



Open Research Online

The Open University's repository of research publications and other research outputs

Improvable objects and attached dialogue: new literacy practices employed by learners to build knowledge together in asynchronous settings

Journal Item

How to cite:

Ferguson, Rebecca; Whitelock, Denise and Littleton, Karen (2010). Improvable objects and attached dialogue: new literacy practices employed by learners to build knowledge together in asynchronous settings. Digital Culture & Education, 2(1) pp. 103–123.

For guidance on citations see [FAQs](#).

© 2010 Digital Culture Education

Version: Accepted Manuscript

Link(s) to article on publisher's website:

http://www.digitalcultureandeducation.com/uncategorized/dce1033_ferguson_abstract_2010/

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Improvable objects and the literacies employed by learners to build knowledge together through asynchronous dialogue

Rebecca Ferguson, Denise Whitelock and Karen Littleton

Abstract

Asynchronous online dialogue offers many advantages to learners, but has previously appeared to restrict opportunities for engaging in the exploratory exchanges characteristic of an educated discourse. To investigate whether this is the case, a multimodal approach was applied to asynchronous dialogue, using analytic tools and techniques developed for the investigation of face-to-face education. The study analysed the online discussions of three small groups of university students as they worked together on assessed research projects and collaboratively authored documents. Sociocultural discourse analysis of the dialogue was combined with visual analysis of its structural elements. These showed that the documents learners worked on together functioned as 'improvable objects' and supported the use of exploratory dialogue. By investigating a wider range of conference dialogue than has previously been explored, it was found that discussion involving improvable objects prompts groups of online learners to share knowledge, challenge ideas, justify opinions, evaluate evidence and consider options in a reasoned and equitable way. In order to use improvable objects to do this effectively, learners need support to develop relevant literacies.

Keywords

Asynchronous dialogue, Cumulative talk, Exploratory talk, Improvable objects, Online learning, Pedagogy, Sociocultural discourse analysis, Visual analysis

Introduction

Interaction within online conferences and forums potentially provides learners with opportunities to cooperate and collaborate without the constraints of time and place they would encounter in a face-to-face environment (Jones, Cook, Jones, & De Laat, 2007). The asynchronous exchanges that take place in these settings have been described as independent of both time and place; learners are not tied to set hours and locations for interaction (Harasim, 1990; Wu & Hiltz, 2004). Because the dialogue is asynchronous, participants have time to reflect, to clarify their thoughts and to present them in an orderly fashion (Garrison & Anderson, 2003). Their discussion is resourced by transcripts and archives that provide them with a record of past interaction (Kaye, 1989; Lapadat, 2002). These factors are significant affordances of asynchronous dialogue, the perceived and actual properties that determine its possible utility (Gibson, 1986).

Despite these apparent advantages of the medium for groups of learners, it remains unclear whether asynchronous dialogue can be as successful as face-to-face talk in providing the variety of support required to promote a rounded set of learner outcomes (Chester & Gwynne, 1998; Drummond & Hopper, 1993;

Walther, 1992, 1996; Whitty & Gavin, 2001). This question is raised because previous research has found that asynchronous learning dialogue produces a more limited set of learning outcomes than face-to-face interaction and that these outcomes tend to be cumulative in nature because the medium supports groups in combining information and ideas (Coffin, North, & Martin, 2009; Littleton & Whitelock, 2005; Wegerif, 1998).

In face-to-face settings, researchers have identified three social modes of thinking employed by learners: disputational, cumulative and exploratory talk (Mercer, 2000, 2002; Mercer & Littleton, 2007; Mercer & Wegerif, 1999; Mercer, Wegerif, & Dawes, 1999; Wegerif, 1996; Wegerif & Mercer, 1996). These categories focus attention on learners' use of talk as a thinking tool. Disputational talk is therefore to be discouraged when the aim is collaboration, because it is unproductive for groups of learners. It is characterised by individuals trying to take control; restating their own point of view while rejecting or ignoring the views of others. Cumulative talk, akin to the dialogue observed in online conference postings, is potentially more constructive; control is shared and speakers build on each other's contributions, adding their own information and constructing a body of shared knowledge and understanding, but they do not challenge or criticise each other's views.

Exploratory talk is more characteristic of an educated discourse because it involves constant negotiation (Mercer & Littleton, 2007). Reasons and explanations are made explicit where necessary and all participants make critical evaluations in order to reach joint conclusions. Extensive work by Mercer and his colleagues (brought together in Mercer & Littleton, 2007) has shown that, in classroom contexts, exploratory talk can be employed by teachers and taught to students, thus producing measurable improvements in their learning achievements.

In textual online environments, interaction takes place through typed dialogue rather than spoken talk. Analysis of interaction by learners in these environments has found many examples of cumulative discussion but few examples of exploratory dialogue. This suggests that exploratory dialogue may be too risky or too time consuming to be used by online groups of learners (Littleton & Whitelock, 2005; Wegerif, 1998). This is a potential problem, as this is a form of dialogue 'essential for successful participation in "educated" communities of discourse' (Littleton & Whitelock, 2005, p152), and so online learning environments may be impoverished if they do not support its use.

Exploratory talk is also valuable because it supports the use of progressive discourse, a method of increasing group members' understanding by developing thoughts through speech (Bereiter, 1994). Those engaged in progressive discourse must be prepared to work toward common understanding satisfactory to all, to frame questions and propositions in ways that allow evidence to be brought to bear on them, to expand the body of collectively valid propositions and to allow any belief to be subjected to criticism if this will advance the discourse (Wells, 1999). The first three of these commitments can be achieved through cumulative exchanges but, to meet all of them, participants must engage in exploratory exchanges. Progressive discourse therefore necessitates the use of exploratory dialogue and, in turn, the use of exploratory dialogue signals that

speakers are likely to be engaged in building understanding together through progressive discourse.

In face-to-face settings, progressive discourse has been associated with the sustained development of ideas through the use of improvable objects (Wells, 1999). Wells observed that teachers often encourage pupils to construct representations capturing something of what has been said. He suggested that these function as improvable objects, knowledge artefacts that participants work collaboratively to improve because they involve a problem that requires discussion. These are important resources because 'a written text, unlike the text produced in speaking, is a permanent artefact, it can be reviewed, rethought and revised through a different form of dialogue, in which the text under construction plays a central role' (Wells, 1999, p115).

This might be taken to imply that learners interacting in asynchronous conferences and forums have less need for improvable objects because their postings endure and are visible to all. However, the needs to establish 'common knowledge' (Edwards & Mercer, 1989) and to preserve salient ideas are keenly felt in environments where there is a danger that learners will become overloaded with information because dialogue is automatically archived (Conole & Dyke, 2004). In such cases, learners need to have methods of reviewing, rethinking and revising their knowledge through dialogue. They also need to be able to identify, augment and maintain common ground as their work progresses (Baker, Hansen, Joiner, & Traum, 1999), and improvable objects offer a way of achieving this.

The research reported here investigates whether online groups of learners make use of improvable objects, and whether they use such objects to support the development of exploratory dialogue. It therefore begins by identifying improvable objects within an asynchronous learning environment. It goes on to investigate the discourse associated with these, and the literacies necessary for learners to use improvable objects and exploratory dialogue in order to build knowledge together effectively.

Data collection

The data presented here are drawn from an extensive set of material in which groups of students collaborated online using FirstClass conferencing software. Within three separate conferences, small groups of undergraduate psychology students at The Open University developed and carried out research projects with the support of tutors. After six weeks, each of these groups presented its work to other tutors and students, and received feedback intended to support them in their subsequent individual coursework. Because group participation was assessed, learners could not pass the course without taking an active role within their conference.

With the informed consent of all participants, three six-week conferences were archived and analysed in their entirety for this research. The data samples presented below are typical, and are drawn from two of the groups, referred to here as Jet and Pearl. The archived material included the text and title of all messages posted in each conference, together with the names of their authors and the dates and times when they were posted. It also included any documents or icons attached to the postings and, in order to preserve visual elements,

screen captures of all the messages. The history of each posting was also recorded, showing who had created it and when, who had opened it and when they had first done so, who had downloaded its attachments and when they had done this. These attached documents were of particular interest because they appeared to have the potential to be employed as improvable objects. Each group worked collectively on several of these documents. Three of these were assessed pieces of work, while the others were associated with research data collection and analysis.

The online conferences were found to resemble icebergs, in that the bulk of each of them was hidden from the view of a researcher who studied only the conference postings. Pearl conference, for example, contained over 86,000 words, of which only 22% appeared in the postings. The other 78% were all in the associated attachments: documents produced in Microsoft Word, Microsoft PowerPoint, Adobe Acrobat and SPSS and then attached to conference postings for other group members to download, read and consider. In many cases, these attachments were different versions of the same document. Pearl group, for example, produced 17 iterations of their 'video transcript' document. Together, these versions of just one document had a word count greater than all Pearl conference postings combined. The group's video transcripts had a total word count of 23,577 (compared to a total word count of 18,995 for their conference postings). Jet group video transcripts had a total word count of 12,925 (compared to a total word count of 84,530 for Jet conference postings).

When the groups began work on these video transcripts, members had already begun to establish working relationships during a week's work in which they had collaborated on the development of their group's project proposal. They were motivated to work together to develop these documents because their research project could not be completed until they had transcribed their data.

The analysis presented here employs the video transcripts produced by Jet and Pearl as exemplifications of broader patterns in the data. Although few groups of online learners produce a video transcript together, most such groups can be expected to consider material in detail and to develop their understanding of that material together, so the development of these video transcripts can be considered as specific examples of a frequently enacted process.

The data was analysed using a combination of approaches to take into account both its visual and its verbal aspects (Ferguson, 2009). Sociocultural discourse analysis was used to examine how language is used as a group tool. This form of analysis is concerned with the ways in which shared understanding is developed over time in a social context (Mercer, Littleton, & Wegerif, 2004). It combines detailed analysis of talk in specific events with comparative analysis of dialogue across a sample of cases. However, because it was developed for the analysis of talk, it does not take into account the visual elements of online dialogue, such as layout and typography. These aspects of conference data require analysis of the composition of dialogue alongside its content.

In the case of such composite texts, Kress and van Leeuwen (2006) demonstrated that visual and verbal elements interact, and should be analysed as an integrated whole. This led them to identify a set of structuring principles that enable viewers to make sense of the layout of text and images (Kress & van

Leeuwen, 1990, 2006). Their work informed the development of visual analysis (van Leeuwen & Jewitt, 2001), which is employed here to examine the uses, meaning and significance of these within the dialogue. This makes use of the same set of structuring principles, including the salience ascribed to different elements of the text, and the frames that separate these elements

Identifying improvable objects

The first task of the analysis was to investigate whether online groups of learners make use of improvable objects and, if so, what form they take. Wells (1999) identified six criteria for improvable objects:

- participants work collaboratively to improve them
- they involve a real problem that requires discussion
- they provides a means to an end, rather than being an end in themselves
- they act as a focus for the application of experience
- they act as a focus for the application of information
- they inspire and focuses a progressive discourse.

These features of improvable objects, when combined, establish them as a means of sharing and building ideas over time, making such objects sites for the display, comparison, manipulation and development of different understandings.

Conference postings were not, therefore, considered to be improvable objects because there was no evidence that participants worked collaboratively to improve any individual posting. Course materials such as books and CDs were not improvable objects because there was no opportunity to work collaboratively to improve them – and some shared documents, such as journal articles and examination guidelines, were excluded for the same reason.

Video transcripts, and other documents that were produced jointly by groups of learners, were found to meet the criteria for improvable objects. The video transcripts were typical of these in that they appeared in multiple versions, produced by the majority of students in the group, as part of a research project. Students planned, sometimes weeks in advance, to produce these documents; they asked their tutors to archive a copy of the agreed versions for easy access, and in some cases they returned to them after a period of weeks or even months.

In the case of the video transcripts, the documents prompted learners to comment explicitly on their experience of transcript production. Several shared effective methods of reviewing a video-clip and writing a transcript. These suggestions differed from those of tutors because they had a reflective element, and related to work on a specific video transcript rather than on transcripts in general. Other students drew on their experience of working on their video transcript in order to reflect on what had been done and what remained to do, thus linking personal experience to the development of this document. They also drew upon experience to improve their video transcript by sharing techniques and methods of carrying out the work.

Working on the video transcript provoked a return to and re-evaluation of information sources already accessed by the group as they searched for ways of

representing a variety of different elements in a sequential text. This led to practical exchanges of information as the groups struggled to align various sets of information using the software available to them.

It was clear that the video transcripts and other documents developed collaboratively by the learners met the first five criteria for improvable objects: participants worked collaboratively to improve them, they involved real problems that involved discussion, they provided a means to an end and acted as a focus for the application of experience and information. The following section considers these documents as improvable objects and shows how they were used to inspire and focus a progressive discourse.

Improvable objects and progressive discourse

Jet group's first attempts at representing their video data in the form of text are shown in Figures 1 and 2. Each of these versions was produced without reference to the other and they therefore represent the two authors' different understandings as they began work on their agreed project. Olivia (all names are pseudonyms) described her transcript as a 'first attempt and very basic, prime for you to write over and change'. When Heather posted her version the next day she wrote, 'Hope it is of some use, interesting to compare mine with Olivia's!' From the start, these transcripts were treated as group property and as part of a continuing dialogue.

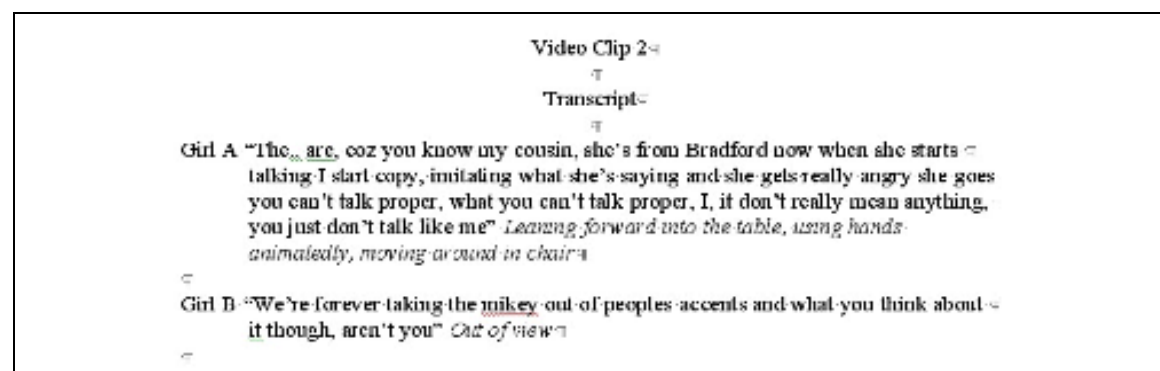


Figure 1: Start of Jet Transcript 1, posted by Olivia.

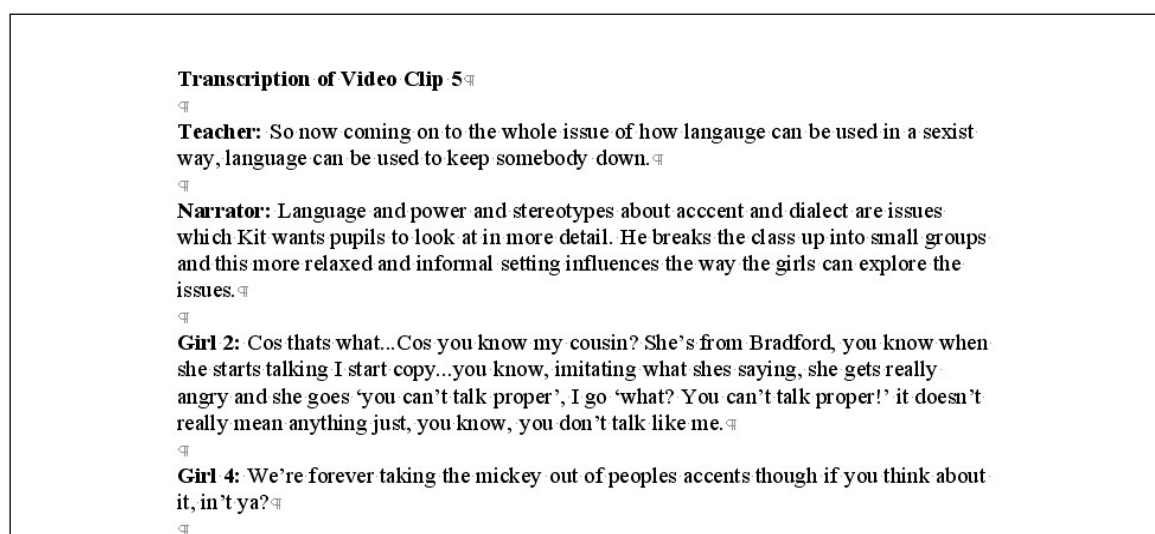


Figure 2: Start of Jet Transcript 2, posted by Heather.

Olivia and Heather's proposals included ideas about the content, terminology and format of the transcripts. Although both transcripts dealt with the same video data, the two authors proposed different ways of approaching these three areas. Heather's content included both the voice of the teacher in the classroom, and that of the narrator who provided voice-over commentary on the video-clip. Olivia omitted both these, but picked up on some of the non-verbal elements of the conversation.

The two authors also varied in the terminology they used. Olivia considered she was analysing Video-clip 2, while Heather described the same data as Video-clip 5. Heather described Olivia's 'Girl A' and 'Girl B' as 'Girl 2' and 'Girl 4'. Such seemingly minor discrepancies impacted on the acceptability and clarity of the transcript and these propositions were subjected to criticism as group members spent ten days discussing whether the young women in the clip should be referred to by number, letter, name or description. The initial propositions set out in Transcripts 1 and 2 thus provoked group members to discuss how to make their transcript clear and comprehensible.

From the point of view of formatting, there were both similarities and differences between the two versions. Both divided separate turns of speech by spacing, identified the speaker at the start of turns of speech and attempted to use standard punctuation. They differed in their use of bold and italic, use of colons and speech marks, and punctuation of the dialogue. Heather gave weight to the contributions of teacher and narrator, while Olivia took readers straight to the girls' conversation. Unlike Heather, she separated the girls' conversational turns, framing them within descriptions of posture, gesture and camera angle. The group therefore had to work together to decide which elements of these approaches they considered most relevant.

Individual group members thus began their research project with different understandings of their data and of the project they had designed. Olivia's transcript appears less detailed than Heather's, because it omits the speech of the teacher and of the narrator, but it was more directly relevant to the group's previously agreed focus on the verbal and non-verbal interaction of young women.

As discussion of the transcripts proceeded, comparison of understandings became more explicit. Both Pearl and Jet groups found it useful to set out the propositions put forward by group members, in order to subject these to criticism and bring evidence to bear on them. Once aware of different points of view, they were also able to bring personal experience to bear on the development of joint understanding.

This was evident when Jet group had agreed on their transcript and used it to focus their analysis. Eileen identified three different understandings of the word 'posh' displayed by members of Jet. Having drawn attention to these, she moved on: 'I was going to try to defend my analysis but actually I think we are all seeing the same thing which is that she is "set apart"'. She thus advanced the discourse by critiquing her original belief and making it clear that, in the light of the contributions of others, she had refined her understanding.

Pearl group also worked hard to frame questions and propositions in ways that allowed evidence to be brought to bear on them. One student, Charlene, noted

that 'It has taken me 6 hours to compile a table and document that links up, line by line, all of our comments'. Her 15-page document was a detailed comparison of the understandings expressed by each student in the group about their data. In it, she used layout and colour to distinguish the voices of different students, and she added a table in which she marked whether students had agreed or disagreed on various points and interpretations. She framed the opinions of each individual in ways that gave them equal weight. Her table format and use of colour supported direct comparison of related propositions.

Charlene's 9000-word comparison of questions and propositions was too long and detailed to be possible in speech. It would also have overwhelmed a conference posting, as these were typically less than one screen in length. Although individuals' views of their analysis differed, the extract in Figure 4 (discussing the data in Figure 3) shows that group members were in the process of developing a sophisticated understanding of their transcript.

14→(Doctor looks over glasses, closes notes, makes eye contact with patient),
15→Dr: Well... do you remember, I guess you don't remember too much about what I
16→told you (Dr takes his glasses off)way back (Dr smiling)then about the operation ..
17→what we actually. (Doctor opens notes)

Figure 3: Lines 14-17 of the agreed version of Pearl's video transcript.

Consolidation of our analysis
To make it easier I have coloured coded our results, and put our names in front of it.
Charlene, Ethan, Andrea, Rita.
Lines we all commented on and our comments.
15
→ Charlene: The Doctor is very patronising... and casting doubt in the confidence of the patient straight away, by saying that he guesses the patient doesn't remember too much about what he has told him.
Ethan: Doctor's tone indicates a slight disinterest in the notes and desire to move onto finding out information from the patient about what he remembers of the procedure. He also assumes the patient does not remember a lot. He is making a negative assumption about the patient, which may be interpreted as a desire to be seen as the knowledgeable party. This could be seen as an attempt at power.
Andrea: The doctor in a show of confidence and authority makes direct eye contact with the patient and tells him in a patronising way (as if to imply he would not be able to remember what he had previously been told in earlier conversations) about what he had been told before.
Rita: The use at times of almost childish language by the doctor looks to be belittling of the patient and the communication of the patient becomes more and more quiet, with only softly spoken, (yeah) which becomes more prominent when the doctor talks about the possible consequences of the operation.

Figure 4: Charlene's 15-page consolidation document: section considering the data in Figure 3.

Pearl Transcript 1, produced by Rita, had focused on the words spoken by doctor and patient. Since then, repeated refinement of this transcript by group members

had proposed the consideration of gaze, overlapping speech, volume, actions and camera angles. By the time Charlene composed her consolidation document, all group members were referencing these as important aspects of the video data. Elsewhere in Charlene's consolidation document, the students drew attention to other aspects of the data of which some individuals had shown no awareness when they began work on the transcript, including posture, gesture, manner, non-verbal sounds and display of emotions.

Through working on documents authored by group members, the students worked towards a shared understanding by framing questions and propositions in ways that allowed evidence to be brought to bear on them, expanding the body of collectively valid propositions, and allowing beliefs to be subjected to criticism in order to advance the discourse. The work achieved by the Jet and Pearl groups in relation to their video transcripts demonstrated the characteristics of a progressive discourse inspired by and focused upon improvable objects. The next section of this paper examines where and how the students made use of the exploratory dialogue that could be expected to form a part of progressive discourse in a face-to-face context.

Improvable objects and exploratory dialogue

The first versions of Jet's video-data transcript were developed in parallel, which resulted in the display of a number of different understandings simultaneously. Heather made it clear that she had produced Transcript 2 without reference to Olivia's Transcript 1 when she posted 'should have looked at board first but I went ahead and did a transcript too so thought I may as well post it up. Hope it is of some use, interesting to compare mine with Olivia's!' This suggests that she was encouraging the use of a cumulative approach in which students would build on each other's contributions. Maggie appeared to take this approach when she shared her version (Figure 5) and stated that she had produced it in response to previous versions: 'Heather and Olivia well done on your transcripts. I was going to wait till I got home but as you guys are already on the go I thought I too would have a go [...] I have worked from your two transcripts too.'

Transcription of Video Clip 2

Class Setting

Teacher:

→ 1 So now coming on to the whole issue of how language can be used in a sexist way, language can be used to 2 keep somebody down.

Narrator:

→ 3 Language and power and stereotypes about accent and dialect are issues which Kit wants pupils to look at 4 in more detail. He breaks the class up into small groups and this more relaxed and informal setting influences 5 the way the girls can explore the issues.

Girl 2:

→ 6 Cos thats what...Cos you know my cousin? She's from Bradford....

Girl 3:

→ 7 Yeh

Girl 2:

→ 8you know when she starts talking I start copy...

Girl 4:

→ 9 Yeh

Girl 2:

→ 10you know, imitating what shes saying, she gets really angry and she goes 'you can't talk proper', I go 11 'what? You can't talk proper!'

Collective laughing

Girl 3:

→ 12 *echo* you cant talk proper

Girl 2:

→ 13it doesn't really mean anything just, you know, you don't talk like me.

Girl 1:

→ 14 *Taps pencil on table*

Girl 4:

→ 15 We're forever taking the mickey out of peoples accents though if you think about it, in't you?

Figure 5: Start of Jet Transcript 3, posted by Maggie.

Maggie's misspelling of the word 'language' in the first line of dialogue (Figure 5) suggests that she had cut-and-pasted this part of the text from Transcript 2, which contained the same error. She also incorporated italicised descriptions of non-verbal actions as in Transcript 1. Because she accepted and used Heather's version of the dialogue, she was able to concentrate on new elements. She included laughter, interjections, echoes and the contributions of two more participants in the dialogue, while her format involved the use of tabulation and line numbers.

Up to the point at which Maggie produced Transcript 4 (an accidental duplicate of Transcript 3), learners' contributions to dialogue concerning the transcript appear to be easily separable from their associated actions. Individuals developed the improvable object by producing and attaching versions of the transcript. They discussed and described these actions in a series of postings that formed an ongoing dialogue. The postings related to the first three versions of the transcript were typical of cumulative dialogue: group members built positively on each other's contributions, adding their own information and constructing a body of shared knowledge without challenge or criticism.

When Hannah introduced Transcript 5 (Figure 6) she represented her production of a transcript as part of this cumulative process. However, her version of the transcript did not build on all that had gone before because, according to the message histories, she had not at that point downloaded

Transcripts 2, 3 or 4 and so she could not build on the work of Heather or Maggie. Her interpretation of the video data therefore unwittingly challenged theirs because she followed Olivia in omitting the contributions of teacher and narrator, and referring to the speakers as Girl A and Girl B.

At this point the students were engaging simultaneously in two forms of asynchronous dialogue, identified here as 'posting dialogue' and 'attached dialogue'. These forms have different characteristics, but may be so intertwined that it is initially difficult to distinguish them.

'Posting dialogue' consists of immediately apparent exchanges in the conference postings. It frequently consists of a series of conversational turns, and is thus easily recognisable as dialogue. Sharing attachments initially appears to be an activity that resources the posting dialogue. This view is reinforced because many attached documents are used as resources rather than as turns in a dialogue. Nevertheless, the exchange of attached documents becomes a form of asynchronous dialogue in its own right whenever it forms a sustained discussion involving two or more people, who are not expected to be in temporal proximity, in which language is used to convey meaning. 'Attached dialogue' takes place through the medium of documents attached to postings. It includes the clear and explicit presentation of ideas, together with challenges, counter-challenges, analysis, evaluation and explanation.

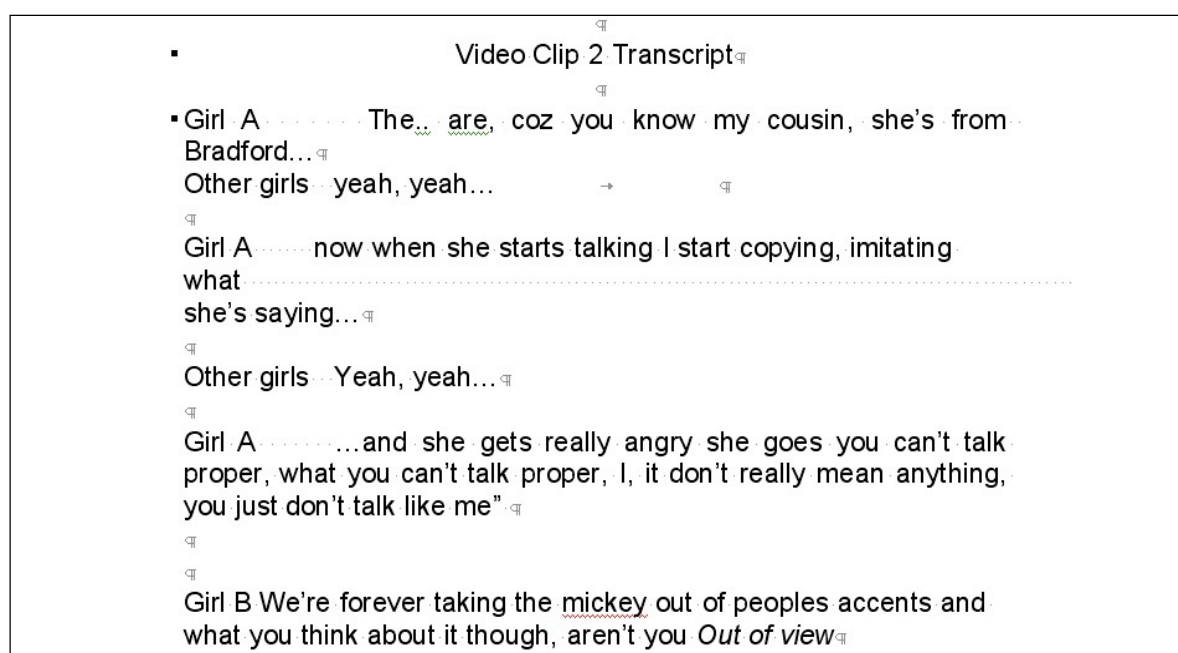


Figure 6: Start of Jet Transcript 5, posted by Hannah.

Because Hannah's interpretation of the video data challenged that of Heather and Maggie, the attached dialogue became exploratory. Although individual authors were not at this point aware that they were producing challenges and counter-challenges, the content of their attached documents fulfilled these functions and thus prompted the development of exploratory dialogue. Olivia and Hannah saw the words of teacher and narrator as irrelevant to the task in hand and omitted these from their documents, while Maggie and Heather made some effort to include them. These two viewpoints were clearly expressed,

developed in some detail and supported by group members. The differences in content, terminology and format suggested a number of areas of contention that needed to be resolved before a final version of the transcript could be produced. Although the dialogue at this point could be interpreted as disputational, in that students were making assertions and counter assertions without attending to each other in the short term, their subsequent behaviour in developing agreed understandings about their data and their project marks this as part of an extended sequence of exploratory dialogue.

When Hannah posted her transcript, the message histories show that she had already opened all previous postings and can therefore be considered to have been completely up to date with the posting dialogue. However, the areas of disagreement about the content, terminology and format of the transcript had not surfaced in conference postings, which had been cumulative in nature. These significant differences of opinion had not been explored, or even mentioned, outside the attached documents. Because Hannah treated the posting dialogue and attached dialogue in different ways, she opened all postings but delayed downloading the most recent attachments. Due to this separation of the different types of dialogue, she was unaware of Heather and Maggie's views until after she had unintentionally presented a detailed challenge to them.

The asynchronous nature of the conference thus allowed challenges and counter-challenges to be mounted accidentally. To avoid engaging in these characteristic elements of exploratory dialogue would have involved extra work for Hannah. Heather and Maggie's transcripts were attached to postings on the evening of 22 November, with the last of these appearing at 22.52. Hannah attached Transcript 5 to a posting early the next morning. The timing of these attachments suggests that Hannah had been working on, or had completed, her transcript before Heather and Maggie attached their versions.

Turns in the attached dialogue tended to be both more widely spaced and more carefully considered than those in the posting dialogue. This resulted in learners working on turns in the dialogue at the same time as each other. The asynchronous nature of the attached dialogue thus prompted the development of exploratory dialogue. In order to avoid presenting a challenge at this point, Hannah would have had to download and consider two additional documents and give extra thought to her own transcript. Mounting the challenge involved less work than avoiding it.

The transcript's status as an improvable object made it difficult for Hannah's unintended challenge to be ignored. The group could not develop multiple versions, so members had to agree on one representation of their video data. The textual nature of the challenge meant that it could not easily be overlooked. All aspects of it could be retained and considered; message histories show that students frequently downloaded transcript versions several times.

Exploratory exchanges were also evident in the attached dialogue of Pearl group. Three days after Pearl group members had agreed their transcript, Charlene posted a new version. Andrea then posted an analysis based on the original version, while Rita posted an analysis based on the revised version. The group spent three days working out which comments related to which version, and this

discussion had the positive effect of prompting both Rita and Andrea to consider new ideas before posting revised analyses.

Pearl group made use of typographical devices and comments within their attached dialogue to distinguish areas of agreement from those that remained problematic. Figures 7 and 8 show them foregrounding the use of exploratory dialogue in their attached documents. Because the response time within attached dialogue is often considerable, Ethan's Transcript 8 (Figure 8) was a response to Transcript 4 (Figure 7), contributed by Rita a week earlier, rather than to the transcripts that made up the intervening turns in the dialogue.

In Transcript 4, Rita had introduced body language. She drew attention to this in the posting dialogue with a statement that formed part of the ongoing cumulative dialogue: 'I have added as much body language as I could find. Could someone please check, as I am sure I have missed some.' At this point, the attached dialogue also appeared to be cumulative. By highlighting her additions in red, Rita drew attention to the ways in which her version developed the previous version. A week later, Ethan's attached document built on Rita's work, but was more exploratory in nature. He used colour not only to frame and distinguish different elements of the transcript, but also to distinguish the different voices of its authors. He preserved Rita's text in black and red and added his own material and comments in blue. This allowed him to engage in exploratory dialogue. In most cases, he amended Rita's version without comment. However, when he removed the word 'authoritatively' from Rita's version, he presented this as a challenge to her interpretation because he not only drew attention to its removal, he also provided an explanation (in blue) for what he had done (Figure 8).

Transcript of Video Clip

Doctor Patient Communication

■ Pre operative visit

1 → (Patient sits next to bed in hospital room. Doctor enters room)

2 → Dr. Mr. Gaylard How are you ?

3 → (Doctor sits opposite patient, nearby making eye contact, Patient speaks very

4 → softly.

5 → Dr. speaks authoritatively louder)

6 → Dr. Nice to see you again.

7 → P: Nice to see you sir. (P leans forward almost like a bow, sits with hands folded)

8 → Dr: How have you been since I last saw you

9 → P. Well since I last saw you... (Patient has head tilted throughout the

10 → conversation)

Commentary: We are going to show you a pre-operative consultation between vascular surgeon Professor Peter Morris and his patient Mr. Gaylard. The patient has been admitted for an operation to reduce the likelihood of him suffering a stroke. Then you will see the same patient the morning after surgery at the post operative ward round.

Figure 7: Start of Pearl Transcript 4, posted by Rita.

Transcript of Video Clip

Doctor Patient Communication

Pre operative visit

1 → (Patient sits on bed in hospital room. Doctor enters room)

2 → Dr. Mr. Gaylard How are you ?

3 → (Doctor sits opposite patient, nearby making eye contact, Patient speaks very

4 → softly

5 → Dr. speaks louder) (removed authoratively – subjective)

6 → Dr. Nice to see you again. ((Dr smiles and extends hand- patient shakes))

7 → P: Nice to see you sir.(P leans forward almost like a bow, sits with hands folded)

8 → Dr: How have you been since I last saw you ((Dr looks at notes))

9 → P. Well since I last saw you... (Patient has head tilted throughout the

10 → conversation)

Commentary: We are going to show you a pre-operative consultation between vascular surgeon Professor Peter Morris and his patient Mr. Gaylard. The patient has been admitted for an operation to reduce the likelihood of him suffering a stroke. Then you will see the same patient the morning after surgery at the post operative ward round.

Figure 8: Start of Pearl Transcript 8, posted by Ethan.

Such exploratory exchanges, containing challenges and worked-through responses, typically took place within the attached dialogue. Only rarely did they prompt a move towards exploratory exchanges within Jet's posting dialogue, and there were no exploratory exchanges within Pearl's posting dialogue. On the few occasions that exploratory dialogue did appear in the postings, quotation and variations in point size, colour and shading were used to develop it in some detail, as in Figure 9. Typographic features allowed the characteristic elements of exploratory dialogue – active participation, justifications, alternative views and visible reasoning – to be interwoven in one posting and used to inform future versions of the improvable object.

In Jet, the posting of Transcript 5 provoked exploratory exchanges in both posted and attached dialogue. Once this challenge had appeared in the attached dialogue, Eileen posted a detailed evaluation of the different perspectives on content, terminology and format of which the different transcripts had made her aware. For example, she asked:

Is it ok to call them "girls"? Wouldn't the title of the clip be: "Young Girls Talking" if so? I feel that there may be an issue we should discuss – though I would agree that the transcripts will be more wordy. Can we work out their names from the way they address each other? and anyone we don't know we could call "3rd person" or something?

Olivia responded: 'I wondered about naming the girls but couldn't do all of them so thought it might be more consistent to letter them instead?' Half an hour later, Hannah suggested, 'Or call them participants?' (Figure 9). Subsequently, the group explored these perspectives in more depth, returned to the literature to investigate how other researchers had dealt with format, and considered why elements of the transcript should be included or excluded.

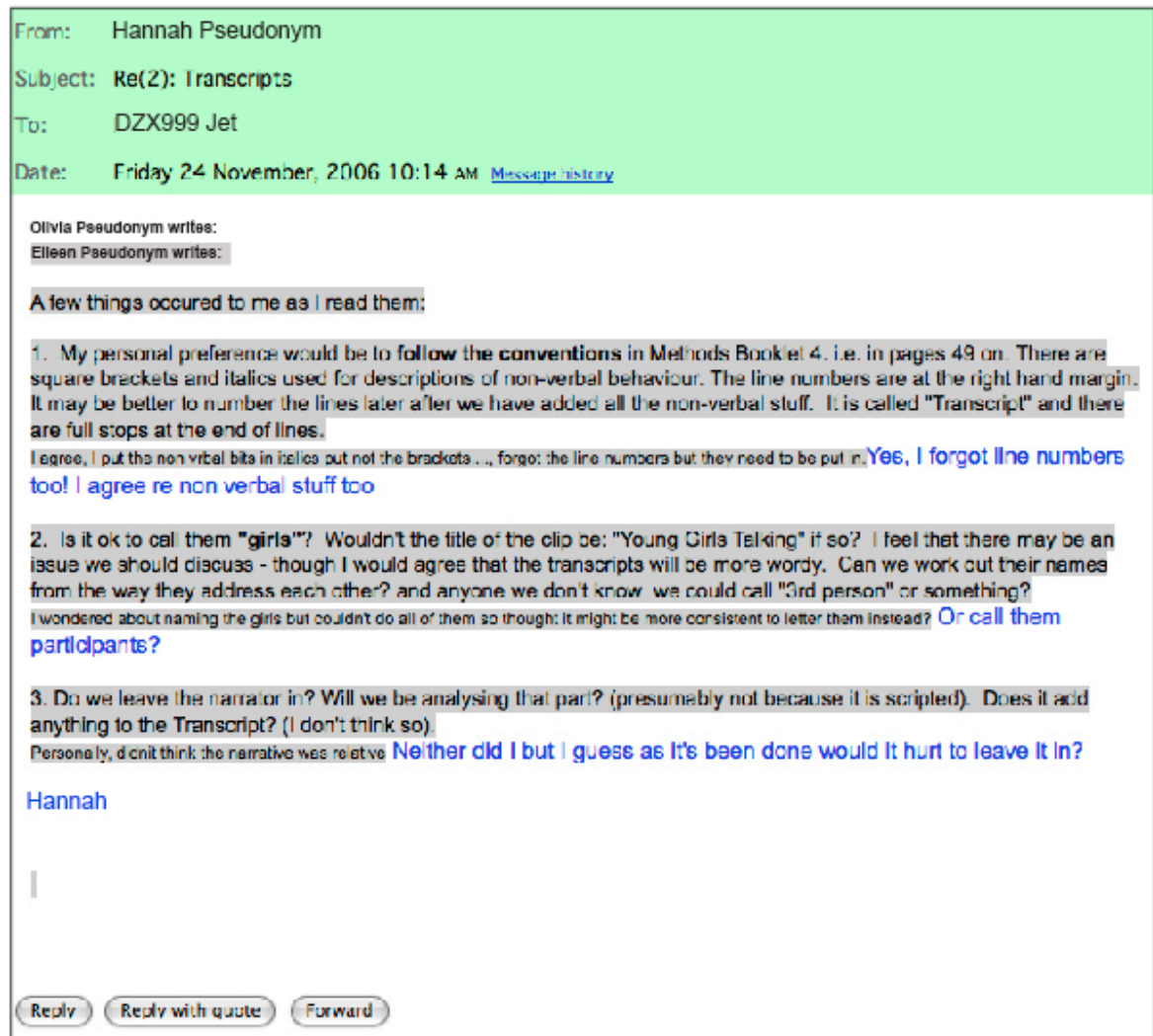


Figure 9: Discussion about Jet transcripts. Different contributions distinguished by size and colour.

Olivia, Eileen and Hannah were all actively involved in the developing conversation, and their contributions could be distinguished due to the use of colour, point size and formatting (Figure 9). When Eileen asked (larger shaded text) whether participants could be named, Olivia justified her position (smaller shaded text) and Hannah added her opinion (unshaded). Thus the reasoning of all was visible at the same time and the numbering of points allowed discussion of three different issues to continue at the same time.

Discussion

Previous examination of asynchronous dialogue between learners has found only limited use of exploratory exchanges. Making use of multimodal analysis and of improvable objects – an analytic tool developed in the context of face-to-

face education – revealed a previously unexplored, and highly exploratory, element to conference dialogue. Analysis showed that active development of improvable objects in an asynchronous environment necessitates the use of some features of exploratory dialogue. Although posting dialogue is largely cumulative, attached dialogue supports and promotes the use of exploratory exchanges because detailed challenges can be easily, even accidentally, mounted and, once mounted, they are automatically retained for consideration. The imperative to end up with a single version of the improvable object on which discussion is focused means that challenges must be resolved. Versions of the same document produced by different authors require active participation by others, they offer statements and suggestions for joint consideration, put forward different approaches, present challenges and are likely to take other opinions into account.

Attached dialogue makes use of features of exploratory dialogue that would be less common in speech. The need to relate discussion to specific versions of improvable objects results in repeated use of evaluation, decision-making and compromise. Sometimes these are explicitly mentioned in postings, but many, particularly small issues such as point size, spacing and minor corrections, are presented in the different versions of the improvable object. The text-based nature of the dialogue supports collation of work and also the direct and detailed comparison of different understandings. These features can be supplemented with use of typographical devices and comments that distinguish areas of agreement from those that remain problematic.

In addition, improvable objects provided learners with the time to develop challenges, evaluate evidence and consider options. Exploratory talk in a synchronous setting requires learners to do these things quickly, producing immediate responses in a continuous conversation that may last for only a short time. In asynchronous settings, exploratory dialogue is more extensive and improvable objects, such as the video transcript, are often the product of many hours of work by learners. Two members of Pearl referred to spending six hours working on a document before submitting it to the group for consideration. Learners set aside time to download, read, consider and work on these documents, and the message histories show that they returned to them over periods of days, weeks or even months. They had to work with these documents for extended periods and could not easily choose to ignore them as they could postings. This added to the documents' importance, encouraging learners to devote time to improving them.

Because improvable objects demand time commitment from learners, their text is likely to be denser and to require more thought than that of conference postings. They also require learners to develop a range of skills and literacies. Each group as a whole had to learn to manage attachments, to post them in forms that were accessible to other group members, to pass control of the document from one to another, and to avoid creating multiple working versions of the same document. In the case of the groups studied here, improvable objects were posted using PowerPoint, SPSS, Acrobat and Word software. In each case some learners encountered problems with software use and noted that they had had to develop their skills in order to create, read and amend these attached documents.

Online learners may be expected to have extensive experience of employing various forms of dialogue in face-to-face educational settings. However, the use of improvable objects and typographic elements to structure, develop and make sense of academic dialogue requires new literacies. In the case of the groups studied here, developing these literacies was not a learning objective of the course, so tutors were not encouraged to do this. This was not necessarily a problem within the posting dialogue, because tutors engaged in this dialogue alongside learners and, in so doing, modelled the good practice they had developed through extensive experience of online group work.

Attached dialogue, on the other hand, is associated with the development of improvable objects. In a course context, it is likely to form part of assessed work. For this reason, tutors on the course considered here worked on the production of these improvable objects only in an advisory capacity and therefore had no opportunity to model the use of the tools developed by other groups. This course may have been unusual in that project groups were excluded from each other's conferences, but groups of learners often work separately on projects, sharing outcomes without discussing their working processes, so they have limited opportunity to develop the relevant literacies in larger groups.

Conclusion

This study has shown that groups of learners within asynchronous conferences make use of improvable objects in the form of attached documents that they develop together. These improvable objects support the use of progressive discourse and exploratory dialogue. When a group is actively engaged in developing one of these documents, its posting dialogue (carried out through conference postings) and its attached dialogue (carried out through the development of documents) can have different characteristics. While posting dialogue remains cumulative in nature, attached dialogue is likely to become exploratory. This form of dialogue is therefore valuable in a learning context because reasons and explanations are made explicit where necessary and all participants make critical evaluations in order to reach joint conclusions.

In order for learners to make effective use of improvable objects in online settings, it is important that educators are aware of their value and are able to help groups of learners develop appropriate literacies. Not all attached documents function as improvable objects, but groups of learners can benefit from documents that they work collaboratively to improve because they involve a problem that requires discussion. Where tutors are involved with the development of these, they have opportunities to model exploratory dialogue and develop awareness of textual elements such as use of colour, point size and numbering that can be used to support this form of dialogue. In cases where the improvable objects are assessed work with little direct tutor involvement, learners need to be provided with opportunities to evaluate their dialogue, and to share good practice.

References

- Baker, M., Hansen, T., Joiner, R., & Traum, D. (1999). The role of grounding in collaborative learning tasks. In P. Dillenbourg (Ed.), *Collaborative Learning: Cognitive and Computational Approaches* (pp. 31-63). Oxford: Pergamon.

- Bereiter, C. (1994). Implications of postmodernism for science, or, science as progressive discourse. *Educational Psychologist*, 29(1), 3-12.
- Chester, A., & Gwynne, G. (1998). Online teaching: encouraging collaboration through anonymity. *JCMC*, 4(2).
- Coffin, C., North, S., & Martin, D. (2009). Exchanging and countering points of view: a linguistic perspective on school students' use of electronic conferencing. *Journal of Computer Assisted Learning*, 25(1), 85-98.
- Conole, G., & Dyke, M. (2004). What are the affordances of information and communication technologies? *ALT-J*, 12(2), 113-124.
- Drummond, K., & Hopper, R. (1993). Back channels revisited: acknowledgment tokens and speakership incipency. *Research on Language and Social Interaction*, 26(2), 157-177.
- Edwards, D., & Mercer, N. (1989). *Common Knowledge: The Development of Understanding in the Classroom*. London: Routledge.
- Ferguson, R. (2009). *The Construction of Shared Knowledge through Asynchronous Dialogue*. Unpublished PhD, The Open University, Milton Keynes.
- Garrison, D. R., & Anderson, T. (Eds.). (2003). *E-learning in the 21st Century: A Framework for Research and Practice*. London and New York: RoutledgeFalmer.
- Gibson, J. J. (1986). *The Ecological Approach to Visual Perception*. London and Hillsdale, New Jersey: Lawrence Erlbaum Associates. (Original work published 1979).
- Harasim, L. M. (1990). Online education: an environment for collaboration and intellectual amplification. In L. M. Harasim (Ed.), *Online Education: Perspectives on a New Environment* (pp. 39-63). New York, London: Praeger.
- Jones, C., Cook, J., Jones, A., & De Laat, M. (2007). Collaboration. In G. Conole & M. Oliver (Eds.), *Contemporary Perspectives in E-learning Research* (pp. 174-189). London: Routledge.
- Kaye, A. (1989). Computer-mediated communication and distance education. In R. Mason & A. Kaye (Eds.), *Mindweave: Communication, Computers and Distance Education* (pp. 3-21). Oxford: Pergamon Press.
- Kress, G., & van Leeuwen, T. (1990). *Reading Images*. Melbourne, Victoria: Deakin University Press.
- Kress, G., & van Leeuwen, T. (2006). *Reading Images* (Second ed.). London: Routledge.
- Lapadat, J. C. (2002). Written interaction: a key component in online learning. Retrieved 5 January, 2009: <http://jcmc.indiana.edu/vol7/issue4/lapadat.html>
- Littleton, K., & Whitelock, D. (2005). The negotiation and co-construction of meaning and understanding within a postgraduate online learning community. *Learning, Media and Technology*, 30(2), 147-164.
- Mercer, N. (2000). *Words & Minds*. London: Routledge.
- Mercer, N. (2002). Developing dialogues. In G. Wells & G. Claxton (Eds.), *Learning for Life in the 21st Century* (pp. 141-153). Oxford: Blackwell Publishers.
- Mercer, N., & Littleton, K. (2007). *Dialogue and the Development of Children's Thinking*. London and New York: Routledge.

- Mercer, N., Littleton, K., & Wegerif, R. (2004). Methods for studying the processes of interaction and collaborative activity in computer-based educational activities. *Technology, Pedagogy and Education*, 13(2), 195-212.
- Mercer, N., & Wegerif, R. (1999). Is 'exploratory talk' productive talk? In P. Light & K. Littleton (Eds.), *Learning with Computers: Analysing Productive Interaction* (pp. 79-101). London and New York: Routledge.
- Mercer, N., Wegerif, R., & Dawes, L. (1999). Children's talk and the development of reasoning in the classroom. *British Educational Research Journal*, 25(1), 95-111.
- van Leeuwen, T., & Jewitt, C. (2001). *Handbook of Visual Analysis*. London: Sage.
- Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction. *Communication Research*, 19(1), 52-90.
- Walther, J. B. (1996). Computer-mediated communication: impersonal, interpersonal and hyperpersonal interaction. *Communication Research*, 23(1), 3-43.
- Wegerif, R. (1996). Using computers to help coach exploratory talk across the curriculum. *Computers & Education*, 26(1-3), 51-60.
- Wegerif, R. (1998). The social dimension of asynchronous learning networks. *Journal of Asynchronous Learning Networks*, 2(1), 34-49.
- Wegerif, R., & Mercer, N. (1996). Computers and reasoning through talk in the classroom. *Language and Education*, 10(1), 47-64.
- Wells, G. (1999). *Dialogic Inquiry: Toward a Sociocultural Practice and Theory of Education*. Cambridge: Cambridge University Press.
- Whitty, M., & Gavin, J. (2001). Age / sex / location: uncovering the social cues in the development of online relationships. *Cyberpsychology and Behavior*, 4(5), 623-630.
- Wu, D., & Hiltz, S. R. (2004). Predicting learning from asynchronous online discussions. *Journal of Asynchronous Learning Networks*, 8(2), 139-152.