Classroom dialogue: a systematic review across four decades of research

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Recognizing that empirical research into classroom dialogue has been conducted for about 40 years, a review is reported of 225 studies published between 1972 and 2011. The studies were identified through systematic search of electronic databases and scrutiny of publication reference lists. They focus on classroom dialogue in primary and secondary classrooms, covering the full age range of compulsory schooling. The methods of data collection and analysis used in the studies are described and discussed, with changes and continuities over time highlighted. Study results are then summarized and integrated to present a succinct picture of what is currently known and where future research might profitably be directed. One key message is that much more is known about how classroom dialogue is organized than about whether certain modes of organization are more beneficial than others. Moreover, epistemological and methodological change may be required if the situation is to be remedied.

Keywords: dialogue; classroom interaction; systematic review

Introduction

The term 'dialogue' derives from two words in classical Greek, 'dia' meaning 'through' and 'logos' meaning 'word', which jointly equate the term with all verbal communication. Contemporary uses are more restricted, insisting on more than one communicator and so contrasting with monologue. Nevertheless, if dictionary definitions are a reasonable proxy for everyday usage, dialogue still encompasses a wide range of social practices: it is typically treated in dictionaries as synonymous with conversation (e.g., Oxford University Press, 2002), and the concept of conversation covers all verbal exchanges (and series of such exchanges) where one individual addresses another individual or individuals and at least one addressed individual replies (Howe, 1981). Yet even if numerous practices are ordinarily regarded as dialogic, there has long been a sense of rarity in classrooms. This sense has memorably been encapsulated in Flanders' (1960) 'two-thirds rule', which recognizes that classroom activity is dominated by verbal communication but stresses that such communication is primarily teacher delivery.

More often than not, recognition of rarity is tinged with regret, for in Western contexts at least, dialogue is often regarded as crucial for effective pedagogy. This is not because any verbal address–reply interaction around curricular material is viewed

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as valuable. Rather, it is widely believed that there are ways of organizing classroom dialogue, which, if achieved with sufficient frequency, will prove beneficial as regards educational goals. This belief too is traceable to classical Greece, in particular to Socrates and Plato, but it is also detectable in the pedagogical writings of, for instance, Rousseau, Mill, Dewey and Piaget. While Vygotsky (1978) does not quite co-ordinate his interests in talk and social interaction into an explicit focus on dialogue (see also Wegerif, 2008), there is an unmistakable steer in Bakhtin's Vygotsky-influenced writings towards regarding dialogue as pivotal. Indeed in such claims as 'The importance of struggling with another's discourse, its influence in the history of an individual's coming to ideological consciousness, is enormous' (Bakhtin, 1981, p. 348), Bakhtin articulates a theme that is central to most theoretical analyses: benefits are associated with the exchanges of competing ideas that dialogue makes possible.

It is difficult to pinpoint precisely when theorizing about classroom dialogue began to be translated into empirical research. However, Edwards and Westgate (1994) indicate a paucity of studies prior to the 1970s, and identify some seminal texts that were published within that decade. Thus, it seems reasonable to contemplate about four decades of empirical investigation. So what have these four decades produced? What is known about how classroom dialogue is organized, and are some modes of organization more beneficial than others? Were these questions answered early in the 40-year period, and if so has research fizzled out? If not, why has it taken so long to resolve the issues? The answers are far from clear, for hitherto there has been no comprehensive synthesis of empirical research into classroom dialogue. Accordingly, during the summer of 2011, we embarked on a project intended to fill the gap, at least as regards dialogue during what, in Western contexts, are the years of compulsory schooling. The present article summarizes the results. It starts by describing the systematic procedures that we used to identify relevant research, and outlining the studies that emerged as the sample for detailed analysis. Thereafter the methods of data collection and analysis used in the studies are described and discussed, highlighting changes and continuities over time. Finally, the studies' results are summarized and integrated, to present a succinct picture of what is currently known and where future research might profitably be directed.

Sample selection

Dialogue was conceptualized above in its broad everyday fashion, but it is clear that many educational researchers reject this conceptualization (see, e.g., Burbules & Bruce, 2001; Lefstein, 2010). Amongst such researchers, dialogue is usually defined via features that characterize it as a specialized sub-type of conversation, not as a synonym. While the features often revolve around competing ideas in accordance with the background theories, there is no clear consensus over these more exclusive definitions. Therefore a systematic review based on any single definition would omit studies that some educational researchers believe to be significant. It would also be confusing for readers who adopt the everyday perspective. As a result, we decided to continue conceptualizing dialogue as all verbal exchanges where one individual addresses another individual or individuals and at least one addressed individual replies. We noted, though, that whilst this conceptualization incorporates the behaviours that most specialized definitions treat as dialogic (as well as some they exclude), it jars slightly with the distinctions that Scott and colleagues make

between 'authoritative interaction' (discussion amongst several individuals about a single, received idea), 'dialogic interaction' (discussion amongst several individuals about contrasting ideas), 'authoritative non-interaction' (one individual's assertion of a single, received idea) and 'dialogic non-interaction' (one individual's commentary on contrasting ideas) (Scott, Mortimer, & Aguiar, 2006; Scott & Ametller, 2007). Our definition resembles Scott and colleagues' notion of interaction, and therefore covers their first two categories. However, it excludes their 'dialogic non-interaction', and hence part of their concept of dialogue. Nevertheless, by virtue of the partial overlap with our definition, the work of Scott and colleagues remains potentially included within this review.

Our definition of dialogue is not restricted to talk, since verbal exchanges can be textual. Equally, it is not restricted to exchanges that occur face-to-face or in quick succession: addressed individuals can reply from a distance or after an interval. Thus, ICT-mediated interaction, such as via email, is potentially included. On the other hand, the emphasis on verbalization means that non-verbal behaviour (including paralinguistic and prosodic features) is only of interest when it supports language. One challenge was to search the literature in a fashion that would maximize the identification of studies that were consistent with our definition and minimize the identification of studies that were inconsistent. A second challenge was to maximize the identification of studies that addressed dialogue in classrooms as opposed to other settings. In the end, we decided to search using two sets of keywords, one set covering 'dialogue' and associated terms, and the other set covering 'classroom' and associated terms. The dialogue set comprised answer, argumentation, communication, conversation, dialogic, dialogue, discourse, discussion, feedback, ground rules*, interaction, interactive, IRE*, IRF*, language, oracy, question, reciprocal, recitation, speaking and listening, talk, turn taking. The classroom set comprised classroom, education, educational, instruction, instructional, learning, peer, promotive*, pupil, school, small-group, student, teacher, teaching, whole-class. Asterisked terms are technical constructs defined later in this article.

We cued the keywords into the Google Scholar search engine, and also used them to examine four electronic databases: EBSCO, ERIC, JSTOR and PsycINFO. The specification was for any publication associated with at least one keyword from each of the two lists which had appeared during the 40 years up to 2011. We then examined the reference lists of items identified via the electronic resources in case further publications were to be found, iterating this process until no new items emerged. These procedures generated 1532 publications, which were then assessed against seven criteria. Studies that met all seven became the review sample. First, the item had to be peer-reviewed, as a straightforward index of threshold quality. Application of this criterion means that the review focuses upon journal articles, books and book chapters. Second, the publication had to be obtainable in full-text form. Third, the publication had to be a primary report of empirical research. Review articles summarizing selections of primary reports were identified, as were commentaries. Some of these items are quoted in this article, but to avoid duplication, they were not included in the review sample. Fourth, the research had to be conducted in primary/elementary and/or secondary/high-school classrooms, since the focus was upon compulsory schooling. Fifth, the research had to make dialogue as defined above its primary focus. Sixth, publication had to be in English, although the reported research did not have to be conducted in an English-speaking country. Seventh, if more than one publication addressed the same study, and the reported

results were identical (or very similar), only one was included, i.e. the item judged to be the most comprehensive. Occasionally, a single study was included twice because the publications covered different results. Initially, the abstracts alone were assessed, resulting in the exclusion of 857 publications for failure to comply with one or more of the criteria. The full text of the remaining items was then examined, resulting in the exclusion of a further 450 publications.

Of the 225 studies emerging from the search and assessment procedures, 24 were published between 1972 and 1981. As Table 1 shows, nearly three-quarters of these early investigations were conducted in the United States (US), with the remainder mostly conducted in the United Kingdom (UK). While the volume of studies is higher in the next two decades (42 between 1982 and 1991; 54 between 1992 and 2001), the US/UK domination continues. This said, the proportion of studies from the US decreases, primarily due to research conducted in Australia and Canada. Nearly half of the sample (105 studies) were published between 2002 and

Table 1.   Geographic location of sampled research.

Country	1972–1981	1982–1991	1992–2001	2002–2011	Total
Australia	0 (0)	5 (12)	2 (3)	12 (11)	19
Brazil	0	0	1	2	3
Canada	0 (0)	2 (5)	7 (12)	3 (3)	12
Chile	0	0	0	1	1
China/Hong Kong	0	0	1	4	5
Finland	0	0	1	2	3
France	0	0	1	0	1
Germany	0	1	0	2	3
Greece	0	0	1	0	1
India	0	0	2	0	2
Iran	0	0	0	1	1
Israel	1	0	1	1	3
Italy	0	0	0	1	1
Japan	0	0	0	1	1
Kenya	0	0	0	1	1
Luxembourg	0	0	0	1	1
Mexico	0	0	1	2	3
Netherlands	0	0	1	1	2
New Zealand	1	1	0	0	2
Norway	0	0	0	1	1
Russia	0	0	1	0	1
Singapore	0	0	0	2	2
South Africa	0	0	0	2	2
South Korea	0	0	0	1	1
Spain	0	0	1	4	5
Sweden	0	0	0	3	3
Tanzania	0	0	0	1	1
UK	5 (21)	10 (24)	13 (22)	36 (32)	64
US	17 (71)	23 (55)	25 (42)	28 (25)	93
Total	24	42	59	113	238

Note: Percentages are given in parentheses. Although 225 publications were identified, two items from 1992–2001 and three items from 2002–2011 were cross-cultural. Specifically, one 1992–2001 publication compared the US and the Netherlands, and another compared France, Russia, India, the UK and the US. One 2002–2011 publication compared the US and Sweden, a second compared the UK and Mexico, and a third compared China, South Korea, Germany, Australia, the US, Japan and Sweden. Thus, the overall total is 238.

2011, and the geographic spread of this recent work is different. Table 1 lists 24 countries contributing research during the most recent decade, and while research from the English-speaking world continues to dominate (and this dominance should be treated as a backcloth to everything that follows), the primary language in many of these countries is not English. In addition, the number of studies conducted in the UK was actually higher during the most recent decade than the number conducted in the US.

While 225 studies is a sizeable sample, there must be research that fulfils the inclusion criteria but was overlooked. Thus, the representativeness of the sample is an issue, and given Table 1, biases from the search and assessment procedures cannot be ruled out. The procedures were heavily reliant on on-line resources, and cataloguing innovations during the past decade make recent publications more accessible via such resources than older items. The massive increase after 2001 is potentially attributable to accessibility. Yet reference lists were also checked, and arguably the older the item the more opportunities it has to be cited. In addition, publication in English was an inclusion criterion, and this could partially account for the prevalence of research conducted in the English-speaking world. Yet it does not explain why research from non-English-speaking countries features in the most recent decade but scarcely before. In any event, there are alternative interpretations of the English-speaking dominance, for instance the fact, mentioned above, that dialogue is particularly emphasized in Western pedagogy. In addition, the shift that Table 1 depicts from US to UK dominance is hard to attribute to the search and assessment procedures, especially when the volume of educational research in general is much higher in the US. Overall then, while representativeness cannot be guaranteed,[1] sample characteristics are unlikely to be fully explained through biases in the search and assessment procedures.

Methodological issues

Data collection

Table 2 presents basic information about the participants who featured in the 225 studies, covering sample size (2a) and student age group (2b). Ascertaining sample size was not straightforward. With 10 studies no sample statistics were provided, and with the remainder there was variation over whether numbers of students and/or numbers of classrooms/teachers were reported. Numbers of students were less commonly used, so numbers of classrooms/teachers were employed to compile the table. In the minority of cases where numbers of students alone were reported, numbers of classrooms/teachers were estimated using the Organization for Economic Cooperation and Development (OECD) averages (i.e. one class per 22 primary students; one class per 24 secondary students). This seemed justified when the countries that dominate the research are all in OECD, and when only a rough approximation is required in any case. As 2a indicates, 34% of the studies were restricted to a single classroom or a subset of students from a single classroom (sometimes as few as one pair). While fluctuating between 25 and 43% of the total, there is no clear trend over reliance on single-class studies across the four decades. At the other extreme, a small number of studies used enormous samples, sometimes as many as several hundred classrooms. However, as with single-class research, there are no discernible trends over the four decades. Indeed, absence of change over time is also a major message from 2b, which summarizes the featured age

Table 2.   Participant characteristics.

	1972–1981	1982–1991	1992–2001	2002–2011	Total
(2a) Number of classrooms					
⩽1	6	13	23	34	76
2–5	4	13	11	27	55
6–9	3	2	8	12	25
10–19	6	4	5	7	22
20–39	2	3	2	14	21
⩾40	2	6	2	6	16
Unclear	1	1	3	5	10
Total	24	42	54	105	225
(2b) Student age group					
Early PS	5	12	9	16	42
Late PS	5	7	7	28	47
PS (Age?)	3	2	5	8	18
Early SS	6	9	15	17	47
Late SS	0	4	7	7	18
SS (Age?)	2	5	4	6	17
PS + SS	1	1	3	8	13
Unclear	2	2	4	15	23
Total	24	42	54	105	225

Note: The basic classification in 2b (Early PS = early primary school; Late PS; Early SS = early secondary school; Late SS) approximates, respectively, English KS1 (approximately 5–7 years of age), KS2 (approximately 7–11 years), KS3 (approximately 11–14 years) and KS4 (approximately 14–16 years). Studies classified as PS (Age?) or SS (Age?) indicate the primary or secondary sector but either cover the whole sector or do not specify the age range. Some studies (classified as PS + SS) include students from both sectors. Around 12% of studies (Unclear) do not indicate student age.

groups: research with what are identified in 2b as primary and early secondary students dominates the full 40-year period.

Table 3 addresses aspects of data collection, namely the curriculum context (3a) and the procedures used (3b). As regards context, it is striking that 30% of the studies (67% in the first decade) were unclear as regards the aspect of the curriculum being covered, meaning either that the context where data were collected was unspecified or that data were collected in a range of specified contexts without differentiation. This suggests that the curriculum context is not necessarily viewed as significant as regards conclusions about dialogue. When the curriculum context is highlighted, it is typically science, mathematics or literacy, with science especially popular (particularly between 1992 and 2001). On the other hand, the most recent decade has also produced 10 studies relating to second-language teaching, when this subject does not feature at all in the previous 30 years.

Regardless of curriculum context, virtually all studies (219 in total) revolve around samples of dialogue that were recorded while lessons were in progress. The six exceptions (all recent) address reflections about dialogue (Fisher & Larkin, 2008; Pratt, 2006; Rop, 2003; Sadler, 2006; Simon & Richardson, 2009; Thompson, 2007), a topic that is developed in conjunction with analysis of recordings in other recent research. It is important to note this focus on recording (sometimes supplemented with reflections), for it is relevant to interpreting the procedures that are listed in 3b. Also relevant though is the fact that all five of the frequently used procedures were available throughout the 40-year period, for this means that

Table 3. Data collection.

	1972–1981	1982–1991	1992–2001	2002–2011	Total
(3a) Curriculum context					
Computing	0	2	5	6	13
Cookery	0	0	1	0	1
L1	2 (8)	7 (17)	6 (11)	18 (17)	33
L2	0	0	0	10	10
Mathematics	3 (12.5)	9 (21)	3 (6)	18 (17)	33
P4C	0	0	1	2	3
Science	3 (12.5)	11 (26)	22 (41)	23 (21)	59
Social	0	4	1	3	8
Unclear	16 (67)	9 (21)	15 (28)	28 (26)	68
Total	24	42	54	108	228
(3b) Procedures					
Video	3	10	31	65	109
Audio	3	15	17	19	54
Field coding	13	15	7	9	44
Field narrative	0	8	8	19	35
Field rating	2	0	0	2	4
Online log	0	0	2	3	5
Actor interview	1	4	9	33	47
Actor survey	0	1	3	4	8
Actor diary	0	0	1	1	2
Unclear	5	2	4	7	18
Total/mean	22/1.16	53/1.33	78/1.56	155/1.58	308

Note: Percentages are given in parentheses. (3a) Computing = classes that focus on ICT skills; classes where ICT supports another discipline are classified by that discipline; L1 = native language literacy; L2 = second-language teaching; P4C = philosophy for children; Social = social sciences including history and geography. Two publications from 2002–2011 report data from two (L1 and Social) or three (L1, Mathematics, Science) contexts and differentiate their data by context. These publications are counted with all relevant disciplines, making the 2002–2011 total 108, despite being derived from 105 studies. (3b) Field X = observer in classroom, engaging in real-time coding (coding), making notes (narrative) or rating interaction (rating); Online log = dialogue via computer; Actor X = interview (interview) or questionnaire (survey) with participant, or record from participant via diary (diary); Unclear = 'transcript', 'recording', 'observation' or no method noted. Some multi-method studies were unclear about some of their methods; they are classified against clear methods only. In the final row, Total = number of methods minus 'unclear'; Mean = total divided by number of studies minus studies where methods unclear.

technological innovation cannot fully explain the shifts that 3b documents. Field coding was especially popular during the first two decades, with many studies using some or all of the categories listed in Brophy and Good's (1970) 'dyadic interaction system'. These categories cover functions (e.g. student-initiated question, teacher process question, student correct answer, teacher praise or criticism) and subject matter (i.e. work-related, procedural or behavioural), and observers use coding sheets to tick each time instances occur within fixed periods. The popularity of audio recording peaked during the middle two decades but declined subsequently. Use of video recording increased substantially after 1992, and overall video has been used twice as frequently as any other method. Interviewing about classroom dialogue has also become popular during recent times, resulting no doubt from the interest in reflections. At the same time, the bottom row of 3b indicates that many studies used a combination of procedures, especially since 1992.

Data analysis

Finally, Table 4 presents two aspects of the data analysis, whether the focus was on teacher–student dialogue, dialogue amongst students or both (4a), and whether the analytic approach was quantitative, qualitative or mixed (4b). From 4a, it is clear that the majority of studies address teacher–student dialogue, uniquely or together with dialogue amongst students. Studies of teacher–student dialogue increased in frequency across the four decades, but the increase is very much in line with increases in the total number of studies. While research into student–student/s dialogue has also become more frequent over time, it accounts for an unusually high proportion of studies conducted between 1992 and 2001, where it was actually more prevalent than teacher–student research. Table 3 indicated a disproportionate emphasis on science between 1992 and 2001, raising the question of whether this was associated with the concurrent emphasis on student–student dialogue. Chi-square analysis across all teacher–student and student–student studies (i.e. all four decades, excluding studies that considered both forms of interaction) indicates that a student–student focus was more frequent with science than other areas of the curriculum, $\chi^2(1) = 8.82$, $p < 0.01$. Between 1992 and 2001, 19 of the 22 studies that took science as the curriculum context were concerned with dialogue amongst students, typically students working in small groups. It may be relevant that while group work has always been relatively prominent in science compared with other disciplines (Baines, Blatchford, & Kutnick, 2003), between 20 and 30 years ago it began to be regarded not merely as an inevitable by-product of equipment shortage but also as significant for student learning (Driver, Guesne, & Tiberghien, 1985; Howe, Tolmie, & Mackenzie, 1995).

It is clear from 4b that across the 40-year period, the number of studies that employed a quantitative approach (computation of the frequencies with which dialogue categories are used, perhaps involving inferential statistics) is fairly similar to the number using a qualitative approach (identification of themes, perhaps via formalized techniques such as 'grounded theory' and/or via specialized software such as NVivo). However, while quantitative studies were proportionately very frequent during the first 20 years, qualitative studies have dominated subsequently.

Table 4.   Data analysis.

	1972–1981	1982–1991	1992–2001	2002–2011	Total
(4a) Dialogue focus					
T–S	19	26	21	53	119
S–S	3	12	25	30	70
Both	2	4	8	22	36
Total	24	42	54	105	225
(4b) Analytic approach					
Qualitative	6	10	31	58	105
Quantitative	18	28	17	31	94
Mixed	0	4	6	14	24
Unclear	0	0	0	2	2
Total	24	42	54	105	225

Note: T–S = teacher–student; S–S = student–student(s). To be counted as 'mixed' in 4b rather than merely quantitative or qualitative, studies had to make extensive use of both approaches; it was not sufficient, for example, to use a few qualitative examples to clarify codes in largely quantitative analysis.

The number of studies that employed a mixed approach is roughly in line with the total number of studies within each decade. The high frequency of quantitative studies in the early period is not especially surprising: Table 3 showed field coding to be the predominant recording method during that period and ticked categories more-or-less force frequency-based approaches. In fact, all 44 studies that employed field coding used quantitative methods of analysis. However, even in the 1970s, field coding was being criticized (e.g. Delamont & Hamilton, 1976), and by the late 1980s the criticisms were becoming impossible to ignore (see, e.g., Edwards & Westgate, 1994, for a summary of key publications). The primary objections were that field coding isolates utterances from the broader context that affects their meaning and ignores their temporal sequence. This amounts to eliminating the dialogic component from the analysis of dialogue, a paradoxical situation to say the least. Moreover, while these limitations can be addressed to some extent when category usage is assessed from audio or video recordings and not in real-time, they cannot be eliminated entirely from the quantitative approach. Recognition of this about 20 years ago is undoubtedly a major reason for the recent popularity of qualitative analysis.

Nevertheless, despite their lack of subtlety, total dismissal of field coding or quantitative analysis is arguably ill advised. As evidenced through the extensive use of Brophy and Good's (1970) dyadic interaction system, coding schemes can be used reliably and repeatedly by different researchers, permitting comparison across a wide range of contexts. As regards quantitative analysis, research into children's peer relations (e.g. friendship, popularity) provides grounds for circumspection. This research began over a century ago and now amounts to many thousands of studies (see Howe, 2010 for details). Initially, peer relations were established through qualitative analysis of whom children work or play with, and how they interact. Around 70 years ago, a quantitative technique called 'socio-metrics' was introduced where (in its basic form) children make simple nominations of whom they like and dislike, and relations are established via frequency counts. For example, popularity within, say, a classroom is defined via the number of times each child is nominated as liked or disliked. Results obtained through socio-metrics have been found not only to correspond to results obtained from qualitative analysis, but also to predict key aspects of children's long-term development. In other words, a quantitative technique has been shown to perform as a reasonable proxy for the more nuanced picture that qualitative approaches reveal, including over predictive validity. Earlier, a predictive question about classroom dialogue was identified as focal, namely whether some modes of organization are more beneficial than others. Indeed the question was shown to follow naturally from key theoretical models. Noting this, we wondered whether the question had been addressed quantitatively prior to 1992 when such methods were ascendant, and if so whether the results were convincing. If not, had the qualitative methods favoured more recently provided satisfactory answers?

Characterizing dialogue

In fact, we quickly discovered that predictive questions have seldom been the critical issue: 158 (70%) of the 225 studies focus upon characterizing classroom dialogue as it typically occurs and not upon charting its implications. Key amongst these studies is the work of Sinclair and Coulthard (1975), which presents a three-step pattern as the paradigm participation structure. The pattern was characterized

Table 5.   Themes in research that characterizes dialogue.

Theme	1972–1981	1982–1991	1992–2001	2002–2011	Total
(5a) Patterns of dialogue					
Participation	3	3	8	24	38
Content	1	3	4	13	21
Total	4	6	12	37	59
(5b) Prediction of variability					
Student	12	25	18	12	67
Teacher	2	2	5	18	27
Other	3	1	3	5	12
Total	17	28	26	35	106

Note: Two studies in 5b looked at other characteristics as well as student characteristics, one looked at other characteristics as well as teacher characteristics, and four looked at teacher characteristics as well as student characteristics. Therefore the 99 studies are associated with 106 types of characteristic.

as initiation–response–feedback (IRF), with teachers taking primary responsibility for initiation (e.g. 'When was the Battle of Hastings?'), students providing responses (e.g. '1066'), and teachers following with feedback (e.g. 'Very good'). As shown in 5a of Table 5, 59 studies have been primarily concerned with describing dialogue patterns, and in every decade at least half of those studies focused on participation structures. Indeed, when participation was the focus, most studies either addressed IRF explicitly or considered initiation–response–evaluation (IRE), which when evaluation is a form of feedback is actually an IRF subtype (Berry & Kim, 2008; Bleicher, Tobin, & McRobbie, 2003; Casey, 2009; Chin, 2006; Culican, 2007; Cullen, 2002; Dombey, 2003; Eggleston, 1983; Greenleaf & Freedman, 1993; Mehan, 1979; Olitsky, 2007; Panagos, Griffith, & Ripich, 1985; Parker & Hurry, 2007; Pontefract & Hardman, 2005; Schwab, 2011; Sepeng, 2011; Skidmore & Murakami, 2010; Vadeboncoeur & Luke, 2004; Viiri & Saari, 2006). Although alternative participation frameworks feature (e.g. Mchoul, 1978; Sage, 1994; Stierer, 1995), IRF is the only participation structure to be addressed in more than one study. While its prevalence in the sample may partially reflect our decision, noted earlier, to use IRF and IRE as search terms, it is most likely mainly due to the fact that 'once seen, [IRF is] impossible to ignore in any observed classroom talk' (Edwards & Mercer, 1987, p. 9).

Patterns of dialogue

All of the studies concerned with IRF document its high visibility within classroom dialogue, and when 15 of the studies cited in the previous paragraph were published in the most recent decade, the structure has clearly endured long after Sinclair and Coulthard's initial identification. Moreover, many of the recent studies were conducted amongst communities where English is not the primary language, suggesting cross-cultural relevance in addition. On the other hand, the studies reviewed here do not present IRF as a monolithic structure. On the contrary, they document considerable variation in how each of the three steps is realized, and one recurring theme is the manner in which initiation and feedback strategies affect the harmonization of IRF with the broader discourse context. In particular, it has long been recognized that IRF can be extended into and/or co-exist with structures where competing responses are discussed before feedback is given (e.g. Bleicher et al.,

2003; Dombey, 2003; Eggleston, 1983; Olitsky, 2007; Sepeng, 2011; Skidmore & Murakami, 2010). Indeed, this is also implied in work that does not explicitly adopt the IRF framework. As noted earlier, two of the four categories employed by Scott and colleagues are consistent with the present concept of dialogue (Scott & Ametller, 2007; Scott et al., 2006). Of those categories 'authoritative interaction' (with its emphasis on the received voice) must encompass classic IRF. 'Dialogic interaction' is, on the other hand, explicitly conceptualized as considering several points of view. Interestingly, dialogic interaction depends not simply upon withholding feedback but also upon providing encouraging, non-evaluative feedback (e.g. Berry, 2006a; Chin, 2006; Delafield, 1999; McIntyre, Kyle, & Moore 2006; Olitsky, 2007). This implies that past histories of feedback are crucial to whether response discussion occurs.

The notion of response discussion within the IRF structure shifts the emphasis from exclusively teacher–student interaction to a modicum of interaction amongst students. However, student–student interaction could, in principle, be boosted still further via activities that do not involve teachers. Thus, a number of studies have examined the dialogue that occurs while students work collaboratively in small groups, reporting a richness of student contribution that is not apparent in teacher-fronted IRF (Bleicher et al., 2003; Danielwicz, Rogers, & Noblit, 1996; Kim, Anderson, Nguyen-Jahiel, & Archodidou, 2007; McIntyre et al., 2006; Olitsky, 2007; Roychoudhury & Roth, 1996; Rymes, 2003). The groups do not even have to be face-to-face: Kim et al. (2007) found that online discussion amongst students was peppered with the proposal, justification and reconciliation of competing perspectives. Yet using data collected with very large samples, Galton and colleagues show that group work is rare in classrooms (Galton, Hargreaves, Comber, Wall, & Pell, 1999; Galton, Simon, & Croll, 1980), and when it occurs is seldom structured to facilitate rich exchanges of opinion. Typically, tasks do not even require a group perspective, so social chitchat is as probable as serious task discussion. It is worth noting that Galton and colleagues are almost unique in using quantitative methods, so when they talk of 'rarity', they mean this literally. In fact, 52 of the 59 studies that describe patterns of dialogue were exclusively (48 studies) or primarily (four studies) qualitative.

While diagnosing participation structures has been the predominant concern across the 40-year period, the content of what is said has not been forgotten. Thirty-six per cent of the studies presented in 5a of Table 5 are concerned with content, with three themes attracting the lion's share of research. The first is the representation (and, by implication, influence) of background cultural experiences (Black, 2007; Cubero & Ignacio, 2011; Doecke, Gill, Illesca, & Van de Ven, 2009; Kurth, Anderson, & Palincsar, 2002; Lee, 2006; Mills, 2007; Pastour, 2004), with an emphasis upon matches and mismatches between teachers and students or amongst groups of students. The second is the representation of preconceptions about the topic, how these inter-mingle with each other and/or the target knowledge (Edwards, 2009; Edwards & Mercer, 1987; Finkel, 1996; Mortimer & Machado, 2000; Palincsar, Anderson, & David, 1993; Tao, 2001). Finally, a small number of recent studies have considered how previous or anticipated dialogue exerts an influence on current practice (Åberg, Mäkitalo, & Säljö, 2010; Aguiar, Mortimer, & Scott, 2010; Maher, 2009; Mercer, Hennessy, & Warwick, 2010). For instance, åberg et al. show how students' small-group discussion of environmental issues was constrained by anticipated feedback sessions with the whole class; Mercer

et al. report how teachers use interactive whiteboards to log ideas so they can be consolidated subsequently.

Prediction of variability

Thanks to research like that summarized above, variation in patterns of dialogue is widely recognized. Thus it is unsurprising to find a sizeable body of research within our sample (99 studies – see 5b in Table 5) charting the factors that predict this variability. Of the studies, 71 employ an exclusively quantitative approach, mapping variations in characteristics of interest against variations in dialogue category frequencies, and 14 employ an approach that is primarily quantitative. In 68% of the 99 studies, the selected characteristics relate to students, perhaps as a legacy of the IRF focus, for the paradigm case (e.g. 'When was the Battle of Hastings?', etc.) allows few possibilities for variation apart from which student/s respond. From Table 6, it is clear that gender has been the predominant student characteristic in every decade, but attainment and ethnicity have also been extensively studied. In

Table 6.   Specific predictors of variability.

Focus		1972–1981	1982–1991	1992–2001	2002–2011	Total
Student						
	Attainment	4	6	4	3	17
	Age	2	0	0	1	3
	CCapital	0	0	0	1	1
	Ethnicity	2	6	5	3	16
	Gender	7	19	15	4	45
	IT expertise	0	1	0	0	1
	Personality	0	1	1	0	2
	Physique	1	0	0	0	1
	LD	2	1	1	2	6
	Sub-total	18	34	26	14	92
Teacher						
	Age	1	0	0	0	1
	Expectation	0	0	1	1	2
	Experience	0	0	1	2	3
	Gender	1	1	0	0	2
	Pedagogy	1	1	4	17	23
	Personality	1	0	0	0	1
	Sub-total	4	2	6	20	32
Other						
	Class size	1	0	0	0	1
	Group size	0	0	0	1	1
	Resources	0	0	2	0	2
	Curriculum	1	0	1	1	3
	School type	0	0	0	1	1
	Seating	2	1	0	0	3
	Time	1	0	0	2	3
	Culture	0	0	1	1	2
	Sub-total	5	1	4	6	16
Total		27	37	36	40	140

Note: CCapital = cultural capital; LD = sample had recorded disabilities, i.e. not merely (or necessarily) low attainment; Curriculum = school subject; School type = private versus public; Time = comparison across two or more time intervals. Many of the 99 studies examined multiple characteristics, so the overall total is 140.

fact, research into other student characteristics is so rare that drawing conclusions from its findings would be hazardous. It is sufficient perhaps to make two points. First, while the three relevant studies report increasing interactivity with age (Friedman, 1973; Maroni, Gnisi, & Pontecorvo, 2008; Mills, Rice, Berliner, & Rousseau, 1980), they do not suggest marked age differences in the form that dialogue takes or in who typically contributes. Thus, when the focus is upon patterns, it is not necessarily a serious problem that most research samples across narrow age ranges (see Table 2). Second, while the paucity of research addressing cultural capital may seem surprising, social class differences (the fore-runner of the capital construct) were extensively explored during the 1960s (Bernstein, 1973; Giglioli, 1972; Williams, 1970). Even though the focus was talk in general rather than dialogue, the topic may have been regarded as exhausted by 1972.

Gender

The first author reviewed early literature on gender and classroom dialogue for a previous publication (Howe, 1997). Recent research does little to change the general conclusion drawn in that review, namely that on average boys play more focal roles than girls. For instance, studies published after 1997 continue to show boys are more likely than girls: (1) to respond to teachers' initiations (Altermatt, Jovanovic, & Perry, 1998; Duffy, Warren, & Walsh, 2001; Jule, 2002; Younger, Warrington, & Williams, 1999); (2) to receive feedback from teachers (Duffy et al., 2001; Rampton, 2006; Younger et al., 1999), especially negative feedback but occasionally positive too. Equally, subsequent research endorses Howe's (1997) claim that gender disparities result from a mixture of self-selection (e.g. boys calling out proportionately more often than girls without being explicitly invited) and teacher-selection (e.g. boys being chosen proportionately more often from students with their hands up). Burns and Myhill (2004) report that in terms of absolute frequency, girls were more likely than boys to put their hands up. However, there were no gender differences in the absolute frequency of 'answering after invitation', showing once more a proportional bias towards male contribution.

Since 1997, there has been relatively little research into gender differences in student–student interaction. Thus it is unclear whether a second strand in Howe (1997) also remains valid, that girls contribute actively to male dominance. Research such as Lee (1993), Lindow, Wilkinson, and Peterson (1985), Siann, McLeod, Glissov, and Durndell (1990) and Webb (1984a) indicated that girls not only ask for help more than boys, like boys they also typically direct their requests to boys. However, there was also evidence in early research for boys being more likely than girls to ignore requests for help (Conwell, Griffin, & Algozzine, 1993; Lee, 1993; Webb, 1984a), so paradoxically it is girls rather than boys who were most likely to provide assistance. Recent work also provides evidence for relatively high levels of help-seeking and help-providing amongst girls (Younger et al., 1999), but without information about who was addressed, the evidence is hard to interpret.

Attainment and ethnicity

A recurring theme throughout the 40-year period is that the predominance of boys does not result from behaviour that is consistent across all class members. Rather, it stems from the extreme talkativeness of a subgroup (see, e.g., Jones & Gerig, 1994;

Martin, 1972; Rampton, 2006). Thus, a key concern has been identifying the student characteristics that *together with gender* predict contribution to classroom dialogue. This is why, when attainment and ethnicity have been explored, it is typically in conjunction with gender and not alone: 11 of the 17 studies concerned with attainment also address gender, as do 12 of the 16 studies concerned with ethnicity. As noted in Table 6, studies whose focus is recorded learning disabilities have been excluded from the attainment category, but otherwise attainment has been conceptualized in a broad fashion, encompassing studies that differentiate via general ability or via subject-specific performance. Yet no matter how attainment is construed, there is a strong sense of positive correlation with classroom participation. High attainers have been found to contribute disproportionately often to whole-class dialogue, through their own initiations and their responses to teachers (Burns & Myhill, 2004; Daly, Kreiser, & Roghaar, 1994; Eder, 1981; Fiedler, 1975; Good, Cooper, & Blakely, 1980; Good, Sikes, & Brophy, 1973; Good, Slavings, Harel, & Emerson, 1987; Nystrand, Wu, Gamoran, Zeiser, & Long, 2003; Tobin & Malone, 1989). No doubt partly as a consequence of heavy participation, high attainers also receive more feedback from teachers (Buriel, 1983; Good et al., 1973, 1980). At the same time, high attainers are more likely than other students to demonstrate how to solve problems during small-group interaction and to produce solutions that the group eventually accepts (Lindow et al., 1985; Webb, 1982a).

Given the parallels with what has emerged about gender, it is unsurprising that many studies identify high-attaining boys as the prominent group in classrooms. However, in doing this, key differences can be overlooked. First, while teacher feedback in general appears to be more frequently directed at boys than girls, the contrast, as noted, is especially pronounced for negative feedback. On the other hand, it is positive feedback from teachers (e.g. praise) that is disproportionately directed towards high attainers (Good et al., 1973, 1980; Mariage, 1995). If anything (and surely unsurprisingly), negative feedback is more frequently observed with low attainers. Second, while gender is a dichotomous variable, attainment is continuous. Moreover, even though many studies transform into categories (typically high, medium and low attainment), the possible combinations for student group work are clearly more numerous than for gender (even for pairs, let alone larger groups). Thus, while research into gender differences during group work has identified two dimensions of indisputable relevance to dialogue (same versus mixed gender, balanced versus unbalanced mixture – see Howe, 1997), research into attainment has had less success (Bennett & Cass, 1988; Schmitz & Winskel, 2008; Webb, 1982a). It remains unclear how attainment composition affects classroom dialogue.

Considered in the abstract, ethnicity is conceptually even more complex than attainment, with potentially enormous numbers of groups. In practice, most studies have focused on a relatively small selection of possibilities, often (although not exclusively) African- and European-Americans. In an earlier review (albeit based on fewer studies than at present), Tenenbaum and Ruck (2007) conclude that there is strong evidence for teachers addressing more positive/neutral remarks to European-American students than to students from minority ethnic backgrounds, but no evidence for differences over negative remarks. Yet amongst the studies represented in Table 6, only Buriel (1983) and Casteel (1998) confirm Tenenbaum and Ruck's claims as regards positive/neutral remarks; Cornbleth and Korth (1980) report no differences as a function of ethnicity, and Hillman and Davenport (1978) and Simpson

and Erickson (1983) report African-American students receiving proportionately more positive/neutral remarks than European-American. Actually the evidence is more consistent as regards teachers' negative remarks, but in contrast to Tenenbaum and Ruck the pointers are to greater frequency towards minority ethnic students (Hillman & Davenport, 1978; Irvine, 1985, 1986; Simpson & Erickson, 1983; Tennant, 2004).

At first sight, the picture seems clearer as regards overall participation, with many studies indicating minority ethnic students participating relatively infrequently and/or feeling less comfortable when they do participate (see Biggs & Edwards, 1991; Conwell et al., 1993; Daly et al., 1994; Dunkin & Doenau, 1982; Shachar & Sharan, 1994). The studies cover both whole-class and small-group interaction. Yet other studies indicate no substantial differences across ethnic groups (Cornbleth & Korth, 1980; Jones & Gerig, 1994; Nystrand et al., 2003). Moreover, Tennant (2004) indicates that results may vary depending on which ethnic groups are studied. Observing in English classrooms, Tennant finds African-Caribbean and white students both engaging in more interaction with teachers than Asian students. The difference between the African-Caribbean and Asian students arises because the former are subject to higher levels of disciplinary action. The difference between the white and Asian students is because the former are more likely to be the recipients of remarks concerned with educational content.

Pedagogic style

In general, research concerned with student gender, attainment and ethnicity has focused upon which students respond to teachers and what form of feedback they receive. Moreover, these two themes recur with most of the other factors listed in Table 6, the only difference being that when examination of each factor has typically been restricted to a handful of studies, interpretation can sometimes prove difficult. For example, while Brooks, Silvern, and Wilson (1978) and Reid (1980) found that students seated near to the teacher receive more teacher feedback than students seated at a distance, Jones (1990) detected no effects of proximity. However, there is one factor amongst the list in Table 6 that has not only been extensively explored (especially since 2002), but has also been approached in a rather different fashion. This is teachers' pedagogic style, for here 23 studies have been identified and the emphasis of these studies is the balance between student and teacher participation and not asymmetries in student responding. Balance is typically interpreted in terms of the encouragement students are given to make extended rather than brief responses to teacher initiations, to supplement responses with underlying reasoning, and to discuss other students' contributions rather than rely upon teacher feedback.

Probably the best way to characterize the studies into teacher pedagogy is via the emphasis they place upon direct encouragement for target practices as opposed to provision of activities that are expected to draw the practices out. Direct approaches include demonstrating to teachers, e.g. via videotapes, and encouraging them to work with students to derive dialogic ground rules (e.g. 'we share our ideas and listen to each other', 'we give reasons to explain our ideas'), which are then written out and posted in classrooms. Activity-based approaches range from specific tasks (usually selected to be challenging and open-ended) to broad programmes (e.g. Philosophy for Children, Lipman & Sharp, 1978). Group work has often been

incorporated given its potential, noted earlier, for rich student contribution. While most studies use both approaches, work that places relatively heavy emphasis upon direct methods includes Brown and Kennedy (2011), Dawes, English, Holmwood, Giles, and Mercer (2005), Fernandez, Wegerif, Mercer, and Rojas-Drummond (2001), Littleton et al., (2005) and Zohar and Nemet (2002). Work that is relatively activity-based includes Blatchford, Baines, Rubie-Davies, Bassett, and Chowne (2006), Christie, Tolmie, Thurston, Howe, and Topping (2009), Erdogan and Campbell (2008), Galton, Hargreaves, and Pell (2009), Gillies and Khan (2009), Kutnick, Ota, and Berdondini (2008), Moore (2011), Osborne, Erduran, and Simon (2004), Richter and Tjosvold (1980), Topping and Trickey (2007) and Wells and Arauz (2006). Based on controlled comparison with students taught through established pedagogies, all studies report enhanced use of the target dialogue. There is no discernible difference in efficacy as a function of approach, but equally the two approaches do not appear to have been directly compared.

Evaluating dialogue

While the focus of the studies discussed in the previous section is description, many also have an evaluative flavour. There is little doubt that many authors regret the fact that classroom dialogue is dominated by subgroups of students (partially predictable from gender, attainment and ethnicity), and feel that in an ideal world contributions should be equalized across the student body. Similarly, redressing the balance away from teachers towards students is often a scarcely disguised value. Evaluative references are unsurprising when, as noted already, the field is founded on the belief that some modes of organizing classroom dialogue are more beneficial than others. What is perhaps more surprising is that very few of the reports reviewed above refer explicitly to conceptions of good practice, against which their findings are assessed. The failure to do this would not matter if relative effectiveness was obvious, but this is not the case. Take gender, for example. Here broad attainment trends in many Western countries have changed over the past 40 years from higher average performance in boys to comparable (or sometimes higher) average performance in girls, yet as noted gender differences in classroom dialogue have remained fairly stable. This does not necessarily mean that classroom dialogue is irrelevant to attainment. It is possible, for instance, that dialogic experiences do indeed advantage boys and disadvantage girls, but over the years boys have become less inclined to consolidate their advantage and girls have become more adept at compensating. However, it does mean that the case for relevance has to be made.

Model-based assessment

The remaining 67 studies in our sample are more explicitly evaluative with Table 7 dividing them into two groups. The first group (termed 'model-based assessment')

Table 7.   Themes in research that evaluates dialogue.

Theme	1972–1981	1982–1991	1992–2001	2002–2011	Total
Model-based	2	2	8	18	30
Target-based	4	7	12	14	37
Total	6	9	20	32	67

uses background theory to derive models of good practice, and assesses observed dialogue against the models. Thus if, for example, the model prioritizes discussion of contrasting viewpoints, dialogue is rated highly to the extent that such discussion occurs. Models frequently underpin studies in the second group too, but this time not as yardsticks for evaluation. Rather, with this group (termed 'target-based assessment'), the evaluation criteria relate to achievement of curriculum targets, not consistency with models. Thus here, there might be interest in whether contrasting viewpoints are associated with superior mastery of some aspect of class-work, or whether, more simply, mastery of class-work is revealed in whatever dialogue occurs. Table 7 shows that most evaluative studies have been conducted since 1992, with the frequency of model-based studies increasing over the past 20 years and the frequency of target-based studies remaining static. Discussion of contrasting viewpoints turns out to be the focus in 14 of the 30 model-based studies, and of the theorists who pinpoint this form of dialogue, Piaget is the one that most early publications align with (e.g. Barnes & Todd, 1977; Wood, 1999; Yackel, Cobb, & Wood, 1991). For Piaget (e.g. 1932), the specific requirement is that competing positions are expressed and justified in response to disagreement, and resolution of differences is achieved through evaluation of justifications, and (with explicit acknowledgement of Piaget's research) Barnes and Todd distil this requirement into what they label 'exploratory talk'. Developed subsequently by Mercer and colleagues (see, e.g., Mercer & Littleton, 2007), the concept of exploratory talk informs many of the more recent studies (e.g. Fisher, 1993; Pierce & Gillies, 2008; Rojas-Drummond, Albarrán, & Littleton, 2008; Weber, 2008), even though the emphasis of these studies is often decidedly non-Piagetian.

A recurring theme is that teachers find it extremely difficult to promote exploratory talk in classrooms. The explanation that is most commonly advanced lies with tension between providing students with the freedom to explore each others' views and maintaining sufficient control to deliver curriculum goals (Brown & Hirst, 2007; Buzelli & Johnston, 2001; Emanuelsson & Sahlström, 2008; Jones & Tanner, 2002). One specific challenge is identifying the correct moment and/or the correct strategy for introducing target knowledge (Franke, Webb, & Chan, 2009; Wood, 1999; Yackel et al., 1991), i.e. for taking students beyond what they could achieve without expert input. This requires careful monitoring of what students say, another challenge for teachers unless they record contributions on, e.g., whiteboards or flipcharts (Pierce & Gillies, 2008 – but see also Mercer et al., 2010, as discussed earlier). A subtly different source of tension is identified in Davy and Brown (2007), namely between the need to construct the whole class as an interacting community to ensure that critique is supportive and the need to split the community into small groups to maximize exchanges amongst students. At the same time, students also experience difficulties with exploratory talk, especially the requirement to challenge each other's ideas (Fuentes & Hernández, 2011; Pierce & Gillies, 2008; Weber, 2008). More generally, students do not necessarily regard dialogue as a vehicle for learning, perhaps even viewing it as a distraction from the main business of classrooms (Fisher & Larkin, 2008; Pratt, 2006; Rop, 2003).

A further difficulty, identified in Wiltse (2006), is lack of integration between the research tradition underpinning exploratory talk and a tradition that promotes a form of dialogue commonly referred to as 'scaffolding'. The tradition is often associated with Vygotsky, despite the ambiguities, noted already, over Vygotsky's own perspective on dialogue. Scaffolding is usually characterized as calibrated guidance towards

target understanding, allowing students to reshape their understanding gradually in response to questions and suggestions from expert partners. Guidance can come from computers or more able peers, but there is also an obvious role for teachers. Thus, teachers' facility with scaffolding has been assessed (Ang, 2006; Franke et al., 2009; Hacker & Tenent, 2002; Jarvela, 1996; Jones & Tanner, 2002; Mercer & Fisher, 1993; Palincsar, 1986), sometimes after training in the technique and sometimes in the normal course of events. Without exception, poor approximation to scaffolding is reported, together with considerable variation over what happens instead. One specific challenge that Palincsar (1986) identifies is getting hold of students' ideas in sufficient depth to permit appropriate feedback. However, the lack of integration that Wiltse (2006) highlights signals a more profound difficulty: there is nothing to guide teachers over the optimal balance between scaffolding and exploratory talk or, given their differences and partial incompatibility, how the two forms should be brought together. Practitioner manuals typically fudge the issue: Johnson and Johnson (1999, 2000), for instance, discuss 'promotive interaction' in publications aimed at teachers (a concept represented in our search terms), and this concept encompasses both exploratory talk and scaffolding.

Target-based assessment

Wiltse's concerns about exploratory talk and scaffolding also highlight the major limitation associated with model-based assessment: it can be used to check compliance with established models, but it cannot be used to establish models over alternatives. In other words, model-based assessment cannot be used to assert the superiority of exploratory talk over classic IRF, nor can it be used to ascertain how scaffolding fits into the picture. In principle, this limitation can be addressed through target-based assessment (since criteria are used which are independent of the models and do not presuppose their truth). However, amongst the 37 studies classified in this group, only 15 were concerned with evaluating the consequences of dialogue (and even fewer with underlying models). Of the 15 studies, three related student mastery of curriculum targets to naturally occurring variations in dialogue, while 12 related mastery to variations that were created through controlled intervention. In most cases, intervention involved strategies described earlier in the context of teacher pedagogy, and indeed two studies (Dawes, 2004; Mercer, Wegerif, & Dawes, 1999) are extensions of work cited above. Two of the 15 studies were conducted between 1972 and 1981, five between 1982 and 1991, two between 1992 and 2001, and six between 2002 and 2011. While 12 studies focused upon mastery of curriculum content, two addressed student social relations (Luckner & Pianta, 2011; Tolmie et al., 2010) and one was concerned with communicative competence (Cheshire & Jenkins, 1991). The latter study is particularly interesting in that it involved teachers observing small-group discussions and then grading student contributions as if they were doing this for a public examination. The content of what the students said proved to be the main determinant of grades, with relatively little attention paid to skill (through back-channel, questions, etc.) in keeping the conversation going.

Of the 12 studies concerned with curriculum content, nine focus on the consequences of small-group dialogue (Dawes, 2004; Howe et al., 2007; Mercer et al., 1999; Peterson, Johnson, & Johnson, 1991; Rivard & Shaw, 2000; Webb, 1982a, 1982b, 1984a; Wegerif, Linares, Rojas-Drummond, Mercer, & Velez, 2005). The

most striking finding is that when such dialogue involves exchanges of views, all students typically benefit; when the dialogue involves scaffolding, the students providing the scaffolding typically benefit but not consistently the recipients. This said, it may be even worse to invite scaffolding and not receive this: the three studies reported in Webb (1982a, 1982b, 1984a) indicate that requesting but not receiving explanations is a significant handicap for students who make the requests. The emphasis of the remaining three studies is whole-class dialogue, and here there is no clear message. Nevertheless, given the emphasis on student responses and teacher feedback in research discussed earlier, it is noteworthy that: (1) Hughes (1973) finds no relation between the frequency with which students respond and the amount they learn, but a positive association between favourable feedback from teachers and student learning; (2) while Firestone and Brody (1975) do not examine student responses, they find that positive and negative feedback from teachers are both negatively associated with student learning.

The 22 target-based studies that are not concerned with the effectiveness of dialogue use dialogue to make assessments of student competencies, either student knowledge (17 studies) or student social relations (five studies). Consistent perhaps with the emphasis on participation that emerged in the previous section, it is social relations along the dominance–submission axis that are the primary concern of the latter five studies (Cazden, Cox, Dickinson, Steinberg, & Stone, 1979; Cornelius & Herrenkohl, 2004; Hogan, 1999a; Toohey, Waterstone, & Jule-Lemke, 2000; Wilkinson, Treagust, Leggett, & Glasson, 1988). Relations that are defined predominantly via liking and disliking, e.g. friendship, enmity, are tangential. Strikingly, the 22 student-competence investigations are heavily science-focused: 14 of the studies concerned with knowledge took place in science classrooms as did three of the studies concerned with relations. As regards science knowledge, five studies focus on conceptual content (Ash, 2008; Gilbert & Pope, 1986; Jiménez-Aleixandre & Pereiro-Munoz, 2002; Meyer & Woodruff, 1997; Nussbaum & Novick, 1981), particularly the match or mismatch between the notions students call upon when explaining physical phenomena and curriculum targets. Apart from being explicitly evaluative, these studies are relatable to investigations identified earlier as concerned with the representation of preconceptions. The work of Ash (2008) around small-group discussion of endangered species is especially interesting, for it demonstrates how students use scientific terms before these are fully understood as well as (sometimes) disguising good understanding in everyday terms. Moreover, it suggests that use of scientific terms during discussion can facilitate alignment with target knowledge. Herrenkohl, Palincsar, DeWater, and Kawasaki (1999), Hogan (1999b), Jiménez-Aleixandre, Rodriguez, and Duschl (2000), Keys (1997), Richmond and Striley (1996) and Tao (2003), by contrast, focus on the epistemological status of science knowledge. Focal questions relate to what dialogue reveals about students' grasp that concepts are theories, theories are provisional, and data are relevant to theory evaluation. Barriers to good experimental design are explored in Richmond and Striley (1996) and Sprod (1997).

Only one of the 22 studies (Jenkins & Lyle, 2010) is accompanied with an explanation of why dialogic assessment was used in preference to, say, individual tests. As regards the remainder, the most likely reasons are aspirations to highlight what teachers might usefully monitor when lessons are in progress, and/or commitment to assessment using qualitative means. Certainly, most of the studies are wholly (15 studies) or mainly (five studies) qualitative. Yet there is no sign of

dialogically based assessment of curriculum mastery being related to previous dia-
logic practices to assess the latter's effectiveness. On the contrary, the 22 studies
currently being considered are entirely divorced from the 15 target-based studies
discussed at the start of this section that were indeed concerned with dialogic
effectiveness. Importantly, with one small-scale exception, the 15 studies were
quantitative: they counted the frequency with which dialogue categories were used,
and related frequencies to individual performance on subsequent tests.

Conclusions

Earlier, we posed a series of questions about research into classroom dialogue since
1972, specifically what is known about how dialogue is organized, whether some
modes of organization are more beneficial than others, whether clarification has
proved straightforward or challenging, and what should be the focus of future
research. The 158 studies presented as 'characterizing dialogue' are most relevant
to the first question, and at least as regards the English-speaking countries that have
dominated the research, they provide a reasonably conclusive answer. Classroom
dialogue revolves around teacher–student IRF, which is embellished in varying
ways and to varying degrees through student–student interaction. Teacher pedagogic
style is a major factor in determining the extent of embellishment, but small-group
activities can also play a role. In any event, student participation is not equally
distributed around the classroom, but heavily dependent on such factors as gender,
ethnicity and history of attainment. Looking at the dates when the relevant studies
were published, it is likely that much the same conclusion would have been reached
about the basic patterns had our review taken place 20 years earlier, and it is of
course interesting to see that so little has changed. It is also re-assuring to find
results replicated. However, given an essentially static situation over 40 years, the
accelerating volume of research documented in the upper half (5a) of Table 5 must
be queried. Occasional revisiting may be justified to check whether the picture
requires modification, but arguably the characterization of dialogic patterns should
not be accorded high priority when it comes to future research.

Equivalent conclusions may perhaps be warranted about gender, attainment and
ethnicity as predictor variables, i.e. occasional checks but no need to prioritize. How-
ever, Table 6 lists a large number of additional factors, none of which have been
extensively explored. A case could be made for examining some of these factors in
greater depth. One such factor is curriculum context: its influence is addressed in
only three of the studies listed in Table 6, and as noted in the discussion around
Table 3, it is frequently not even reported. Yet our review indicates that: (1) science
has featured disproportionately in studies of small-group dialogue; (2) small-group
dialogue is particularly conducive to discussion of competing positions. Without
further information about curricular effects, it is unclear how much opinion exchange
is supported through group work and how much it stems from traditions in science.
A second factor that might benefit from more extensive exploration is culture. Two
studies are listed in Table 6 (Alexander, 2000; Clarke, Xu, & Wan, 2010), which
document and interpret cross-cultural variation in classroom dialogue. Both studies
are monumental enterprises, with interesting and significant results. Nevertheless,
there is little integration with the single study listed in Table 6 that is concerned with
cultural capital, the seven studies listed in Table 5 that address representations of
cultural experiences and, for that matter, the studies that focus on ethnicity. A more

coordinated approach might prove productive, not least to establish how culture should be conceptualized as a potential influence on dialogue.

Yet while desirable in principle, research into under-explored factors should arguably also not be prioritized at this point in time. Such research would be most productive with an unassailable model of optimal practice, for then the work could be framed in terms of which factors influence approximation to the model. In other words, further work on our first question should await a satisfactory answer to our second question, i.e. whether some modes of dialogic organization are more beneficial than others. This is perhaps particularly the case when the answer may itself be culturally relative. In fact, as will be clear from, for instance, the discussion of exploratory talk and scaffolding, satisfactory resolution has yet to be reached, even in English-speaking countries. While 67 explicitly evaluative studies were identified, the majority either engaged in model-based assessment (which presupposes rather than establishes models) or assessed student competencies (which by-passes issues around modelling). Our review shows that model-based assessment has actually become more popular in the recent past. Only 15 studies attempted to evaluate dialogic practices in a target-based fashion, and most of these focused upon small-group interaction amongst students. The studies are reasonably consistent in their endorsement of group dialogue where competing positions are articulated and justified, and hence in their confirmation of the underpinning tradition that dates back to classical Greece. However, the studies have little to say about whole-class interaction, and therefore how this can be yoked with small-group dialogue for maximal benefit. Yet the whole-class context is the one where issues of balance amongst discussion of competing positions, scaffolding and indeed IRF are likely to be most pertinent, and where, as is clear from many studies discussed above, teachers experience uncertainties and confusion. Thus, while it may be reasonable to infer that if dialogic practices matter in small-group contexts they are also likely to matter in whole-class settings, the manner in which they matter is currently unresolved.

In our view, the lack of progress stems partly from dilemmas around qualitative versus quantitative approaches to analysis. As noted, the qualitative approach is relatively responsive to subtleties of dialogue, and the approach is compatible with model-based assessment and assessment of competencies. In fact, mirroring the situation with the latter discussed already, all of the model-based studies considered here were qualitative. By contrast, target-based assessment of dialogic practices through qualitative means is exceedingly difficult, requiring extended series of dialogues together with features in later dialogues that demonstrate the influence of earlier dialogues upon current functioning, primarily such references back as 'I know how to do it. We talked about it yesterday, and we learned…' Even then, it would be challenging to produce data that: (1) demonstrate general mastery as opposed to completion of specific tasks; (2) allow the model under scrutiny to be compared with alternatives. If the qualitative studies reviewed here are representative, there has been no convincing response to the challenge in 40 years. In principle, the problems can be overcome using quantitative means, for there are powerful and relatively straightforward techniques for relating quantitatively analysed dialogue (representing any number of models) to measures of student performance. Examples include correlation, regression, path analysis and structural equation modelling. All 12 of the target-based studies concerned with curriculum content employed one or more of these techniques. However, there is, as noted, widespread unease about quantitative analysis in relation to dialogue.

The dilemma will never be resolved *a priori*, so perhaps it is time to take risks and follow the precedents of research discussed earlier concerned with peer relations. In other words, perhaps quantitative methods should now be employed to examine whether some modes of dialogic organization are more beneficial than others, in the knowledge that: (1) there is little alternative; (2) until the research is complete, it will be unclear whether quantification is a useful proxy or whether the simplification it entails is crippling. What is clear is that if the approach does prove useful (and of course every precaution should be taken with recording and analysis to promote this), the results would not simply clarify relative benefits but also indicate the magnitude of any effects. This is important, for if some modes of dialogic organization do turn out to be more beneficial than others, it becomes critical to establish whether these benefits are sufficiently large to warrant directives for practice. Would teachers, for instance, really wish to combat what is clearly a strong imperative towards IRF for modest improvements? Finally, with greater certainty about what good dialogic practice actually means, model-based studies that assess efficacy of implementation would be entirely justified, suggesting perhaps enhanced significance for the 30 examples reviewed here. Moreover (and somewhat paradoxically since its warrant would be grounded in quantitative research), the qualitative approach that model-based assessment characteristically employs would have a key role to play.

Note

1. In a rather paradoxical fashion, our confidence over representativeness has been boosted through the enormously helpful comments we received on this manuscript from two anonymous reviewers. Like (we predict) many readers, the reviewers identified research (even areas of research) that we might possibly have overlooked. We checked our records, finding that in every case the work in question had been identified and was therefore incorporated within the initial set of 1532 publications. In many cases, the work was then excluded for failure to comply with one or more of the assessment criteria. In some cases though, it survived assessment, and is actually included in the final sample. Most likely we referenced the research against a different source from the one that the reviewers were using and/or did not cite the research explicitly in the text. (About 20% of the asterisked items listed in the References are not cited, usually because their topic was not developed in depth, e.g. as with some of the infrequently explored 'predictors of variability' listed in Table 6).

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