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The role of exploratory talk in classroom search engine tasks

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1 **The role of exploratory talk in classroom search engine tasks**

2 Simon Knight* & Neil Mercer

3 *Faculty of Education, University of Cambridge, Hills Road, Cambridge, CB2 8PQ*

4 Corresponding Author: Email sjgknight@gmail.com

5 Simon Knight undertook this research as part of his MPhil in the Faculty of Education,
6 under the supervision of the second author. At the time of writing he was a Teaching
7 Associate in the Faculty, and a PhD Student at the Open University's Knowledge Media
8 Institute. He completed his PGCE in Social Sciences and Masters in the Philosophy of
9 Education at the Institute of Education, London. Following teaching (mostly a-level
10 philosophy and psychology) in a school south of Cambridge he returned to academia.
11 His research focuses on the implications of technologies – particularly search engines –
12 for how: individuals manage information; educators assess knowledge; and more
13 broadly how we conceptualise knowledge and understanding. He is particularly
14 interested in applying a sociocultural, and philosophical approach to these issues.
15
16 Neil Mercer, Professor of Education at the University of Cambridge, is a psychologist
17 with particular interests in the development of children's language and reasoning,
18 teachers' use of talk and the use of ICT in the classroom. With Lyn Dawes and Rupert
19 Wegerif, he developed the *Thinking Together* approach to talk for learning. His most
20 recent book is I*nterthinking: putting talk to work* (with Karen Littleton).
21

1 **The role of exploratory talk in classroom search engine tasks**

2 While search engines are commonly used by children to find information, and in

3 classroom based activities, children are not adept in their information seeking or

4 evaluation of information sources. Prior work has explored such activities in

5 isolated, individual contexts, failing to account for the collaborative, discourse-

6 mediated nature of search engine use which is common in classroom contexts.

7 This small-scale study explored the established 'typology of talk', particularly

8 'exploratory talk', in a classroom search context. We found that the most

9 successful pupils were those who engaged in the most exploratory talk. This

10 finding has practical classroom implications: the collaborative nature of search

11 and potential of collaboration and discourse should be exploited in search-based

12 tasks. This study also indicates a rich area for future research.

13 Keywords: dialogue; ICT pedagogy; search engines;

14

15 **Introduction**

16 The days of being able to direct students to a particular pre-moderated textbook and

17 sections in it, are largely over; both teachers and students expect to be able to find and

18 use information online. However, evidence suggests that, despite their familiarity with

19 the medium, young people commonly experience problems when searching for

20 information online. Our suggestion is that enabling students to engage in high quality

21 collaborative discussion would improve the success of their information seeking.

22 In this paper, we first consider this issue of information seeking (IS) by young people.

23 We then refer to research on collaborative dialogue before highlighting some research

24 showing that collaborative IS is a quite common – yet understudied – phenomenon. In

25 particular we note that where research has been conducted on collaborative IS, it has

26 tended to ignore the discourse in which, and through which, IS tasks are navigated and

27 co-constructed. In the final section of this introduction, we propose the exploration of

28 some properties of this collaborative discourse, which we then pursue in this paper. The

29 rest of the paper reports a small-scale study which explores the collaborative discourse

30 in one classroom, when students were pursuing a series of IS tasks.

31 *Children's search behaviours*

32 Although search engines are commonly used by young children and teenagers, many

33 report some issues with finding information (Livingstone, Bober, & Helsper, 2005;

1   Walraven, Brand-Gruwel, & Boshuizen, 2008; Williams & Rowlands, 2007). While

2   most children use the internet, younger children rate their information-seeking abilities

3   significantly lower than older students (Eynon, 2009). Similarly, although adults use

4   search more than browsing, (OxIS, 2007) research suggests that children are more likely

5   to try to retrieve information by browsing within specific pages than searching more

6   widely (Bilal, 2001). A recent review (Bartlett & Miller, 2011) paints a bleak picture,

7   indicating that a quarter of 12-15 year olds make no checks at all, that they tend to

8   emphasise aesthetics over quality, and that they take the inclusion of websites on search

9   engine results to be an indicator of their veracity. Worryingly, two thirds of 9-19 year

10   olds also claimed to have never been taught how to judge the reliability of the

11   information they find, while over half of teachers were concerned that their students did

12   not understand how to conduct searches. Despite these concerns, almost all teachers

13   thought digital skills were important, and indeed most thought the internet was an

14   important research tool (Bartlett & Miller, 2011).

15   *The importance of Collaboration*

16   Evidence indicates that collaboration and high quality discourse are strongly related to

17   positive educational outcomes – but only if they are mediated by the kind of reasoned

18   discussion which is known as Exploratory Talk (Mercer & Littleton, 2007; see also the

19   collection edited by Littleton and Howe (2010)). Encouraging children to use that kind

20   of talk when working with others, as in the Thinking Together interventional research

21   (Dawes, Mercer, & Wegerif, 2004) has been shown to stimulate subject learning and

22   general reasoning skills (Mercer, Dawes, Wegerif, & Sams, 2004; Mercer, Wegerif, &

23   Dawes, 1999; Mercer & Sams, 2006; Rojas-Drummond, Littleton, Hernández, &

24   Zúñiga, 2010). However, some concern has been raised that particularly in computer

25   based tasks, the shared nature of the resource – particularly the screen – may reduce the

26   need for children to talk and articulate their knowledge explicitly indicating the need for

27   task-based studies which explore the ways that discourse are used (Clark & Brennan,

28   1991; Pickering & Garrod, 2004). There thus seems to be a need for children to be

29   encouraged and enabled to use Exploratory Talk when working together at the

30   computer.

31   Prior work also indicates a range of benefits to collaborative IS – including in

32   workplace contexts (see e.g. (Amershi & Morris, 2008, 2009; Hansen & Järvelin,

2005)). Evans and Chi (2010, p. 661) built on this work to propose a model of social, indicating various ways, and stages at which, collaboration might occur including:

(1) The defining of information needs and exchange of relevant information surrounding those, such as important URLs and keywords.

(2) The search processes itself, such as shared understanding of information found in both the short previews given by search engines, and deeper information from websites.

(3) The evaluation, and 'use' stage, such as organising information into various shared tools, and perhaps dissemination.

Collaborative IS in Education

Some research has explored the extent of collaborative IS in educational contexts (Amershi & Morris, 2008; Ba, Tally, & Tsikalas, 2002; Livingstone et al., 2005; SQW, 2011) finding that it is frequent, and often involves the co-construction of understanding – for example via the sharing of search queries. However, these studies have focussed on professional's (teachers and librarians) (Amershi & Morris, 2008), or self-report methods (Ba et al., 2002; Livingstone et al., 2005; SQW, 2011) rather than direct observation.

Although self-report measures of collaborative use are important, they may neglect the specific ways in which collaborators mediate contact with the world of information through discourse. Fundamentally, self-report measures may contain bias – through sampling, interviewer effects, and the subjective nature of understanding one's situation both as an interviewer, and interviewee. By failing to explore collaboration in action we may ignore means to support higher quality collaboration.

One researcher who has explored collaborative IS in an educational setting suggests that teenagers may be, "largely unable to select appropriate search strategies (planning), check their progress (monitoring) and assess the relevance of search outcomes (evaluating)." (Lazonder, 2005, p. 466). Lazonder's research explored the effect of collaboration on this "inert knowledge problem" (Lazonder, 2005, p. 466) suggesting that verbalisation might improve the self-regulatory processes, prompting users into better negotiating the search process. The implication here is that, by encouraging the creation of common knowledge and the joint, critical evaluation of information, we facilitate better IS processes. Indeed, from a sample of 20 students with

1 a mean age of 20 Lazonder found that pairs performed better, and faster than

2 individuals, used more varied search strategies and provided marginal support for

3 superior website evaluation in pairs. In particular, they tended to have better 'first

4 answers' than individuals, who more frequently had incorrect initial answers. However,

5 this was a small scale study, based on older students in which, although talk or

6 'verbalisation' was deemed important for self-regulation, it was not analysed as a data

7 form.

8   This is one reason why qualitative analysis may be of interest in this context: it

9 would offer greater insight into the different kinds of discourse surrounding such

10 differences, allowing, for example, an exploration of the types of language related to

11 use of fewer keywords in search queries, and their relation to the situated context, for

12 example drawing attention to prompts such as 'autocomplete' functions, which young

13 individual searchers often ignore (Druin et al., 2009).

14 ***Understanding Discourse***

15 However, although research emphasises the incidence, and benefits of collaboration,

16 little has been conducted into the language used to collaborate. Furthermore, we are

17 aware of no study to date which has explored the educational outcomes of such

18 collaborative IS, with studies instead focussing on the processes of collaboration and the

19 *content* of utterances as moves (which direct activity), rather than the intentions behind

20 them and their use as tools to share knowledge. That is, it has tended to focus on the

21 ways moves are navigated; dominance established; the stages of IS at which particular

22 sentence structures emerge; and so on, over the effectiveness of such talk; its reasons for

23 emerging; and the ways users co-construct meaning through such talk.

24   As such, by focussing solely on the discourse's relevance to tool-mediated

25 action they may miss important information regarding the nature of the sociocultural

26 context in which discourse exists and through which shared meaning is created (Wells,

27 2002). In educational settings, workplaces and other contexts, this shared use of spoken

28 language to create meaning and achieve joint goals has been called 'interthinking'

29 (Littleton & Mercer, 2013; Mercer & Littleton, 2007). Understanding the dialogic

30 interactions that take place around computer based search tasks may be an important

31 step in improving and deploying such tools effectively.

1   Searching and processing information requires the identification of needs, and

2   information which meets those needs – these are thus issues regarding "beliefs about the

3   nature of knowledge and knowing, which may facilitate or constrain searching and

4   evaluating sources of information on the internet." (Mason, Ariasi, & Boldrin, 2011, p.

5   139). In collaborative contexts, this involves the sharing of knowledge, and the

6   important situated cognition notion that "1) Knowledge is not passively received but

7   actively built up by the cognizing subject, and 2) the function of cognition is adaptive

8   and serves the organization of the experiential world, not the discovery of ontological

9   reality." (Clancey, 2008, p. 20). Understanding learning, then, is a matter of

10   understanding the co-construction of such understanding – and the ways talk and any

11   other cultural tools such as digital technology are used to do this (Säljö, 1999).

12   *A Model for IS*

13   Traditional approaches to IS tend to focus on structures, users, and algorithms. Our

14   approach focuses on a relatively under-examined aspect of IS: "the various interactions

15   between the entities of the searcher, the information need and environment" (Knight &

16   Spink, 2004, p. 232) in which users define their information needs, seek information to

17   address those needs, and evaluate that information in light of the needs. At each stage,

18   the object of activity is mediated by the situation in which it is embedded, and at each

19   stage the process is understood to be iterative, in particular as mediated by the discourse

20   – such that needs may be redefined at preliminary stages, or in light of the search tools

21   and processes available, or indeed in light of material that has been fully evaluated.

22   Thus the interest is the constant reconstruction of information needs in light of current

23   and new information which is judged within a particular activity system, constituted by:

24   • The demands of the task; both those set in the rules, and artefacts of the

25   classroom (e.g. the worksheet, which may act as a supportive artefact to

26   encourage pupils to reflect on their information need (De Vries, van der Meij, &

27   Lazonder, 2008)) and those co-created in the discourse,

28   • The nature of the discourse,

29   • The tools at the subject's disposal, and their co-constructed assessments of the

30   nature of the information required.

1 As such this study set out to investigate the ways in which pupils searched for

2 information in collaborative groups specifically asking: "What is the role of exploratory

3 talk in classroom based collaborative search engine tasks?"

4 **Methods**

5 *Participants*

6 The study took place in a large comprehensive school in the West Midlands, United

7 Kingdom. Eight pupils (two groups of three, and a pair, as detailed in [Table 1) were

8 selected from a Religious Studies lesson by virtue of seating themselves in self-selected

9 groups at three PCs which had been setup as observation stations. All participants in the

10 sample were female and between eleven and twelve years old. The participants were of

11 a similar educational attainment on established baseline assessment scores (Key Stage 2

12 Average Point Scores, where the expected level at KS2 is 27) as in Table 1. The topic

13 was a new one for all pupils and they exhibited no prior knowledge in their talk,

14 although some other pupils in the class had heard of Marie Curie and Nelson Mandela.

15 [Table 1 around here]

16 *Ethics*

17 BERA (2011) guidance was followed, with consent gained from the school and all

18 parents/guardians of the class members prior to testing; no ethical concerns were

19 anticipated. Each participating pupil also gave verbal consent after a brief explanation

20 of the purpose of the recordings. The use of a generic logon precluded access to the

21 pupil's personal files thus removing a potential concern in this area. In any of the

22 examples below, pseudonyms replace real names.

23 *Design*

24 This study employs established methods of sociocultural research to explore between-

25 group differences, particularly sociocultural discourse analysis (Mercer, 2004, 2010). In

26 this type of research the focus is on language as a tool to engage in sharing and creating

27 ideas and at most co-constructive *interthinking*. Analysis involves an iterative

28 movement from of words, to utterances, to whole transcript and artefact analysis,

1 employing a range of data sources from those familiar to observational research, to

2 worksheet and screencast data analysis as described further in the 'analysis' section

3 below. This combined-method approach is common in sociocultural research, which

4 attempts to understand learning in its cultural context.

5 *Materials*

6 Three flipcameras were used as a backup audio recording, and provide visual assistance

7 in transcription. Three Roland Edirol R9 Audio Recorder**s** were used as the main audio

8 recording devices, and placed in front of the keyboards on the workdesks. A classroom

9 of desktop computers had Camstudio installed on them, and three of these in relatively

10 isolated positions were selected as testing stations.

11

12 Camstudio was setup to reduce file size as far as possible and to save onto a shared

13 network drive for later 'collection'. The worksheet was copied as requested by the

14 teacher, for one sheet per group.

15 *Procedure*

16 Prior to the lesson starting, three computers were logged on to a generic pupil account

17 and CamStudio was setup for use. The lesson was largely dictated by the class teacher,

18 although a PowerPoint presentation and lesson plan were provided for guidance. The

19 lesson started with:

20 • A brief introduction to the task: to find out about role models

21 • A discussion of what a 'role model' is

22 • A discussion of 'group rules' – listen to each other, work together, explain

23   answers, etc.

24 The pupils then worked through a worksheet, the first seven questions of which were

25 'assigned' or 'directed' tasks (find out about role model x) and the last two involving

26 more self-directed tasks (pick a role model as a group, and find out about them). These

27 appeared alongside probing questions as indicated in [Figure 1. These tasks were

28 constructed with the teacher to maximise validity. The assigned or closed tasks were

29 used to provide a means for assessment (fact retrieval) and self-directed tasks to provide

30 opportunity for more open ended search.

31 **[Figure 1 around here]**

The teacher chose appropriate points at which to stop the pupils, ensure they were all moving along well, and check answers. The audio recorders were appropriate for recording these sections of teacher-led talk as well as recording the small groups when they were working on the activities. The lesson was a single 75 minute session of which about 65 minutes was spent working (roughly 10 minutes being spent on admin tasks). The teacher for this session was covering for a planned absence by the usual teacher. The pupils received one worksheet per group, and chose their own groups of two or three.

Analysis

Analysis was conducted on group talk transcribed from the audio recording, with video recording to support this process. Audio was transcribed with little technical notation except ellipses '…' to indicate overlapping speech, and relevant annotations made in square brackets (e.g. [inaudible] where the words could not be made out.)

Screencast data was also used as a secondary form of analysis to explore the context of utterances where relevant. Following transcription, some relatively simple counts were taken, such as number of utterances made by individuals, and the type of behaviour (off task, teacher talk, search related, task related). This latter analysis was based on a time-based quantification of coded talk in which codes are applied over periods of spoken dialogue as opposed to counting numbers of sequences, or words coded. While this approach is not unproblematic (in particular, individuals speak at different speeds), analysis of other approaches indicates similar proportional relations to those indicated in the results section. To our knowledge, there is no body of research discussing these various methods for the quantification of talk.

The broad methodology offered by sociocultural discourse analysis (Mercer, 2004, 2010) is a direct response to the joint nature of thinking, and the importance of language to the construction of common knowledge. In this methodology, language based methods are used to highlight salient features of talk particularly as related to learning outcomes; an area in which little IS research has been conducted (Imazu, Nakayama, & Joho, 2011).

Within Mercer and colleague's work, a three-part typology (

1 [Table 2) has been used, aiming not to reduce data to a tally, but to highlight the

2 nature of talk used towards learning outcomes. This forms the key element of the

3 analysis in this work.

4

5 [Table 2 around here]

6

7 Such analysis involves the use of both qualitative and quantitative methods, however,

8 the quantitative data should be taken as an aid to understanding the broad qualitative

9 data (including that which cannot be included in the body of the text) and not as a

10 means to reduce the data to a numerical tally. Thus, excerpts from sections of talk are

11 presented alongside concordance analysis of keywords associated with 'exploratory

12 talk' – such as "I think", "because", "so", etc. Such use of concordance analysis allows

13 researchers to "test…hypotheses about how topics are being carried forward and how

14 meaning is being jointly developed through talk" (Mercer, 2000, p. 69) by providing not

15 only a numerical count, but also the context in which keywords and phrases are used as

16 we now describe further.

17 Understanding the context of such utterances is important for understanding how

18 utterances are used by collaborators to think together. In 'systemic functional

19 linguistics', the perspective is taken that types of text have contexts by being members

20 of a particular genre, which is revealed through the way such texts are written (See

21 Halliday, Hasan and Christie (1989)) – thus , context is imbued into texts at the time of

22 writing. However, in the context of co-construction through discourse, "'context' is

23 created anew in every interaction between a speaker and listener or writer and reader.

24 From this perspective, we must take account of listeners and readers as well as speakers

25 and writers, who create meanings together" (Mercer, 2000, p. 21). One particular

26 technique to understand the temporal aspects of context, as involving continuity across

27 talk, is to look for repetition of words, to understand how "speakers can jointly, co-

28 operatively create cohesion in…their speech" (Mercer, 2000, p. 62); an approach we

29 also adopted here aided by our use of the concordance analysis.

30 **Results**

31 Following the analysis described above we now present our results, starting with some

32 general points regarding the amount, and type of interaction within the groups. We then

33 relate this to the task completion of the groups, highlighting a number of ways to

1 measure 'success' in this context. Finally we present analysis related to the nature of

2 the discourse within groups, using the 'typology of talk' first to present quantitative

3 analysis which should be used to inform the reading of the subsequent section which

4 presents a brief discussion of each group's discourse, and some short transcript extracts

5 to illustrate these.

6 As [Table 3 illustrates, it is significant to note that within Group 1 (a pair) the

7 utterances tended to be longer than the other groups, thus they engaged in similar

8 durations of talk overall. In Group 3, the pupil who seemed to speak less was more

9 likely to control the mouse, keyboard, or worksheet than either of the others.

10 Furthermore, in that group the pupil who talked the most also instigated the most 'off

11 task' talk. However, the discrepancy here is of interest and may help to explain some of

12 the problems this group experienced.

13 [Table 3 around here]

14

15 *Success – issues with measures, and measures of issues*

16 In terms of task completion, Group 1 completed four questions, and had discussed the

17 fifth (in fact, they had almost found the answer). However, they did not find the correct

18 answer for question three (to find another name for Nelson Mandela). Group 2

19 completed all nine questions, although no talk was transcribed for the ninth. Group 3

20 completed only three questions.

21

22 In particular, Group 2 did not discuss question 7 (on Florence Nightingale) at all, and

23 discussed only one aspect of the final two questions – which they based on 'mums'

24 being a good role model. It was also very difficult to draw out sections of discrete talk

25 regarding where they had found the information, and whether other information might

26 be more useful – although in at least some instances such talk did occur, in the context

27 of answering other questions, and the worksheet answer is drawn from that talk. In any

28 case, Group 3 clearly completed the least work, and were the least effective group;

29 while Group 2 was very effective, this was sometimes in superficial ways – however,

30 they did complete the most questions. Group 1 worked together effectively – as will be

31 more apparent from the discourse analysis below – although they completed fewer

1 tasks. This comparison highlights the importance of contextual information in assessing

2 success in such tasks.

3 ***Using language to think together***

4 While raw success – and its measurement – is of interest, we are also interested in the

5 ways in which the pupils searched, and talked, together to find information and make

6 meaning. This section provides some quantitative analysis to illustrate these issues.

7 However, while in coding systems excerpts are taken to be illustrative of the

8 quantitative information, in this case the quantitative data should be taken to illustrate

9 the qualitative. That is, the analysis provided is not that of a coded quantification of

10 data, thus the numbers should help the reader to understand the context, but it is the

11 qualitative data from which the core meanings are drawn.

12   A key element of our analysis involved the Typology of talk (see

13   [Table 2). One method to highlight the presence of exploratory talk is the use of

14 concordance analysis for keywords associated with such talk – as indicated in the

15 relative incidence of exploratory talk words highlighted in [Table 4. This illustrates one

16 issue with the quantification of discourse, in that Group 3's "cuz" instances were often

17 not being used as explanatory devices (i.e. substitutes for "because, xyz") but rather as

18 devices to close off conversation, a commonly known (and infuriating) example being

19 the exasperated response, "oh, just because!" – as in: "it just is – now stop asking about

20 it". Similarly, Group 2 has two cases bracketed from the concordance analysis, "I don't

21 really wanna read it cuz it's too long", and "cuz I'm very bad at this" – neither of which

22 is aimed at the joint construction of knowledge. A final example serving to highlight the

23 usefulness of concordance analysis as a means to provide numeric, but qualitatively

24 contextualised, data comes from Group 1's use of 'if' (4 occurrences), all of which co-

25 occurred with another word often associated with exploratory talk 'so', and were thus

26 removed to avoid double counting.

27   [Table 4 around here]

28

29 [Table 5 gives some indication of the presence of such types of talk – although it should

30 be noted that sometimes more than one type may be present in any one section. It is

31 striking that Group 3 engaged in very little exploratory talk, while Groups 1 and 2

1 engaged in similar amounts; varying more around the cumulative and disputational

2 types.

3 [Table 5 around here]

4

5 To illustrate the types of talk engaged in, we use two devices – firstly, reference to the

6 typology of talk in a fairly broad sense. However, it is also possible to draw out some

7 commonalities within the types of talk within groups. Thus, the extracts below should

8 be taken as illustrative both of the typology, and – with reference to the description

9 offered – the groups' behaviours more generally.

10 *Group 1*

11 Specifically,

12 Sequence 1 illustrates the use of exploratory talk to build new knowledge, and create

13 shared meaning, in this case dominated by Frances, while other instances showed

14 similar interventions from Karen. This example is particularly interesting because the

15 pair is not prepared to simply take at face value that Marie Curie is a good role model,

16 indicating some awareness that understanding why someone is a good role model is

17 important. A frequent term tying together this group's discourse was "why" – a term

18 used with reference to *why* information was good.

19

20 Sequence 1 – Illustrative example of exploratory talk from Group 1

21   *Karen: And then we, do you think this person is a good role model? Yeah*

22   *Frances: wait no, let's read a bit first because we don't know*

23   *Karen: she received a general education*

24   *Frances: ah look, Dr of science, she succeeded her husband as head of physics*

25   *at the laboratory at the Sorbonne, gained her Doctor of Science degree in 1903*

26   *following the tragic death of Pierre Curie in 1906, she took his place as*

27   *professor of General Physics in the faculty of science, the first time a woman*

28   *had held this position*

29   *Frances: Well yeah, I think she's a good role model*

30   *Karen: Because she's the first woman*

31   *Frances: Yeah, she's a good role model*

1

2 We can also see a use of repetition in this short sequence, to create 'cohesive ties' for

3 continuity (Mercer, 2000, p. 59), for example Frances says "the first time a woman had

4 held this position", which Karen then highlights "Because she's the first woman". These

5 cohesive ties are used throughout, and we can see differences in the ways they relate to

6 the talk of the three groups.

7 *Group 2*

8 Similarly, the cumulative talk illustrated by

9 Sequence 2 was a common feature of Group 2's talk. Here, we see a point is raised Ada,

10 asking a question – which is then simply affirmed from their prior assumption, rather

11 than fact checked, or explained. This sort of acceptance of 'the given' – either from

12 websites, or each other's talk, was common in a number of Group 2's interactions. This

13 group tended to focus on newly discovered information and repeating it. A tie seen

14 throughout their responses (inter-question tie) made reference to the fact that "I didn't

15 know that…".

16

17 Sequence 2 – Illustrative example of cumulative talk from Group 2

18   *Ada: erm, he was the president*

19   *Ada: was he a president or a prime minister?*

20   *Barbara: I think he was a president, I'm not sure…*

21   *…Ada: that's what I thought*

22 *Group 3*

23 Finally, Sequence 3 indicates the sort of disputational talk characteristic of Group 3's

24 interactions. The group are discussing Nelson Mandela, and why he might be a good

25 role model. However, they have failed to select pertinent information, and after a period

26 of silence, a vague suggestion is posed – but not followed up, the group instead moving

27 on to name the website, and then a stretch of off-task talk. These periods of silence and

28 off-task talk within fairly short exchanges – that is, identifiable sections of talk

29 regarding a particular topic – were characteristic of this group. Similarly, their talk

30 exhibited few cohesive ties. This was partly in virtue of the fact that identifying inter-

question ties, as opposed to intra-question ties, was challenging because they made so little progress.

Sequence 3 – Illustrative example of disputational talk from Group 3

> *Anita: Erm…he has he had 6 children*
>
> *Mary: and he has 20 grandchildren*
>
> *Silence [16 seconds]*
>
> *Anita: Just put, he stood up for what he believed in, put something like that, he stood up for what he believed in*
>
> *Jean: What's this called?*
>
> *Anita: Mtholyoke [reads website name]*
>
> *[Chatter about year 6 plays]*

Summary

Thus, while ostensibly group 2 was the most 'successful' group, closer analysis of task completion indicates that group 1 were also rather successful. Furthermore, quantitative analysis of the discourse shows that group 1 engaged in a longer duration of exploratory talk than group 2 (a claim supported by the incidence of 'exploratory talk words' in [Table 4) while the brief discussion indicated above relates some of the further differences between these groups. It should also be noted that group 3 (which completed by far the fewest tasks) also engaged in the least constructive dialogue, and the most 'off task' talk. These findings will now be discussed in more detail.

Discussion

The results thus indicate the importance of group discourse in successful collaborative IS. The study set out to explore the role of exploratory dialogue in collaborative classroom based search engine tasks, and results indicate that the success of groups in such tasks is related to their use of educationally productive dialogue, specifically exploratory dialogue. Here we first discuss some general accords in our findings with prior work, before discussing the distinct contribution of this work as an analysis of collaborative dialogue in IS tasks. We go on to highlight some weaknesses with the study and some areas for further work, before concluding.

In accord with prior work, a range of issues were experienced by all three groups to varying extents. [Table 6 below summarises the main issues students faced, almost all

1 of which were reproduced to some extent in this study; although much of this prior

2 research is ten or more years old, many of the same issues remain.

3 [Table 6 around here]

4

5 The further contribution of this study is the analysis of collaborative IS in the

6 normal classroom context, mediated by talk. While the differences between Group 1

7 and 2 are more nuanced, it is interesting that Group 3 – who were clearly the least

8 successful – also engaged in the least exploratory talk, and reflected very little on the

9 nature of the tasks, or information on which their attention was focussed, and the ways

10 these could be tied together. In a similar vein, their concern with gathering information

11 focussed on quantity and easy access (or aesthetic value), over the focus on explanation

12 and important information of group one, and novelty and detail – with some degree of

13 selection (i.e. not *just* quantity) – of Group two. Findings indicate that particular kinds

14 of productive dialogue, notably exploratory talk, can be identified in and are related to

15 effective collaborative information seeking.

16 These findings have implications for the ways that search engines and

17 information management tasks, are used in classroom contexts. Perhaps most

18 prominently, they reiterate the concern that even where pupils may have prior

19 experience with technology, they may not necessarily be adept at using it – even when

20 they can share their expertise in collaborative contexts. Moreover although pupils may

21 be familiar with the particular functions of tools – such as 'suggested search', spelling

22 correction, and image or video searches – they may not be adequately equipped to deal

23 with the information these searches present them with, using naive strategies and failing

24 to consider – particularly collaboratively – results fully.

25 Although this study did not explore individuals' search capabilities, the pupils

26 were all of a similar ability in terms of academic attainment. It is therefore interesting

27 that, despite this, they were not equally successful, and their success appears to be

28 related to their ability to work together and use the kind of dialogue which mediates this

29 collaboration most effectively – these are important considerations. Just as whole class

30 dialogue can involve a variety of dialogue and questioning styles, including short closed

31 questions and longer open ones, so too can search tasks. Some more open questions

32 might involve multi-part factual search tasks which involve finding one answer before

33 finding another (and working out that this is the correct strategy), while others might

1   involve exploratory search – getting a 'feel' for a domain. Then aims should be to

2   encourage dialogue which explores misconceptions, discusses the utility of results, and

3   shares strategies for finding information. These are important considerations when

4   setting students tasks which involve the use of search engines, particularly given that in

5   the general classroom context, both whole class and small group dialogue are associated

6   with improved educational outcomes – as discussed in the introduction[1].

7   *Limitations and Future Work*

8   A concern can be raised, regarding the generalisability of findings, with respect

9   to the small scale of this study and the fact that all participants were of a similar

10   academic level, and female. We accept that limitation, but suggest that the interesting

11   results gained from this exploratory research encourage investigations on a larger scale.

12   The methods chosen for this particular study were well suited to a small scale analysis

13   of the specific situation. However, following on from the introduction to the lesson,

14   which might be described as 'grounding', the worksheet could be thought of as

15   'scripting' – providing a structured space for thinking – which might lead to longer, and

16   more structured responses (Schoonenboom, 2008). Thus, while this method is a useful

17   prompt for encouraging particular types of talk – and response – in group activity, and

18   indeed it reflects a naturalistic classroom task, the validity of observations made outside

19   of the context of such tasks may be called into question.

20   These concerns addressed, there are some ways in which further research could

21   give deeper insights into the issues raised, including checking reliability of qualitative

22   analysis through dual-coding techniques, and the use of pre/post lesson knowledge

23   assessment for analysing learning outcomes – perhaps both for search and subject

24   knowledge.

25   In addition, there are other concerns regarding the particular setup, further

26   research should explore the impacts of: group configuration; search engine interface

27   changes; and extended task designs.

1

[1]The first author has written some teacher notes on this point, available (under a Creative Commons licence) here http://people.kmi.open.ac.uk/knight/edusearch-tips/ and in abridged form published (S. Knight, 2013).

Concluding Remarks

The importance of understanding student IS is highlighted by the fact that teachers can no longer direct students to one or two books, and while they may be able to direct them to some appropriate websites, it is both unlikely that students will restrict themselves to these, and undesirable that we should wish them to. Understanding the ways that children work together to navigate such information searches, and of ways that teachers can help them to do so more effectively, are not only important for improving their IS activities but also for promoting their ability to use productive dialogue in small groups.

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