constitution of dialogic spaces in content-production projects of different kinds.

Conclusion

This study emphasises, and empirically evidenced, the close relationship between the concepts of dialogic space, collaboration and intersubjectivity. It offers a way of looking at how the seeking and use of information sources can mediate the opening of dialogic space. Moreover, the study indicates the broadening of dialogic space to be achieved by introducing and emphasising the importance of using various information sources. Additionally, it underscores the challenges surrounding the deepening of dialogic space that remain to be addressed.

As an implication for the research community and practitioners, this work offers an analytic typology for exploring the dynamics of dialogic space in naturalistic classroom-settings. Here we use this typology to shed light on the characteristics of the moves of opening, broadening and deepening dialogic space in naturalistic settings where groups work on convergent and divergent tasks – and the swift transitions between the moves.

The notion of dialogic space is salient in diverse teaching-learning contexts and the importance of these ideas needs to be recognised in order to develop efficacious dialogic pedagogies. As an implication for teachers and practitioners who want to foster effective educational dialogues in their classrooms, the study emphasises the salience of careful teacher orchestration and its impact with respect to the nature of the interactional

trajectories and the quality of dialogic spaces. Furthermore, the study gives indication of the opportunities and challenges the use of technological tools create in respect of, negotiating the creation and sustaining of, dialogic space.

To enhance the educational quality of dialogic spaces, the teacher is needed to emphasise the significance of the social ground rules that would invite groups to question the framing grounds of their contributions and to introduce the ideas of divergent and convergent talk to broaden and deepen dialogic spaces. From the perspective of instructional design, the study suggests that a judicious balance of pre-planned and real-time activities, as employed in these classrooms, may represent valuable points of departure and reflection. What must be fostered, then, is the powerful process of disciplined improvisation, whereby pre-planned lesson structures are brought into dynamic interplay with opportunities for collaborative emergence (Sawyer, 2004).

The study opens up avenues for future joint projects, involving both educational science and information science researchers and practitioners, designed to increase our understanding regarding the interconnections between classroom information practices and dialogue – thereby realising the potentials inherent in the concept of dialogic space.

Notes

1. Collaboration is argued to necessitate common ground among group members who are engaged in working towards a mutually negotiated goal by building upon each other's suggestions and contributing to all parts of the shared task, though dynamic and horizontal task division may occur (Dillenbourg, 1999). The beneficial mechanism of collaborative learning is the diversity of perspectives providing possibilities for creativity and generating interaction that provokes knowledge elicitation or disagreement (Dillenbourg, 1999).
2. Whereas the exploratory form of talk refers to sharing and negotiating ideas, opinions and perspectives for joint consideration and reasoning, the cumulative form stands for positive, albeit uncritical, building upon other participants' utterances, while the disputational form dignifies short turns at talk, disagreement and individualised decision-making (Mercer *et al.* 1999).

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