EXPLORATORY TALK IN TIMES OF GLOBALISATION AND DIGITALISATION: A NARRATIVE REVIEW

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Abstract

Over the last decades researchers and educators have promoted the use of language in collaborative activities in the classroom. Accordingly, there is considerable support for the sociocultural idea that knowledge is the result of a co-constructed activity of students, and that exploratory talk can support them to develop higher-order thinking, high-level understanding, the voicing of personal opinions and ideas, and argumentation skills. Positive learning effects of exploratory talk have inspired researchers all over the world to replicate, refine or elaborate on these early studies, using both quantitative and qualitative methods and often finding similar positive linguistic, cognitive, social, psychological, and pedagogical effects. In this study we present a narrative review into the definition, measurement, and effects of exploratory talk. The review is both a part and an extension of a PhD study on the use of exploratory talk in primary schools in Flanders, the Dutch speaking part of Belgium. Based on this review we will highlight the relevancy of exploratory talk and associated challenges for L1 education in a globalising, diversifying and digitalising context. We will argue that exploratory talk can meet these challenges, but its potential can only be realized fully by a shift towards dialogic teaching as opposed to the IRF/IRE-pattern which still seems to dominate classroom practice.

Key words: exploratory talk, speaking and listening skills, learning, globalisation, digitalisation

T'Sas, J., & Daems, F. (2024). Exploratory talk in times of globalization and digitalization: A narrative review. L1-Educational Studies in Language and Literature, 24, 1-38. https://doi.org/10.21248/l1esll.2024.24.2.609

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1. INTRODUCTION

Over the last five decades the relationship between learning and classroom talk has been the subject of extensive research. Early researchers started examining classroom talk from two angles: the language of the teacher and that of the students. They found that the quantity and/or quality of student talk compared to teacher talk often remains low (Sutherland, 2013). The first to mention the educational value of one specific way of talking, called *exploratory talk*, was Douglas Barnes (1976), who describes it as the kind of classroom talk that is used to jointly construct knowledge through dialogue and during which learners formulate hypotheses and discuss these in a constructive way. In the mid-nineties, following the growing implementation of the constructivist view on learning in school curricula, and considering the fact that interaction is an important aspect of the constructivist view on learning, the concept of exploratory talk was further explored and defined by British researchers who largely focused on student-student talk (e.g. Fisher, 1993b; Mercer, 1996; Wegerif & Mercer, 1997). During classroom experiments students of different age and background were taught to use exploratory talk during collaborative activities.

As pre- and post-tests in multiple studies repeatedly proved its educational value (Mercer & Hodgkinson, 2008), research interest in exploratory talk for learning expanded: classroom experiments have been and are being replicated by researchers using familiar but nevertheless varying descriptions of exploratory talk and/or refining and elaborating on the concept. A database search teaches us that, so far, interventional studies on exploratory talk have been undertaken in 28 different countries worldwide. This number rises to 32 if discourse analysis on exploratory talk in non-interventional studies is included. Researchers have also introduced or focused upon specific context variables, using an increasing amount of different analytical models. Simultaneously, effects of exploratory talk in classroom activities have been measured for a growing number of school subjects, which suggests a generic potential for learning in a growing variety of (digitalised) educational contexts. We argue that for L1 education to fully realize this potential, sustained dialogic approaches in the classroom are needed. The augmentation, by means of exploratory talk, of student's higher-order thinking, high-level understanding, the voicing of personal opinions and ideas, and argumentation skills may also be the answer needed to meet persisting L1 challenges as well as challenges which have become substantially clear since the beginning of the 21st century: globalisation and (super)diversity, and digitalisation. Before translating this into research questions we will first elaborate on the nature of these challenges.

1.1 Persistent L1 challenges

Research tells us that general teaching practice has been and is being dominated by rather monologic classroom approaches (Sinclair & Coulthard, 1975; Mehan, 1979; Cazden, 2001; Haneda & Wells, 2008; Mercer & Dawes, 2014). Additionally, for those

teachers who do embrace a more dialogic pedagogy, implementing collaborative strategies often turns out to be ineffective because it is not prepared in a sufficient manner (Dawes, Fisher & Mercer, 1992; Mercer, 2010) and because it lacks the appropriate use of language (Mercer, 1995). According to Fisher (2011) a number of teachers also need an attitudinal shift, as their personal experiences as a student, when dominated by 'all listening an no communication', had made them reluctant to introduce dialogue into their lessons. Other inhibiting mechanisms are the nature of the curriculum and the lack of research. For example, in the Low Countries, especially in Flanders, education and research have been lagging behind considerably in promoting speaking and listening skills in L1 education. In their reviews Hoogeveen and Bonset (1998), Bonset and Braaksma (2008) and Bonset and Hoogeveen (2011) found only a handful of studies on speaking and listening skills between 1969 and 1997, and as good as none between 1997 and 2008. After 2008 research on this matter remained equally scarce (T'Sas, 2018). Bonset and Braaksma (2008) believe this can be explained by several factors: first, compared with e.g. writing skills and from the teachers' point of view, teaching and assessing oral skills is very time consuming; second, oral skills are much more diverse than writing skills, which makes handling all aspects and finding the proper teaching methods and lesson materials not easy and very demanding; third, teachers seem to hold to the implicit idea that, as we are all born as listeners and speakers, teaching these skills is less essential or obligatory. On top of that, international studies such as PISA have put a substantial focus on reading skills. As a result of all these factors students do much listening and speaking at school, but little is being done to improve listening and speaking skills in their L1. Knowing that the quality of speaking and listening can 'make or break' the quality of collaborative learning and knowing that teachers do not seem to fully realize this (Kagan, 2014; Mercer, 1995), it is not surprising that they may eventually skip collaborative activities, as too often the only tangible outcomes are decibels.

1.2 The challenges of globalisation

Over the past decades, the population in most cities in the western world has become more culturally diverse (Geldof, 2013). Consequently, cultural differences and multilingualism have entered the classroom, which requires systematic attention for communication and mutual understanding through language education. As Heugh et al. (2017, 197) write: "Worldwide, issues relating to multilingualism are an increasing focus of attention. Globalisation and mass migration have led to rapidly changing demographics [that] challenge education systems everywhere."

Al-Rodhan and Stoudmann (2006, 5) define globalisation as "a process that encompasses the causes, course, and consequences of transnational and transcultural integration of human and non-human activities". Both researchers emphasize that globalisation is a process which has been influencing communities, cultures, and economies for decades if not centuries. They also express a positive outlook on this development by adding that globalisation "can be understood in a way that allows

for a greater appreciation of, and, consequently, movement towards furthering, individual, as well as global, security and stability" (*ibid*., 6). It will come to no surprise when we say that language plays a key role in this.

In a globalising school, students from different backgrounds introduce different values from multiple cultures, which may lead to a lack of understanding or even a lack of respect for one another's identity as well as one another's viewpoints and opinions. In many ways, communication and understanding are highly influenced by cultural background (Claes & Gerritsen, 2017) and "Because people are different, they can have different perspectives and subsequently different emotions about specific topics" (Wansink, 2022, 38). Moreover, "Students can become more extreme in their beliefs when their (group) identities are threatened" (ibid.) and "Confronted with complex societal issues and tensions in this context, teachers may struggle to adequately guide a discussion on these topics in the classroom" (Cousijn, in Wansink, 2022, 24). The latter already shows in European classrooms.

In Flanders, but undoubtedly in western countries in general, the most visible and recent consequence of globalisation has been the increased immigration of ethnic-cultural minorities (Geldof, 2013). This process started in the early sixties, became significantly visible in schools in the nineties and evolved into an ongoing diversification of ethnic-cultural backgrounds, up to the point where sociologists began to speak of *super-diversity* (Geldof, 2019; 2013). Super-diversity encompasses: (a) ethnic-cultural, linguistic, ideological, and pedagogical diversity, (b) the demographic evolution in cities where the authentic monocultural majority becomes a minority, and (c) the increasing diversification of already existing diversity of education, lifestyle, gender etc. On top of this, international comparative studies such as PISA (Schleicher, 2019) have revealed, in Flanders more than in most other OECD countries, that ethnic-cultural minority students obtain lower scores for reading, mathematics, and science skills than the majority of Flemish students. Two important causes for this are the over-representation of these minorities in populations with a lower economic status and lower language skills of the students involved. Agirdag (2020) also stresses negative learning effects caused by stereotyping behaviour, discrimination, segregation, and racism, and concludes that the Flemish education system perpetuates inequality (Agirdag, 2020; see also Smits & Janssenswillen, 2020). First-generation immigrant students bare the brunt of these indicators. In most OECD countries, these students perform worse than students without an immigration background (OECD, 2016). And often "schools struggle with issues of inclusion; they do not succeed in facilitating interactions between newcomers and their mainstream peers" (Aarsæther, 2021, 14).

All this suggests that the traditional way of teaching, in which dialogue largely remains absent, excludes students from ethnic-cultural minorities as well as low SES students (Reay, 2006; García-Carrión et al., 2020) and marginalizes them (Sutherland, 2013). Further, students with a migration background are quite capable in having daily conversations, but often lack the competencies to use formal or academic language as needed in schools (Cummins, 2000; Elbers & de Haan, 2005; Elbers,

2010) or they lack the kind of vocabulary needed for reasoning and considering arguments (Herrlitz-Biro et al., 2013; Mercer & Sams, 2006; Agirdag, 2020) Finally, if controversial topics are to be addressed in the classroom in such a way that strong emotions and prejudice do not take the upper hand, a pedagogical approach is needed that makes students put rational thinking above emotional impulses.

1.3 The challenges of digitalisation

Since the beginning of this century, communication and information boundaries have thoroughly been blurred due to the internet and social media (McQuail, 2011). The media environment in which students are currently growing up differs substantially from that of previous generations. Digital television, social network sites, tablets, smartphones, and other digital media have become an integral part of life. The younger generations take the ubiquity of these technologies for granted and develop their social lives partly online. But despite the ease with which young people interact with these technologies, they present several challenges, which can also be problematic for teachers and parents (Meeus et al., 2016). The digitalisation of society, of life, poses extra demands to education. As internet and social media, apart from their benefits, make it more difficult for students to assess the quality and validity of information, education has to include media literacy in its curriculum. And the very diverse quality of media content, commercial influences, and social risks (for an overview, see Meeus et al., 2016) demand the development of cognitive skills like critical thinking and rational reasoning, both of which are linked directly with exploratory talk.

In 2019 and 2020 the Covid crisis caused schools all over the world to speed up their digitalisation process, which resulted in more distant teaching and the increased use of online learning trajectories by students. The introduction of ICT in education, which started in the early nineties, was already finding its way into the classroom in a growing and more diverse way, but this does not mean that the implementation of ICT had/has improved the quality of education on every level. For example, one of the reasons why distance education courses, the quality of which also depends on the quality of online discussions, fail to provide benefits for student's learning outcomes, appears to be lacking or inadequate scaffolding or guidance by the teacher (Sas et al., 2017). Some studies have pointed out that having students discuss subject matter or do joint assignments online, guarantees higher quality of cooperation and conversation (Riley, 2006). Others however, found that online discussion board activities must be improved to engage students in discourse beyond minimal levels to increase learning outcomes (Sas et al., 2017). Concluding, the question rises whether ICT tools are helpful to improve the learning and use of conversational skills in the classroom.

1.4 Research questions

In this article we will discuss the challenges mentioned above through a narrative review and we will argue that exploratory talk as a didactic approach may do justice to them.

If we want to ascertain that exploratory talk as a didactic approach has the potential to meet the challenges mentioned above it is necessary to clarify the concept of exploratory talk itself thoroughly. Therefore, in this contribution, we will make a round-up of the research process on exploratory talk as it has developed since 1976 and see where it has led us to, both conceptually and methodologically. We want to determine whether early descriptions of exploratory talk as a type of student-student talk still stand, as well as its characteristics and the analytical methods used to label classroom conversation as exploratory (or not). This generates the following research questions:

1) How is exploratory talk defined and/or described?
2) How is exploratory talk being measured?
3) What are the effects of exploratory talk in an educational context?

Last but not least, while answering these questions, we will discuss to what extent exploratory can help tackle the L1 challenges discussed above.

For the period January 1976 - June 2016 the research questions were answered extensively in a narrative review of 115 articles by T'Sas (2018), as the theoretical basis of a PhD study on the use of exploratory talk in primary schools in Flanders. To this we have added specific data from 49 articles published after that period, i.e. July 2016 - December 2023. In this article, we will summarize all these findings.

2. METHODOLOGY

In order to answer the research questions, a literature search was conducted. For the period January 1976 - June 2016, six electronic databases were searched: Web of Science (https://www.webofscience.com), ERIC (https://eric.ed.gov), Communication & Mass Media (https://www.ebsco.com/academic-libraries/communication-mass-media), Education-line (https://www.ariadne.ac.uk/issue/10/education-line/), JSTOR (www.jstor.org), and Linguistics and Language Behavior Abstracts (LLBA; https://www.proquest.com/llba). To fill in any gaps, Google Scholar was searched as well. To be included in this review, all manuscripts had to be peer reviewed.

For the period July 2016-2023 the same databases were searched, using identical search parameters. However, the resulting articles were only used to zoom into the L1 challenges considering globalisation and digitalisation.

2.1 Literature search January 1976 - June 2016

The main search term, 'exploratory talk', provided a total of 361 articles. The search results showed considerable overlap while the abstracts revealed that a number of

articles were not relevant for this review, either because the term 'exploratory talk' was used in a non-educational context (e.g., politics, business) or because it was used as a descriptive term rather than a type of talk. Therefore, secondly, we refined our search by combining the main search term 'exploratory talk' with additional terms which were collected and categorized via peer debriefing (Figg et al., 2009). That way, four concepts were defined: education (concept 1), language (concept 2), context (concept 3) and theory (concept 4). We used education and its subterms as the first concept, as these were most likely to rule out any non-educational context in which the main term would be used. Language, context, and theory were added as second, third and fourth concept to determine the main focus of each article (Table 1). In order to be reviewed, each article had to contain the main term, one or more (sub)terms of concept 1 and (sub)term(s) of at least one of the other three concepts. The combination of search terms resulted in a selection of 121 articles.

Table 1. Search terms hierarchy applied during literature search 1976-2016

Main concept	**Combined with**	**Including**
exploratory + talk	Concept 1: education	
	education	
	classroom	
	groups	Students
		teacher
	learning	collaborative
	teaching	interaction
	Concept 2: language	
	language	(linguistic) markers
		discourse/discursive
		reasoning
	Concept 3: context	
	problem solving	
	attitude	
	Concept 4: theory	
	Piaget	
	Vygotsky	
	(social) constructivism	

Third, after ruling out doubles, 105 manuscripts were identified for further reading and the reference lists of these manuscripts were explored to search for other relevant manuscripts, i.e., articles being referred to by at least three different researchers or research teams and which did not appear in the databases we searched. These were mostly older manuscripts written by early researchers ('pioneers') such as Sinclair and Coulthard (1977), Barnes (1976) and Barnes and Todd (1977). This way, 10 articles were added for analysis, totalling 115 articles for reading.

Fourth, all selected manuscripts were read thoroughly to search for patterns in the results. The nature of these search patterns was dictated by pre-defined themes based on the research questions. Article excerpts thought useful to answer the

research questions were coded into these themes, using NVivo 11. The following pre-defined coding scheme was applied (Table 2):

Table 2. Coding scheme 1976-2016 articles

Main item	Subitems	Including
Exploratory talk as a concept	a. Defining exploratory talk	Definitions
		Synonyms and antonyms
		Elaborating/refining terms
		Overarching terms
		Antonyms
	b. Concept growth	
	c. Contextual use/relevance	
Measurement of exploratory talk	a. Type of studies	
	b. Methods	Qualitative
		Quantitative
		Mixed methods
	c. Variables and characteristics	
Effects of exploratory talk	Results	

Finally, the themes were further explored in the manuscripts and incorporated into a narrative review, i.e. providing 'qualitative descriptions of the findings from literature' (Dochy et al., 1999, 150).

2.2 Literature search July 2016 - December 2023

As mentioned earlier, a similar database search was performed for the period July 2016 - December 2023, the only difference being that the LLBA database is now part of a new database, i.e., Communication Source (https://www.ebsco.com/products/research-databases/communication-source). After ruling out doubles and reading the abstracts 49 articles were selected for reading. For time's sake the content analysis of these articles was restricted to the starting foci of this article, i.e. L1 challenges, globalisation, and digitalisation. To that end NVivo 12 was used, applying the following additional coding scheme:

Table 3. Coding scheme 2016-2023 articles

Main item	Subitems	Including
Exploratory talk	a. globalisation	diversity
		superdiversity
		cultural difference
		translanguaging
		multilingual
	b. digitalisation	ICT tools
	c. L1 challenges	

Finally, we used the data of both periods to obtain an accurate count of the countries in which exploratory talk has been the subject of interventional studies.

3. RESULTS

In the following sections we will use the 1976 - July 2016 data to discuss exploratory talk as a concept (Section 3.1) extensively. After that we will address the measurement (Section 3.2) and effects of exploratory talk (Section 3.3) more briefly. Conclusions will be drawn in Section 3.4, including consequences for L1 challengers, globalisation, and digitalisation. We will conclude this article with Section 4, Discussion, in which we will also integrate the July 2016-2023 data.

3.1 Exploratory talk as a concept

We will now describe our findings based on the selected themes (nodes). In subsections 3.1.1-3.1.5 we will discuss concept growth, the various definitions, antonyms and synonyms, refinements, and over-arching terms of 'exploratory talk'. In total, 63 articles enabled us to answer RQ1.

3.1.1 Concept growth

In *Thought and Language,* which was originally published in 1934 in Russian as *Thinking and Speech*, Vygotsky (1978) highlights the importance of language for learning, suggesting it helps us to develop new ways of thinking. The greatest stimulus for this development comes from the interaction between a learner and his/her 'teacher' or anybody else who knows more about a subject and has the ability and willingness to support the learner in his learning. Vygotsky considers knowledge construction primarily as a social process: in our learning, we are influenced and stimulated by others. Language, then, has three major functions which work together: as a cognitive tool we use it to process knowledge, as a social or cultural tool we use it to share knowledge, and as a pedagogic tool we use it to provide intellectual guidance to another (Mercer et al., 1999). Simply put, we use talk to develop our thinking and make sense to our experiences. It is only after this social process that we internalize and individualize what we have learnt collectively. Bakhtin, Vygotsky's contemporary theoretician, developed similar thoughts about the role of language in learning, using the word 'dialogue'. To Bakhtin (2010), dialogue—in its dialectic sense—is essential when it comes to handling knowledge in an educational discourse and in learning. Vygotsky's and Bakhtin's theories were gratefully adopted by constructivist theoreticians, as, according to (social) constructivism, learning is only effective when students can play an active part in their learnings (Dewey, 1933), especially through exploratory forms of talk (Hardman in Mercer & Hodgkinson, 2008).

Renewed interest in Vygotsky's theory and its consequences for the link between language and learning has stimulated research thoroughly over the last five decades

(for an overview, see McConaghy, 2014). This was stimulated by pioneers like Bruner, Britton, and Barnes. Building on the constructivist view of the nature or learning, Barnes (1976) stated that learning can never be a passive process. Whatever method or strategy a teacher uses, the students have to do the learning. As the essence of learning is connecting new knowledge to existing knowledge in an attempt to make sense of the world, students continually have to actively construct their new way of understanding. One of the readiest and most flexible tools to do so is language, more specifically talk, but not all kinds of talking have the potential to improve our understanding (Barnes, 1976). Barnes distinguishes between *presentational talk* and *exploratory talk*. Presentational talk (also called 'final draft' talk) means that students formulate a restrictive—mostly by the teacher—expected answer while in exploratory talk they concentrate on sorting out their thoughts and try to actively construct knowledge (Barnes, 1976). Therefore, Barnes suggests, exploratory talk should come before presentational talk, as children need time to organize their thoughts. Exploratory talk, Barnes (1976, 28-29) explains, "is usually marked by frequent hesitations, rephrasings, false starts and changes of direction. […] it is one means by which the assimilation and accommodation of new knowledge to the old is carried out […] the children not only formulate hypotheses, but are compelled to evaluate them for themselves" and "the learner himself takes responsibility for the adequacy of his thinking" (Barnes, 2010, 113). To this he later added a description which is since then being quoted more often than his 1976 description: "Exploratory talk often occurs when peers collaborate in a task, when they wish to talk it over in a tentative manner, considering and rearranging their ideas. The talk is often but not always hesitant, containing uncompleted or inexplicit utterances as the students try to formulate new understandings; exploratory talk enables students to represent to themselves what they currently understand and then if necessary to criticize and change it [....]" (Barnes, 1976, 50; 2010). In this respect exploratory talk does not provide new information, "[…] rather students are able to make sense of something by sharing knowledge, explaining options, and examining ideas critically as they are being held publicly accountable" (Barnes in Mercer & Hodgkinson, 2008, 50). In other words: exploratory talk encourages thinking *par excellence* and is therefore the preferable kind of talk during peer collaboration (Barnes, 2010; Mercer & Howe, 2012). Although Barnes does not really provide a closed definition of exploratory talk, his descriptions of the concept are still being quoted or referred to (e.g. Soter et al., 2008; Lofgren et al., 2013; Brown, 2016).

From 1990 researchers picked up Barnes' trail and started analysing student-student talk during problem solving tasks in pairs. Among many, Galton and Williamson (1992) argue that students must be taught how to collaborate if they are to do so successfully. Also, special attention must be devoted to the language they use. Or, as Mercer (2010b) states: children are not born with the skills to talk effectively together or to develop specific dialogic strategies for thinking collectively. As Phillips (1992) acknowledges, the talking itself must have certain qualities in order to facilitate learning. Bluntly talking towards a consensus is bound to be less valuable for

learning than exchanging arguments and counter-arguments in order to explore hypotheses. Exploratory arguments as a process of finding an answer or conclusion were found to be effective in fostering students' cognitive development (Phillips, 1992). Also, according to Kruger (1993), learning is linked to the quality of dialogue, particularly the amount of *transactive reasoning.* Light (1991) found that using language to make plans explicit, to make decisions and to interpret feedback facilitates problem solving and promotes understanding (Light, 1991).

3.1.2 Defining exploratory talk

The onset to a standard definition of exploratory talk was given during the two-year SLANT research project which investigated the potential of computers as a medium for exploratory talk (Fisher, 1993b). Analysis of students' dialogues revealed three different categories of talk: *disputational talk, cumulative talk* and *exploratory talk*. Disputational talk "can be characterized as an initiation in various forms (e.g. suggestion, instruction), followed by a challenge […resulting] either in a lack of any clear resolution or a resolution which does not build directly on the previous utterance" (Fisher, 1993b, 255). In cumulative talk "initiations are accepted either without discussion or with additions or superficial amendments" (*ibid*., 255). Both cumulative and disputational have little potential for learning (Fisher, 1993b). This is different for exploratory talk, "in which the initiation may be challenged or counter-challenged, but with suggestions which are developments of that initiation. Progress then rests on the joint acceptance of one of the suggestions, or of a modification of what has been put forward" (*ibid*., 255).

Since then, the triad cumulative-disputational-exploratory has been referred to (as a typology) in the majority of research on student-student talk in the classroom. Building on the findings of the SLANT-project and on Barnes (1976), Mercer defines exploratory talk as the kind of talk in which "partners engage critically but constructively with each other's ideas. Statements and suggestions are offered for joint consideration. These may be challenged and counterchallenged, but challenges are justified and alternative hypotheses are offered. […] Knowledge is made publicly accountable and reasoning is more visible in the talk. Progress then emerges from the eventual joint agreement reached" (Mercer, 1996, 369; Wegerif & Mercer, 1997, 53). This definition is quoted or referred to in all 63 articles reviewed to answer RQ1. Barnes' (1976) pioneer work is referred to 41 times, while his description of exploratory talk is quoted or referred to 17 times. Barnes' (2010) description is quoted or referred to 7 times.

In 2009, Enghag et al. (2009, 457) formulated a definition which is more descriptive though not fundamentally different from Mercer's: "We defined talk as exploratory if students have subject-matter focused talk and use language in an exploratory fashion, such as questioning, challenging, and encouraging. They often use half sentences and interject to fill missing words into the other person's sentences." The same holds for Coultas (2012, 176): "This exploratory talk is the type of talk that leads

to the guided construction of knowledge that can develop students' thinking. It involves sharing ideas and giving reasons for them and this is the kind of talk that allows for cognitive challenge and development."

Atwood et al. (2010, 366) elaborate on Mercer's definition by using more operational terms and describing some of the processes Mercer includes in his definition, though not adding any substantial characteristics: "Exploratory talk is that the methods used to reason are explicit; that is, these methods are observable in what participants do and are thus publicly accountable. Such methods include questioning of one's own and others' assumptions, outlining reasons for claims, making explicit evaluations and critiques, and engaging in persuasion. When challenges occur, participants give reasons and offer alternatives. Furthermore, challenges are launched from a stance in which the aim is to lay bare reasoning processes in order to make them available to others for the purposes of refining and reconstruction. As is evident in this description, exploratory talk is cooperative interaction." Some researchers restrict to the very basics of the definition, e.g. exploratory talk "… is talk that teachers and learners use when committed to learning and building understanding together" (Rutter et al., 2016, 23).

Though most researchers implicitly confirm the added value of exploratory talk as opposed to cumulative and disputational talk, only Schmitz & Winskel (2008) explicitly put this triad into a hierarchic structure. Taking collaborative learning as an evaluative criterion, they consider disputational talk to be the lowest and least valuable level of talk, because its orientation is basically competitive. Competition remains absent in cumulative talk, but here the orientation is solitary. Therefore, Schmitz and Winskel (2008, 583) argue, cumulative talk is the second level of talk. Exploratory talk is the highest level as its orientation is "working towards best solutions through shared reasoning."

Finally, some researchers use the term exploratory talk as a criterion to analyse student-student talk but do not specify what definition of the term is being used. Mostly this is because they use different frameworks or typologies in which the notion 'exploratory talk' is primarily used to describe an aspect or dimension of that framework. E.g. Murcia and Sheffield (2010) categorize student talk within the Mortimer and Scott (2003) framework: 'Dimensions of discourse and the communicative approaches'. In their analysis of the quality of student talk, they distinguish between 'Argumentation-reasoning', 'Exploratory talk', 'Student to student' and 'Other (low quality)'. It is unclear to us why a distinction is made between argumentation-reasoning and exploratory talk, as according to Barnes (1976) and Mercer (1996) the first is by definition included in the latter.

3.1.3 Defining exploratory talk: synonyms and antonyms

We will now look at synonyms and antonyms of exploratory talk. Synonyms of exploratory talk are rare and if there any, they appear to emerge from earlier theory on communication or education. One synonym is *transactive reasoning*, which was

introduced by Berkowitz and Gibbs (1983), following Bentley and Dewey (1949). Berkowitz and Gibbs (1983, 402) define *transactive reasoning* as "reasoning that operates on the reasoning of another. […] In a very dialectical sense, one's own reasoning confronts the other's antithetical reasoning in an ongoing dialogic dynamic." Kruger (1993, 167) also uses this term and makes its definition more operational by displaying concrete elements: "criticisms, explanations, justifications, clarifications, and elaborations of ideas." In her experiment she found that "peers directed these exchanges at each other; they transacted on each other's ideas" (*ibid*.). Though close to exploratory talk as far as speech acts are concerned, the term transactive reasoning has not been used again in the articles analysed for this review, except for short references by Wegerif and Mercer (1997) and Schmitz and Winskel (2008). Perhaps the fact that it requires a more dialectic view on peer group conversation is considered too determining, as not all students enjoy a dialectic approach to learning (Robins, 2011) and exploratory talk seems to be more than merely dialectic (Wegerif, 2013).

Chick (2015, 299), referring to Mercer (2000), uses the notion of *dialogic* or *reflective talk*, defining it as "talk which is characterized by features such as constructive engagement with each other's ideas, a spirit of enquiry and intellectual openness, and by an atmosphere of trust. It is a type of talk where suggestions can be offered for joint consideration and opinions treated with respect." This notion of reflective talk was picked up by Nikolaidou (2012), who distinguishes it from exploratory talk (cf. infra). Mannion and Mercer (2016) introduced exploratory talk in a 'reflective' learn-to-learn project, during which students were required to develop their ability to reason out loud, thinking and working together in pairs and small groups. It did not inspire both researchers to replace the term exploratory talk with *reflective talk*, though, which makes us presume that the term has no real future (yet).

Some researchers occasionally use the term *exploratory discourse* as a synonym (Fernandez et al., 2001; Kumpulainen, 1996; Nussbaum, 2005), but only Golanics and Nussbaum (2008) do this consistently. While they describe exploratory discourse as "the functional equivalent of collaborative argumentation," they seem to concur with Mercer's definition of exploratory talk: "Our definition of collaborative argumentation is similar to Mercer's (1996) notion of exploratory discourse." (Golanics & Nussbaum, 2008, 168) In collaborative argumentation, students work together to construct and criticize arguments (Nussbaum, 2008). By using the word *discourse*, Golanics and Nussbaum (2008) fortify the argument that exploratory talk is a characteristic of interaction at group level. The term *exploratory discourse* is also used once, though undefined, by Fernandez et al. (2001). Nussbaum (2005) opposes it to *adversarial discourse* and refers to Wegerif et al.'s (1999) findings that it is the kind of talk most closely linked to learning outcomes. Finally, Brown (2016, 88) seems to use the term as a synonym when she writes: "The dialogue then lends itself to introducing a counter-argument, and continues with exploratory discourse of 'I believe' or 'I think' using generalizations to create and open up dialogue."

Yaguchi et al. (2010) adopt the terms 'expository' vs. 'exploratory' from Holmes (1992) who explains that expository talk conveys facts and/or opinions while exploratory talk develops ideas through negotiation. In an educational context this comes close to Barnes' classroom talk dichotomy of presentational vs. exploratory talk (cf. supra). Yaguchi et al. (2010, 587) add that in exploratory talk "the speaker shows an affective attitude toward the listener."

Like Murcia and Sheffield (2010), Lofgren et al. (2013) refer to the analytical tool developed by Mortimer and Scott (2003) in order to evaluate communication and meaning making processes in the classroom. The tool focuses on the scaffolding efforts of the teacher, i.e., the way in which he or she supports students in developing their knowledge. It is characterized by four classes, one of which is called *interactive/dialogic*. About the latter, Lofgren et al. (2013, 486) write: "There are strong similarities with Barnes's (2008) definition of exploratory talk, which incorporates different ideas or opinions, explicit reasoning, critical but constructive engagement."

According to Boyd and Kong (2017), referring to Wegerif (2013), Mercer and his colleagues now call exploratory talk '*dialogic talk*'. This seems to appear out of the blue, but indeed, after confrontation with the results of an experimental study in Mexico (Rojas-Drummond & Zapata, 2004) in which the teaching of exploratory talk led to an improvement in collaborative, creative or divergent tasks without any explicit reasoning, Wegerif (2013, 13) argues: "What is essential to exploratory talk is not in fact the explicit reasoning [as invoked by the definitions of Barnes and Mercer]… Just as disputational talk and cumulative talk can best be defined by the type of identification they imply, so can the intersubjective reality referred to previously by the term exploratory talk. I now prefer the term dialogic talk since what seems to be most essential to this type of talk is identification with dialogue itself."

Zooming in on the aspect of identity, Polo et al. (2015) acknowledge that disputational, cumulative and exploratory talk reflect different attitudes towards self-identity at the individual level. Nevertheless, as post-2013 research is still using the term exploratory talk abundantly, it seems improper to just do away with it. Moreover, 'dialogic talk' is not a new concept. It was introduced by Vygotsky's contemporary theoretician Bakthin who claimed that language is a social practice and all thought is dialogical (Bakhtin, 2010; see also Lyle, 2008). Following Bakhtin, Asterhan and Schwarz (2009) speak of *dialectic argumentation* (see also Howe, 2009). The concept of *dialogic teaching* was rejuvenated by Alexander (2001), who describes it as what happens when teachers and students work together to build on their own and each others' knowledge and ideas in order to develop coherent thinking. For Alexander (2008), dialogic teaching reflects a view that knowledge and understanding come from testing evidence, analysing ideas and exploring values, rather than unquestioningly accepting somebody else's certainties. Alexander's (2008) definition of dialogic talk is that it should be collective, reciprocal, supportive, cumulative, and purposeful. Although there are many similarities with exploratory talk, we find it premature to call it a synonym of dialogic talk, because, as Sutherland (2013) puts it, exploratory' talk has many features in common with 'dialogic' talk, but it also

stresses public accountability and the visibility of reasoning processes. As if to emphasize the difference, Alexander (2010) himself has added exploratory talk, together with *expressive talk*, as a fifth and sixth kind of talk to his characteristics which can help teachers to engage in dialogic teaching.

Finally, according to Webb et al. (2016, 568), exploratory talk "is not far removed from 'collaborative reasoning' (Chinn & Anderson, 1998; Reznitskaya et al., 2009), 'critical discussion' (Keefer et al., 2000), 'accountable talk' (Michaels et al., 2008) and argumentation approaches to learning science (Osborne, 2010)." It shares conceptual and procedural features with dialogic argumentation and dialogic discussion. Gillies (2014), too, refers to the concept of *accountable talk.* Michaels et al. (2008) describe it as talk that emphasizes logical connections and the drawing of reasonable conclusions. It involves explanation and self-correction. It often involves searching for premises, rather than simply supporting or attacking conclusions. And "speakers make an effort to get their facts right and make explicit the evidence behind their claims or explanations. They challenge each other when evidence is lacking or unavailable" (Michaels et al., 2008). Gillies (2014), following Alexander (2010), also sees parallels between accountable talk and dialogic teaching.

3.1.4 Defining exploratory talk: elaborating/refining terms

Apparently, it has taken researchers some time to start deepening the concept of exploratory talk, for we did not find many elaborations on a conceptual level. In a replicator study Rojas-Drummond et al. (2003) propose *incipient exploratory* and *elaborate exploratory talk*. Incipient "suggests exploratory talk is neither very consistent nor very prominent in the way children talk, whereas the latter indicates exploratory talk is more consolidated and sophisticated" (Rojas-Drummond & Mercer, 2003, 359). This distinction has implicitly been acknowledged by Herrlitz-Biro et al. (2013), who argue that the analysis of key words as indicators of exploratory talk ('Why?', 'What do you think?', 'because' etc.) leaves unattended other aspects of exploratory talk, such as collaborative processes. In an experimental study they used a qualitative analysis which proved students to talk exploratively without using such 'key words'. They consider *elaborations*, i.e. the restructuring of information or linking new information to existing information (Webb, 2009; Van Boxtel et al., 2000), to be a main ingredient of exploratory talk but do not go as far as to claim that exploratory talk is the same as elaborating. Nevertheless, parallels can be drawn with the lack or prominence and consistency in the Rojas-Drummond (2003) study. Thus far, though, the concepts of 'incipient' and 'elaborate' exploratory talk have not been re-used by other researchers.

Sutherland (2006, 107) refers to *group exploratory talk*, which is "characterized by equality of participation, with students responding to each other's points", and by: tentativeness (Wilkinson, 1965, cited in Howe, 1997), student higher-order questions or statements, requiring reflection or 'wait' time (Tobin, 1987); requests for

clarification or illustration and an ability to elaborate and sustain the dialogue (Barnes & Todd, 1977; Mercer, 2000).

In an analytical framework for integrating everyday and scientific discourse, Renshaw and Brown (2007, 543) identify four formats of classroom talk: replacement, interweaving, contextual privileging, and pastiche. They consider these as "different instantiations of exploratory talk and a useful differentiation of that style of classroom talk".

Introducing the notions of *inclusive* and *exclusive exploratory* talk Rajala et al. (2012) focus on quantitative and interactional a/symmetry, i.e., the participation rate of individuals in group discussion. When all students are able to more or less equally contribute to exploratory discussions (quantitative symmetry) Rajala et al. speak of inclusive exploratory talk. When this is not the case, e.g., when one student drops out of the discussion or starts dominating the conversation, exploratory talk is exclusive. Referring to earlier studies Rajala et al. consider quantitative a/symmetry as an important aspect of collaborative learning and, as Mercer's 'ground rules' (see Section 3.2) for exploratory talk include that students encourage each other to be involved, also of exploratory talk.

Finally, Nikolaidou (2012, 746) finds the triad cumulative-disputational-exploratory insufficient. He adds the notions of *reflective* and *operational talk* to construct an extended matrix. In operational talk utterances relate to "operational transactions with regard to talk and software respectively." Reflective talk means "engaging critically and constructively expressing a self-reflective thinking". Both terms do not reappear in the articles we reviewed, although in an experiment during which students used exploratory talk to discuss literature, Brevig (2006, 529) also makes a link with reflection: "I am confident that exploratory talk and reflection assist students in developing meaning. They can self-monitor their learning and develop and nurture evolving ideas."

3.1.5 Defining exploratory talk: over-arching terms

Some studies do not restrict to exploratory talk as a type of talk, but suggest broader concepts or terms to fit exploratory talk into. Those suggestions are discussed in this section.

IDRF may be considered as one of the first over-arching terms. The term is meant as a dialogical improvement on Sinclair and Coulthard's IRF-pattern, where IRF stands for Initiation—Response—Feedback; Mehan (1979) calls it IRE, Initiation - Response - Evaluation. After analysing the question-response pattern of English secondary school teachers, Sinclair and Coulthard (1977) found out that teachers mostly do not ask questions about things they do not know (and hope to learn from their students), they ask questions mostly to find out if their students know the correct answer, adding minimal feedback. This IRF-pattern has been found as a dominant discourse pattern in the classroom by many studies. Over the years it has also become clear that it does not make students learn through talk. Therefore the

interaction needed between teacher and students is not an IRF-pattern but an IDRF-pattern (Wegerif & Scrimshaw, 1997; Mercer, 1996), where D stands for 'Discussion'. IDRF "describes the basic structure of the educational exchange activity of groups working together […]. Where the discussion element is exploratory, this exchange structure combines an aspect of directive teaching with an aspect of exploratory learning." (Wegerif, 1996, 13)

Harris and Ratcliffe (2005) integrated exploratory talk in a science project in secondary schools. They refer to three different models of teaching citizenship, as introduced by Huddleston and Rowe (2003): the 'civics' model (transmission of knowledge), the 'current affairs' model (more or less critical exchange of opinions) and the 'public discourse' model. In the latter students explore where their views come from and critically examine the views of others, so that discussion is not merely the activity but a means to develop the ability to participate in informed public discourse. To Harris and Ratcliffe (2005), public discourse implies the use of exploratory talk, though they also use both terms as synonyms.

Acknowledging Mercer's definition of exploratory talk, Rojas-Drummond et al. (2006, 92) suggest the use of one single over-arching term, i.e. *co-constructive talk* (and also co-constructive interaction) "as an inclusive term to characterize the joint efforts of coordination, negotiation and collaboration in various group work activities." They add that exploratory talk is "a particularly effective and sophisticated type of educated talk or social mode of thinking, which represents one specific form of co-constructive interaction." Their argument is that the contrast between exploratory and cumulative talk is too artificial, as it depends on how one defines 'explicit reasoning'. This over-arching concept would also be useful to "characterize a much wider scope of collaborative discussions children display when working together to solve problems […] and in many educational contexts." (*ibid*., 93)

Riley (2006, 63) sees exploratory talk as an exponent of *critical learning* which he describes as "a reflective activity with critical intent that enables students to socially engage in learning tasks and collaborative problem solving through sharing and challenging personal perspectives, experiences and knowledge to co-construct knowledge and generate solutions and outcomes by using peer-critical evaluation and reflective practices."

Enghag et al. (2009) consider group discussions and exploratory talk as indicators of *group ownership*. Within this context Haglund and Jeppsson (2012, 910) characterize exploratory talk as "rapid turn-taking, incomplete sentences and sustained focus on a shared line of reasoning,", all characteristics previously made visible by (Barnes, 1976; Mercer, 1996).

Beghetto and Kaufman (2009, 311) plunge exploratory talk in an *intellectual estuary* which "describes an area of great and diverse intellectual identities in which separate streams of ideas flow in and meet with the vastness of ideas found in a given academic discipline." In fact, they argue that several characteristics of exploratory talk are indicative for the formation of an intellectual estuary. These characteristics are the use of ground rules (Section 3.2), orientation to shared reasoning,

and using opportunities to create and support new insights. Somewhat similarly to the notion of intellectual estuary, Bowskill (2010, 61) has developed a socio-cultural practice and theoretical framework for "a new generative learning environment that creates shareable electronic artefacts from reflective dialogue across a whole-group." He calls it *shared thinking*. "This environment contains a space, a structure, a reflective dialogue, a disposition, a purpose and a shareable product." (*ibid*.) The dialogical space (see also Mercer, 2000), in which students generate question-options by reflecting upon and sharing their experiences, is generated by a protocol resembling exploratory talk. To Bowskill, a 'listening pedagogy' is one of the important characteristics of shared thinking.

Atwood et al. (2010) use Crook's (1998) notion of *collaborative engagement*, which is comparable to *collaborative argumentation* (Golanics & Nussbaum, 2008; Herrlitz-Biro et al., 2013), or *exploratory discourse* (cf. supra). Basically, it is synonymous to Beghetto and Kaufman's *intellectual estuary* and there are also parallels with Riley's *critical learning*. As to Atwood et al. (2010), collaborative engagement describes a classroom in which students engage one another's ideas through joint or collective reasoning. Exploratory talk, then, is the specific form of talk which learners use to co-construct their reasoning process (Brown & Renshaw, 2000). Atwood et al. (2010, 363) also refer to the term *quality talk*: "Mercer (1995, 2000), Mortimer and Scott (2003), and van Boxtel and Roelofs (2001) have characterized quality talk as that which displays reasoning, the articulation of propositions, and the clarification of misconceptions about those propositions."

Dourneen (2013), too, is not convinced that the term exploratory talk says it all. In a qualitative study focusing on pragmatic features while students perform tasks, she argues that exploratory talk might not always explain how learners make sense of each other in order to develop their ideas. She would rather speak of *dialogic reason*, quoting Wegerif (2005), as "the broader concept of shared orientation, ground rules and utterances that helps people reach shared understandings and construct shared new knowledge." (Dourneen, 2013, 43) In addition, *constructive talk* is suggested as a concept, meaning "talk which enables learners to construct ideas and helpful working relationships through the pragmatic expressions they use to make meaning in the context in which they are working." (*ibid*., 46)

Polo et al. (2015) collect four specific types of talk which are considered to be of high educational value: academically productive talk, accountable talk, collaborative argumentation and co-constructive, critical argumentation. Exploratory talk seems to have characteristics of each of these types. Zooming in on the aspect of identity, they acknowledge Mercer's (1996) statement that in exploratory talk there is no conflict of people, only a conflict of ideas. According to the researchers disputational, cumulative, and exploratory talk reflect different attitudes towards self-identity at the individual level: in the case of disputational talk Polo et al. (2015, 3) speak of 'competitive footing', in the case of cumulative talk it is 'consensual footing', and for exploratory talk they speak of 'constructively-critical footing', where 'footing' "corresponds to the changing roles an individual displays during a conversation."

Concluding, in an educational context the concept of exploratory talk has found solid ground in two stages: Barnes (1976) and Mercer (1996). We conclude that the notion of exploratory talk has evolved from a mere type of talk to an indispensable part of a triad taxonomy of classroom talk: disputational—cumulative—exploratory. Although Mercer's definition of exploratory talk still stands, the results of some studies suggest further refining or rather emphasizing certain characteristics which we can agree with. We believe turn-taking and especially the lack of interactive dominance/recession to be important. We also believe group identity is a condition as well as a result of exploratory talk. Therefore, we would like to elaborate on Mercer's definition as follows (the additions are marked in italics): Exploratory talk is a *specific form of co-constructive interaction expressed through discourse*, in which partners *equally participate to maintain a sustained focus on a shared line of reasoning.* They engage critically but constructively with each other's ideas. Statements and suggestions are offered for joint consideration. These may be challenged and counterchallenged, but challenges are justified, and alternative hypotheses are offered. Knowledge is made publicly accountable. *Reasoning is more elaborate* and more visible in the talk. Progress then emerges from the eventual joint agreement reached *and supported by group ownership*.

Considering the challenge of globalisation, it may be clear by now that the results of interventional studies clearly suggest a much wider potential than learning effects only. Recurring words in the studies we discussed are 'shared', 'understanding' and 'respect' but also 'openness', 'trust' are mentioned. We do not find these words in descriptions of disputational and cumulative talk. The emotions related to both cumulative and disputation are even liable to threaten group achievement. Especially, "negative emotions affect motivation and self or group efficacy" (Polo et al. 2017, 306). In exploratory talk, however, ground rules even the path for more rational discussion and for a shift from individual identity to group identity (Wegerif & Mercer, 1997). They seem to cause an emotional shift towards more rational thinking and less provocative reasoning, which is exactly what is needed when cultural differences threaten adequate conversations on more sensitive or controversial topics. We found confirmation of this emotional shift in several studies (Topping & Trickey, 2014; Wegerif, Littleton & Jones, 1997; Luby, 2014; Mannion & Mercer, 2016; Murphy, 2015). We will look further into this in section 3.4.

3.2 The measurement of exploratory talk

In this section we will address how exploratory talk is measured. For an elaborate overview see T'Sas (2018). In total, 88 articles enabled us to answer RQ2.

In a review on methods and methodology, Mercer (2010a) discusses relevant methods for analysing classroom talk and compares their strengths and weaknesses. Mercer distinguishes between two main approaches: linguistic ethnography and sociocultural research. Linguistic ethnography finds its rationale in social anthropology and descriptive linguistics. Researchers emphasize, among other aspects, "that talk

is always referential, interpersonal, emotive and evaluative [and] that socialization is a never-ending process, mediated through language and interaction" (Mercer, 2010, 2). As social situations are thought to be unique, ethnographic researchers refrain from quantitative approaches as these are often used to draw generalizing conclusions which they do not believe to be valid. Therefore, within linguistic ethnography, studies are observational, non-interventional and qualitative. Researchers examine classroom talk in its social and cultural context through detailed close reading of transcripts and leave out statistical analysis. Research questions address issues such as the expression of identities by means of classroom talk and the use of languages and language varieties of different cultures at school.

Sociocultural researchers bear on research traditions in social and developmental psychology and pedagogical studies. Since education is considered to be a dialogic process, the way talk—i.e., dialogue—is organized in the classroom could have an important influence on students' reasoning and reasoning skills. Therefore, sociocultural researchers "are positively inclined towards the use of pre/post interventional designs, seeking to measure differential effects of talk on problem solving, learning and conceptual change" (Mercer, 2010, 3). While often combining qualitative and quantitative methods, their studies are mostly observational, interventional, and/or quasi-experimental. This is also what we found in most of the studies we analysed. Research questions focus on the occurrence of types of classroom talk and the way these types promote learning and develop understanding. Within the sociocultural approach of exploratory talk in educational settings (Wegerif & Mercer, 1997) suggest four levels of analysis to capture the nature of types of talk in classroom conversations.

Level 1 is about the fundamental way in which students orientate themselves towards each other when they start constructing knowledge. Which social mode of thinking do they employ: disputational, cumulative or exploratory?

Level 2 focuses on the ground rules that govern the production of appropriate utterances, e.g., speech acts which are allowed and those which are not. These ground rules, which students have to learn before being able to master exploratory talk, are:

1) All relevant information is shared
2) The group seeks to reach agreement
3) The group takes responsibility for decisions
4) Reasons are expected
5) Challenges are acceptable
6) Alternatives are discussed before a decision is taken
7) All in the group are encouraged to speak by other group members.

Level 3 deals with specific speech acts or utterances classified according to their apparent function in the immediate context. Examples of speech acts in exploratory talk are: the assertion of knowledge, confirmation, joint elaboration, giving and asking for opinions, the justification of ideas, reformulating another's idea, stating a consensus etc.

Level 4 considers the actual, particular words recorded and transcribed. In exploratory talk these are word or word groups like 'I agree', 'because', 'for example', 'I don't think so, because…', 'Why do you say that?' etc. Mercer (1995) refers to them as 'key words in context' (KWIC).

Though many studies and especially quantitative analyses focus on the use of these key words (Rojas-Drummond & Mercer, 2003; Schmitz & Winskel, 2008; Sutherland, 2006; Wegerif, Mercer & Dawes, 1999; Wegerif, Mercer & Rojas-Drummond, 1999), other indicators of exploratory talk have been analysed regularly as well. These are: turn-taking, length of utterances, the quantity and quality of arguments and—close to level 1: social modes of thinking—self-identity. Again, see T'Sas (2018) for an elaborate description of these indicators.

The four levels proposed by Wegerif and Mercer (1997) represent levels of growing abstraction. Merely counting certain words (level 4), for instance, is more abstract than interpreting those words within a context (level 3). According to Wegerif and Mercer (1997), in order to grasp all aspects of classroom talk, explicit reference to these four levels is beneficial to explaining the nature and function of students' talk during collaborative activities. Also, this four level analysis makes it possible to start off with a limited set of qualitative data which are analysed at a micro-level and then triangulated with a much larger set of quantitative data which are processed statistically and make generalizations possible (Wegerif, Mercer & Rojas-Drummond, 1999; Rojas-Drummond & Mercer, 1999). Combining these types of data at different levels of analysis enables researchers to interpret results in a recursive and comprehensive way (Wegerif & Mercer, 1997). This is what Wegerif and Mercer call the 'inverted dynamic pyramid' method.

In our 1976-2016 literature search 88 articles describe experimental interventions and discourse analyses in various school contexts and with students/students and/or teachers of different levels of education. Students, from Kindergarten tot higher education, were the focal participants in 80 experiments. In 8 cases we found insufficient information for conclusive identification of the participant's profile. In 11 cases the role of the teacher was also subject to analysis.

We found 41 studies to be qualitative, 2 to be quantitative and 45 to be mixed methods. 33 of the 41 qualitative analyses include solely conventional analysis. This means that exemplary extracts of transcripts are analysed in depth. In 8 studies talk is analysed via other protocols (e.g. Ten Have, 2007) or 'conventional discourse analysis' without reference to any specific protocol. In one of the quantitative studies and nearly all mixed methods studies conventional discourse analysis is used. Of the 45 mixed methods studies, Mercer's coding scheme for social modes of thinking (cumulative—disputational—exploratory) is used 23 times. Barnes' description and Mercers' definition of exploratory talk are used for analysis exclusively two times respectively one time. Specific characteristics of exploratory talk are analysed separately in 12 studies, e.g., shared participation, connection, reasoning, and challenge (Cervetti et al., 2014), argument claims and levels of arguments (Nussbaum, 2005), descriptions, predictions, explanations, arguments (Webb & Treagust, 2006). In 14

studies other frameworks related to exploratory talk are used. These are, for instance, models to analyse arguments (Beardsley, 1950; Toulmin, 1958, cited in Golanics & Nussbaum, 2008), to distinguish between transactive and non-transactive utterances (Kruger, 1993), to identify dimensions of classroom talk (Murcia & Sheffield, 2010), to analyse elaboration (Herrlitz-Biro et al., 2013) and to define group ownership (Haglund & Jeppsson, 2012).

In most of the studies a variety of instruments has been used to obtain data: collecting background information on school(s), teacher(s), student(s); making field/ethnographic notes on educational activities, mostly during interventions; audio and/or videorecording of classroom talk; taking interviews from teacher(s) and/or student(s); collecting written assignments, etc. Relevant conversations are transcribed for analysis, for which various coding schemes, conceptual frameworks and reflection scales are used, though mostly used is Mercer's CDE-scheme. Quantitative conversation analysis is done by means of concordance software. When a problem-solving test is included in order to measure cognitive effects, Raven's Standard and/or Coloured Progressive Matrices is used almost exclusively. Quantitative results are processed statistically. In some cases, it is unclear which instruments were used.

Concluding, Mercer's coding scheme for social modes of thinking and his definition for exploratory talk are used most. It must be noted, though, that about a quarter of these studies were carried out by researchers close to Mercer's research circle and by Mercer himself. Still, the fact remains that only one quarter of the 88 studies uses a different analytical framework or combines Mercer's with other frameworks, choices which can be explained by specific research foci.

Considering the challenge of digitalisation, we found that 28 studies which were performed in the 1976-2023 period set up a research design which included the use of ICT tools. For example in the SLANT project (Fisher, 1993a) students used software while working in pairs. The set up clearly defined what they were expected to do and data gathering followed by discourse analysis was somewhat easier as the students were 'glued' to their screen, which caused less distraction by other students, and which made it technically easier to capture conversations. Comparatively, in most studies, conversation analysis took place while students were doing specific assignments using a pc or notebook, a digital whiteboard, tablets, iPads etc. Students worked individually, in pairs or small groups, and their conversations, either live in the classroom or online, were analysed by the researchers. In a number of cases the students were first taught the ground rules of exploratory talk, while in other the ICT context was used for discourse analysis without the pre-teaching of any conversational skills. We will discuss this further in chapter 3.4.

3.3 Effects of exploratory talk

In this section we will discuss measured effects of exploratory talk, which were described in the 88 articles mentioned before. As students learn how to use exploratory

talk, they primarily improve language skills which are inherent to this type of talk, but other effects have also been noted, tested, and demonstrated. For this, interventional studies of exploratory talk share the same protocol: students and/or teachers are instructed how to talk exploratively via the use of ground rules. The results of pre- and post-tests and of in-depth analyses of exploratory conversations are then used to formulate effects. Based on our literature study and at the risk of imposing too rigid a structure, we wish to consider four main effect categories: linguistic, (socio-)psychological, cognitive, and pedagogical effects. Many studies formulated effects in more than one of these domains. This suggests that effects are interactive or interwoven, and may trigger or amplify one another, but for clarity's sake we will summarize them separately.

3.3.1 Language effects

In most experimental interventions the successful learning of exploratory talk is a condition which has to be fulfilled in order to generate other effects. It is therefore important to make certain that exploratory talk can actually be taught and learned, and that the teaching of exploratory talk can successfully transfer between educational contexts. The latter means that if exploratory talk is taught and learned in, say, a science class, its added value would be that students also employ it during group work for maths, languages, religion/ethics, world orientation, and—in the end—in life outside the classroom. Quoting Galton and Williamson (1992), Mercer (1996) acknowledges that successful group work depends on the extent to which students are taught to collaborate. According to Mercer (1996, 374) "most children over 9 or 10 years old may have all the language strategies they need to engage in exploratory talk (and so in educated discourse) without being expressly taught them. They even may already be using them to good effect on occasion". The question is, however, to what extent they use language as a social mode of thinking: "[…] we also need to consider what is the function and content of such conversations. Justifying social or moral choices to friends, or even discussing the social norms of classroom life (Much & Schweder, 1978; Elbers, 1994) is not necessarily the same as using language as a social mode of thinking when making joint decisions in solving problems or choosing between alternative explanations for observed physical events." (Mercer, 1996, 374). This is what a number studies did as soon as exploratory talk was defined: successfully determining that students can learn how to use it for learning (Mercer, 1996; Mercer et al., 1999; Wegerif, Mercer & Dawes, 1999).

3.3.2 (Socio-)psychological effects

As we know that exploratory talk, like disputational or cumulative talk, is a social mode of thinking (Mercer, 1996) several studies report on (socio-)psychological effects. E.g. when students work in dyads, triads or in groups of four or five, they use language differently than Barnes' (1976) presentational talk and their interactions

have the potential to become more symmetrical (Mercer & Sams, 2006). Also, they more easily develop group ownership while doing work (Haglund & Jeppsson, 2012), they take up more assertive roles (Mercer, 1996; Wheeldon, 2006), talk is more consensus driven (Tin, 2003), students are more open to ideas developed by others or found in other sources (Dawes, 2010), their feeling of self-efficacy increases (Topping & Trickey, 2014; Webb et al., 2016), collaborative attitudes like equity, active listening and goal-mindedness increase (Coultas, 2012; Golanics & Nussbaum, 2008; Kerr, 1998) and cultural divides are more easily crossed (Tin, 2003). As we will discuss in Section 3.4 these findings are important in view of the challenges posed by globalisation.

3.3.3 Cognitive effects

A number of researchers have tested cognitive effects in relationship with the use of exploratory talk, e.g. during problem solving activities. Apparently, such activities give students more opportunities to develop research skills (Mercer & Sams, 2006). As a matter of fact, Vygotsky claimed that solving problems in groups can enhance individual problem-solving skills. The basic idea is that social—or intermental—activity can promote individual—or intramental—development, a process which is mediated by language (Mercer & Sams, 2006). Quite possibly, "by internalizing or appropriating the ground rules […] students have come able to carry on a kind of silent rational dialogue with themselves" which explains gains in strategic thinking about problem issues" (Rojas-Drummond & Mercer, 2003, 106). In several empirical studies (e.g. Fernandez et al., 2001; Mercer, 1995; Mercer et al., 1999; Rojas-Drummond et al., 2006; Rojas-Drummond & Mercer, 2003; Webb et al., 2016; Wegerif & Mercer, 1997; Wegerif & Mercer, 1997) researchers have therefore measured effects in problem solving skills after interventions. Apart from improving their problem solving skills, students also seem to become better at critical thinking and reasoning in general (Wegerif et al., 1999; Soter et al., 2008; Topping & Trickey, 2014), at the development of thought and meaning (Brevig, 2006; Golanics & Nussbaum, 2008; Webb et al., 2016) as well as at academic performance (Mercer et al., 1999; Tin, 2003; Rajala et al., 2012; Luby, 2014). The positive scaffolding role of exploratory talk in discussing and understanding literature was also demonstrated (Pierce, 1995; Maloch, 2002; Soter et al., 2008). Finally, Mercer (1996), Wegerif et al. (1999) and Rojas-Drummond (2003) have provided ample evidence for Vygotsky's claim that social learning precedes and stimulates individual learning.

3.3.4 Pedagogical effects

On a pedagogical level, positive effects of collaborative talk have been found during interventions comprising various school subjects, such as sciences (Cervetti et al., 2014; Dawes et al., 2010; Enghag et al., 2007; Haglund & Jeppsson, 2012; Polo et al., 2015), mathematics (Kassoti & Kliapis, 2009; Mercer & Sams, 2006; Murphy, 2015;

Rojas-Drummond et al., 2001; Schmitz & Winskel, 2008; Webb, 2015), geography (Bullen et al., 2002), languages, i.e. reading comprehension, writing skills (Boyd & Kong, 2017; Brevig, 2006; Maloch, 2002; Soter et al., 2008), music education (Nikolaidou, 2012); reasoning skills in specific contexts such as philosophy for children (Topping & Trickey, 2014) and computer-based learning. We will discuss the latter in more detail in Section 3.4.

Though the boundaries between these four categories may not always be clear, we conclude that studies on exploratory talk show positive effects in several domains.

3.4 Conclusions

Based on the above review we believe it is safe to assume that Mercer's (1996) definition of exploratory talk is still standing. There have been some elaborations and refining, and synonyms for the concept have been proposed, but the definition itself has not been refuted. This makes us also conclude that it contains a workable set of criteria for analysing classroom talk. Researchers generally seem to agree that exploratory talk is about peer collaboration/interaction, visible reasoning, knowledge construction, and public accountability. This is realised by means of active and respectful listening, critically challenging or counter-challenging ideas, tentatively discussing hypotheses, giving and asking for arguments and striving for joint agreement. Ground rules function as an underlying framework for this type of talk and mostly interventional mixed method studies have amply demonstrated positive linguistic, psychological, cognitive and pedagogical effects of exploratory talk for learning in an educational context.

We will now discuss what this means for L1 challenges, globalisation and digitalisation.

3.4.1 Persisting L1 challenges

Despite the many findings in favour of exploratory talk, some researchers express a certain concern when it comes to implementing exploratory talk or more broadly speaking—dialogic education—in the classroom. E.g. the ever dominating IRF/E-pattern suggests that the use of language as an effective learning tool in the classroom has long been—and still is—problematic. Even when teachers see the added value of knowledge construction through exploratory talk or dialogic teaching, external factors such as a demanding curriculum or a traditional school culture often make them dismiss this as unrealistic (Coultas, 2012; Wegerif, 1996). They may even experience exploratory talk as a contrast to teacher-led conversation in the classroom (Chick, 2015). Some teachers, especially science teachers, also admit they lack the knowhow and the skills to organize opportunities for discussion or do not have the confidence to implement it (Cervetti, 2014; Harris, 2005). How difficult the 'dialogic shift' for teachers can be, is described sharply by Barnes (1976, 78): "The very presence of a teacher alters the way in which students use language, so that they are

more likely to be aiming at 'answers' which will gain approval than using language to reshape knowledge. Only the most skilful teaching can avoid this."

Though the role of the teacher, i.e. the tools, support and scaffolds he provides, may be crucial (Jansen et al., 2010), merely asking teachers to adopt new strategies to engage students in exploratory talk is unlikely to be very successful (Harris, 2005; Mercer, 1995). It is very important that teachers feel committed to talk to 'make it work', that they see the added value of dialogic learning processes and understand how it can fit into their curricula, and that they possess the skills and techniques to put it into practice, either as a participant or as a 'discourse guide' who can model exploratory talk and raise his students' metacognitive awareness of how talk can facilitate their collective reasoning and thinking (Webb, 2015; Coultas, 2012; Kerawalla, 2012; Harris, 2005; Maloch, 2002; Wegerif, 1996). A curricular reappraisal and inclusion of exploratory talk may be the answer to this. For teachers, especially L1 teachers, it is necessary to "embrace the notion that language, or talk, is conceptualized as a tool for thinking and scrutinizing knowledge and, more generally recognize the importance of discourse in learning" (Murphy et al., 2018). Once this has been established, it is the responsibility of L1 teachers to teach exploratory talk.

Apart from pioneers like Barnes (1976) and Mercer (1995) a considerable number of researchers has laid bare strategies and techniques teachers can use to scaffold group discussions (Hewit, 2014; Gillies, 2013; Wheeldon, 2006; Sutherland, 2005; Rojas-Drummond, 2003; Maloch, 2002). In general, these strategies include the gradual release of responsibility ('reciprocal teaching'; Palincsar & Brown, 1986) and incorporating more collaborative activities in daily classroom practice, modelling, being observant at the start of the process, coaching and giving feedback, making metalinguistic interventions and asking rational thought provoking questions, etc. To this Murphy et al. (2018, 1123) add: "[…] teachers must embrace *space and diversity* within the discourse by allowing students the freedom to discuss their own unique individual experiences and backgrounds, resulting in discourse with broader and richer perspectives."

By comparing pupil talk before and after introducing teachers to exploratory talk and dialogic teaching, the 'scaffolding' role of the teacher has repeatedly been measured (Barnes, 1976; Fernandez et al., 2001; Hunter, 2008; Maloch, 2002; Mercer & Sams, 2006; Murcia & Sheffield, 2010; Rojas-Drummond et al., 2001; Rojas-Drummond et al., 2003). Rojas-Drummond (2001) found that modelling was very important while teaching the ground rules of exploratory talk and leading students to the process of argumentation that facilitates knowledge construction. Wegerif (1999) found that in one school the intervention program was implemented by an enthusiastic teacher who was also a researcher and therefore committed to the program and the study. The transfer to two other schools proved problematic, however, and was called an issue for further research. Topping et al. (2014) shared this experience, finding that some teachers were more able to assimilate what they call 'the concept of collaborative enquiry' and put it into practice.

Clearly, the onset for high quality dialogic teaching, including the teaching of exploratory talk, must be given during teacher education. Student teachers must be given ample opportunities and stimuli to try out dialogic techniques to find out 'what works' and to develop a dialogic teaching attitude (Chick, 2015; Topping, 2014; Lofgren, 2013). Chick (2015) suggests that teacher educators should therefore employ exploratory talk during pedagogical discussions as a replacement for the often-used educator-led 'feeding back', but for this to happen teacher educators need to view learning from a sociocultural perspective. They have to see dialogic interaction as valuable for teaching as well as reflecting on it. But as already mentioned by Fisher (2011), even strong teacher education may not suffice when a trainee's 'dialogic willingness' has been smothered during his own school career. As the author suggests, it takes a dialogic school experience to convince some teachers of the value of dialogic teaching and of exploratory talk (Fisher, 2011). Bonset and Braaksma (2008) conclude that more research is needed if such speaking and listening skills are to reappear on the educational agenda and their field status is to be raised.

3.4.2 Globalisation and (super)diversity

Most studies of the added value of exploratory talk seem to focus on learning effects. It may be clear by now, however, that the results of interventional studies clearly suggest a much wider potential. Recurring words in the studies we discussed are 'understanding', 'shared' and 'respect' but 'openness' and 'trust' are mentioned as well. Indeed, these qualities are needed to create and maintain a rational discussion, but they are also needed to make differences between people acceptable on a social and communicative level. A number of studies have shown that the implementation of exploratory talk in classroom activities can be helpful in crossing cultural divides (Tin, 2003), reducing inequality due to poverty and school drop-out (Lampert et al., 2020) and increasing shifts in discourse, confidence, and identity positioning of lower-attaining students of lower SES (Sutherland, 2013). In an interventional study Sutherland (2015) suggests that exploratory talk is a promising means to give low SES students the space they need to ask questions without fear of being laughed at, to ask for clarification whenever needed, and to be a full partner in any conversation. But this can only be realized by a more dialogic approach by both the teacher and the students when constructing knowledge in the classroom. Boblett (2018) developed and successfully tested a 5-sequential structure to implement exploratory talk, supported and managed by nonverbal means, which answers the challenge of teaching L1 to L2 speakers and "offers an important resource for resolving language issues".

Lately, more research is also being done on exploratory talk in multilingual contexts (Creese & Blackledge, 2010; Boblett, 2018; Duarte, 2019; Johnson, 2019; Udling & Reath Warren, 2023). They use the term 'translanguaging' to describe "the flexible ways in which bilinguals draw upon their multiple languages to enhance their communicative potential and a pedagogical approach." (Duarte, 2019, 150) These ways

mostly come down to the scaffolding of students who do not master their school's standard instructional language by a native speaker, i.e. a peer or the teacher, because they have a different mother tongue. Apparently, exploratory talk can be stimulated by a multilingual context, when students are encouraged by the teacher or by a peer during interaction-demanding assignments to ask what- and why-questions, reflect on arguments, etc. in order to ensure fruitful on-task collaboration. Duarte (2019, 162) found that in peer-to-peer talk in collaborative problem-solving activities students spontaneously use a lot of exploratory talk and concludes that "translanguaging is used to scaffold meaning through interaction and contribute to jointly solving school tasks." Uddling and Reath Warren (2023, 270) add that "teachers who actively facilitate the use of students' multiple linguistic resources for sense-making can contribute to a more egalitarian education and increase opportunities for learning in linguistically diverse classrooms." As multilingualism in the classroom is one of the challenges brought about by globalisation, exploratory talk may be a useful strategy for teachers to encourage in multilingual classrooms. In reverse, encouraging bilingual scaffolding between peers may lead to more exploratory talk, which, in turn, L1 teachers can build on.

Diversity in the classroom is also about gender differences. Here, too, exploratory talk may be useful. Wegerif et al. (2005) report of a study of qualitative conversation analysis after teaching exploratory talk to Mexican children. Due to the stronger 'macho culture' in the Mexican culture, it was less obvious that girls would raise their voices and take turns more during discussions when assigned to a group with one or more boys. In the two boys and one girl groups of the study, however, girls were encouraged to take on a more leading role in the joint problem solving. One of the hypotheses was that the ground rules would make it easier for girls to speak and for boys to listen to them and to follow their lead. Indeed, the intervention seemed to have caused "a shift in the role of one girl in the group from being a little subordinated towards taking on a more leading role in the joint program solving." (Wegerif et al., 2005, 47)

To end with a critical note, Alexander (in Mercer & Hodgkinson, 2008, 94) warns us by saying "that the language of education contains few universals and educational conversation across cultures is riddled with pitfalls for the unwary." Hence, the concept of exploratory talk is liable to more than one interpretation depending on the educational context and culture it is introduced to. Another pitfall to avoid is normativity. As exploratory talk proves an added value in rational conversations as compared to cumulative and disputational talk in multiple studies, only few studies consider the fact that cumulative and/or disputational talk may be necessary as onsets for conversational episodes of exploratory talk. In his study T'Sas (2018) therefore suggests that a more elaborate and refined conceptual framework for exploratory talk is desirable in which the value of the other types of talk might be implemented. Doing so may do more justice to e.g. cultural differences that make up language and, more specifically, conversation, e.g. the expression vs. the suppression of emotion, the importance of interhuman relations vs. the importance of the message, the

importance vs. unimportance of hierarchy among discussion participants, gender discrimination vs. non-discrimination etc. This way, exploratory talk can, because of its very nature and more than the other types of talk, answer L1 challenges in a superdiverse, globalising context.

3.4.3 Digitalisation

As mentioned earlier 28 studies include the use of ICT in their experimental design. This is not a recent phenomenon. Starting in 1996, Cambridge researchers Mercer and Wegerif have set up various classroom interventions in which digital means were used to support discussion between students for the purpose of knowledge construction (Wegerif, 1996; Wegerif et al., 1998; Wegerif & Mercer, 1997; Mercer et al., 1999). Other researchers followed suit (Nussbaum, 2004; Hyun & Davis, 2005; Golanics & Nussbaum, 2008) and as technology became more accessible in common classrooms, new ideas emerged to improve or practice exploratory talk using ICT. This has resulted in interventions with e.g. writing and story-making software (Dourneen, 2013; Kucirkova et al., 2014), the interactive whiteboard (Murcia & Sheffield, 2010; Mercer et al., 2010), the combination of interactive whiteboard and iPads (Kerawalla et al., 2023); WebQuests (Liang & Fung, 2020; Murphy, 2015), online discussion platforms (Sas et al., 2017; Lee et al., 2021), student response in wikis (Morin et al., 2017), microblogging (Amundrud et al., 2022) and podcasts (Dversnes & Blikstad-Balas, 2023). More recently, some researchers have reversed this design to a non-interventional approach, i.e. using ICT driven contexts as a primary source of data to analyse discourse and find out to what extent exploratory talk is provoked by ICT itself. Such examples are: the analysis of problem solving conversations in professional Facebook groups (Ekman, 2021), the use of exploratory talk during the use of tablets (Hardman & Lilley, 2023) and during online business courses (Kjølseth & Siddiq, 2023), and oral development in virtual EFL classes (He & Bin Haji Salam, 2022). Some researchers have also used ICT for the development of metacognitive skills (Brevig, 2006; Mannion & Mercer, 2016) and for the transfer of reasoning skills to non-educational contexts or communicative situations (Mannion & Mercer, 2016; Webb et al., 2016).

Based on these findings, we believe the use of online discussion platforms is useful not only for students to practice exploratory talk in a more controlled environment, it can also help teachers to assess students' conversations in ways that are difficult if not impossible to carry out during 'non-digital' collaborative activities. Students can either produce dialogue online, or use smart phones or specific software to record conversations which remain available for (peer) assessment regarding e.g. the nature of the conversation (disputational, cumulative, exploratory), the number and quality of arguments, the length of utterances, the visibility of reasoning, etc. Also, orally recorded discourse offers teachers the possibility to scaffold students by giving them formative feedback.

We are aware that spoken conversation differs from written conversation, but the advantages of using written talk as a pedagogical tool to enhance reasoning skills outweigh the drawbacks. Wegerif et al. (2003) also suggest that computer-enabled reasoning may be more implicit than when students rely on words alone. When pupils start working on a group task, their use of language is likely to differ when they are provided with 'materials' or not. This is what T'Sas (2018) found when observing triads of students during problem solving tests. When students are given materials, they are more likely to use non-verbal language (e.g. pointing at issues) to illustrate their argument and will use less verbal indicators of exploratory talk, like keywords-in-context. Wegerif (2004, 189) defends the idea that ICT can have an added value for learning and teaching dialogues and adds that even IRF interactions with computers have a different effect than IRF interactions with the teacher. The difference is that computers, unlike teachers, are not part of an educational hierarchy in the classroom. This makes it possible for computers to "support discussion, reflection and the active construction of meaning in a way that they may not normally do with human teachers."

4. DISCUSSION

Considering the wide potential and application of exploratory talk, it is surprising that Flemish official minimal attainment targets and curricula do not explicitly focus on conversational skills. In the Flemish curricula a distinction is made between speaking and listening skills but the focus on conversational skills is poor. A thorough word search in curriculum documents shows that the concept of exploratory talk—or a synonym thereof—is mentioned explicitly in neither the Flemish attainment targets nor in the various curricula (T'Sas, 2018). No mention was also found in new attainment targets for secondary education which were introduced in 2019. Characteristics of exploratory talk can be found in these sources but, as in primary education they are distributed over several subjects, like Languages, Social Skills and World Orientation (as of school year 2015-2016 split into 'Man and society' and 'Science and technology'), they lack coherence. In the curricula we examined we found no mentioning of a didactic learning trajectory for exploratory talk or similar approaches (GO!, 2013a; VVKO, 2013). The term 'exploratory talk' was mentioned once, but without any elaboration, in the 2014 issue of the annual '*Onderwijsspiegel*' (Education mirror), which summarizes findings of the official school inspectorate (VMOV, 2014). It is reasonable to assume that absence in attainment targets and curricula also means absence in most classroom practice.

Perhaps, more time is needed. Exploratory talk was introduced in Flemish education in 2018, when T'Sas's (2018) replicator study of Mercer's (1995) research was published. This study included a quasi-experiment with control and target groups in five primary schools. As the results confirmed earlier research on the learning outcomes of exploratory talk, in 2020 a valorisation project was funded which resulted in the publication of extensive lesson materials for teachers, from Kindergarten to

the first grade of secondary education, i.e., 4-14 year olds (T'Sas et al., 2020). This material is freely available on www.neejandertaal.be/sprekendleren.php and is now being downloaded frequently. It has already been presented to the Flemish department of Education, in various schools, during workshops for teachers and in various educational media. Despite these initiatives, the official implementation of exploratory talk in the Flemish attainment targets and curricula remains a missing step in (L1) education.

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