

Communicating Knowledge, Getting Attention, and Negotiating Disagreement via Video Conferencing Technology: A Multimodal Analysis

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This article examines dyadic team work via video conferencing (inter)actions and explicates communicating and accepting knowledge, coordinating attention, and disagreeing. We demonstrate that such knowledge communication, which in the literature quite often is viewed as solely or primarily language-based is, in fact always multimodal. Communicating knowledge, coordinating attention, and disagreeing are always performed through the interconnection of multiple modes from gaze and gesture, to posture and object handling, and may be produced with or without language.

According to our findings presented here, the verbal acceptance of knowledge lags much behind the action that already demonstrated a participant's acceptance of another's knowledge. Language use also tells us little about the attention that a participant may pay, as being quiet might easily be misinterpreted as listening. Further, our findings show that language is never used alone in disagreements, rather, language may build an aggregate with other modes, and language may be super-ordinated or sub-ordinated to other modes in (inter)action.

The article illustrates the complexity of everyday knowledge communication, which is relevant for educational and also particularly to organizational settings.

Keywords: Attention, disagreement, knowledge communication, multimodal (inter)action analysis, multimodal discourse analysis, multimodality, negotiation, video conferences

1 INTRODUCTION

This article investigates how two participants communicate knowledge, shift their focused attention and negotiate a disagreement in a task-based (inter)action via video conferencing technology. Utilizing multimodal (inter)action analysis as our theoretical and methodological framework, we begin by outlining the various theoretical notions and analytical tools used in this article. In our analysis, we first examine a site of engagement, a window opened up through the intersecting practices and discourses (Scollon, 1998, 2001; Norris, 2014) that make the real time irreversible actions possible. We then narrow the site of engagement and zoom in on particular higher-level actions such as communicating knowledge or disagreeing, which come about through and establish the intersecting chains of lower-level actions formed by the modes of gesture, gaze, posture or object handling as well as language (Norris, 2004, 2011, 2014). After these micro-analyses, we again examine the site of engagement from which these excerpts were taken and analyze the practices and discourses that come into play in these examples. While the data come from a video conferencing (inter)action, we would like to argue that much of what is discussed here is relevant also to face-to-face communication. Some instances in the examples, however, are particularly relevant to the action of using video conferencing technology. Overall, the article will add to the literature on video conferencing as well as to the literature of knowledge communication and the literature on negotiating disagreements.

2 MULTIMODAL (INTER)ACTION ANALYSIS: THEORY AND METHODOLOGY

Multimodal (inter)action analysis is a holistic analytical framework that understands the multiple modes in (inter)action as all together building one system of communication (Norris, 2004, 2011, 2013a, 2013b, 2014a, forthcoming). (Inter)action in this analytical framework is written with parenthesis around ‘inter’ in order to highlight that all actions, no matter if they are taken with another human being, or objects within the setting, or the environment, are interactions. With this notion, the theory/methodology emphasizes the connection between social actors and environment (Norris, 2013a, 2014a, forthcoming).

Building upon Scollon (1998, 2001) and many other frameworks (Goffman, 1959, 1963, 1974; Gumperz, 1982; Tannen, 1984; Kress and Van Leeuwen, 2001; Van Leeuwen, 1999; McNeill, 1992), multimodal (inter)action analysis consists of a large number of methodological tools that can be utilized to analyze (inter)action, i.e.: any human action, in its complexity. The analytical tools enable a researcher to move easily between macro, intermediate, and micro analyses; and the nature of this socio-cultural theory/methodology necessarily leads the researcher to connect various levels of inquiry. In the following paragraphs, we set out to demonstrate how some of the analytical tools are used to embrace a broader socio-cultural as well as a practice-based level and commensurate these with very detailed micro analyses. Next, we illustrate the key concepts used in our data analysis below. In order to demonstrate the ways in which the particular concepts are used, we walk the reader through the analysis that we have conducted for the data pieces in the next section.

2.1 Mediated action

Multimodal (inter)action analysis (Norris, 2004, 2011, 2013a, 2013b, 2013c, 2014a) takes the mediated action as a unit of analysis. The mediated action is defined as a social actor acting with/through mediational means (Wertsch, 1998; Scollon, 1998). At all times there is an inherent tension between the social actor and the mediational means. Through this tension the mediated action embraces socio-cultural, historical and individual characteristics. We utilize a notion of mediation that builds on Wertsch (1998) and Scollon’s (1998) development of Vygotsky’s (1978) work. However, whereas Vygotsky used the concept of mediation to explore language and social development, Wertsch and Scollon broadened the notion of mediation, considering, for example, how having a cup of coffee links to neoliberal and neocapitalist discourses (Scollon, 2001), and how developments in pole-vaulting technology fundamentally alter the

sport (Wertsch, 1998). Further, work in multimodal (inter)action analysis (Norris, 2004, 2009, 2011; Geenen, 2013, 2014; Pirini, 2013, 2014, 2015, 2016; Makboon, 2015; Matelau, 2014; Norris and Makboon 2015) uses various kinds of mediated action as the unit of analysis for the study of social action in many different settings. Norris (2004) delineates the mediated action into higher- and lower-level actions. Lower-level actions are defined as the smallest (inter)actional meaning units of a mode. A mode is defined as a system of mediated action (Norris, 2013c), emphasizing their composition of the socio-cultural, historical, and individual acquisition aspects. In the mode of gesture, a gesture unit is a lower-level action. Similarly, in the mode of spoken language an utterance is a lower-level action. A higher-level action is defined as a chain of lower-level actions, with an opening and a closing. For example, a conversation with a colleague is a higher-level action with a clear opening and closing. The higher-level action of a conversation with a colleague might open as a social actor enters the office of another employee, and close as they leave. Multiple chains of lower-level actions co-constitute the conversation. These lower-level actions might include gestures, spoken language, postural shifts and movements in relation to the layout of the office. Higher and lower-level actions are heuristic units for the analysis of mediated action, and neither is logically prior. Thus, the higher-level action of a conversation with a colleague is constituted by and made possible through multiple chains of lower-level actions. Simultaneously those lower-level actions are made possible through the higher-level action of a conversation with a colleague. Analysis shows that many levels of higher-level actions exist, and clearly delineating higher- and lower-level actions allows for replicability of the analysis.

2.2 Foreground/background continuum of attention/awareness

Social actors always produce multiple simultaneous higher-level actions, and they produce these higher-level actions at different levels of their phenomenological attention/awareness. Norris (2004) defines three (continuous) levels of attention/awareness: Foreground, mid-ground and background. The higher-level actions that a social actor produces can be placed upon this continuum using modal density as a measure of attention/awareness. Modal density is a composite measure of the intensity and complexity of lower-level actions that co-constitute a higher-level action (Norris, 2004, 2011). Thus any higher-level action can be analysed to determine the complexity of lower-level actions and the intensity of lower-level actions that co-constitute it. Based on this analysis higher-level actions are positioned along a continuum of attention/awareness in either the foreground, mid-ground or background of attention/awareness or somewhere in-between. The foreground/background continuum of attention/awareness shows a snapshot in time of the simultaneously produced higher-level actions of a particular social actor. Graphing different moments in a particular site of engagement shows higher-level actions moving within different levels of phenomenological attention/awareness, and newly produced higher-level actions entering into phenomenological attention/awareness.

2.3 Semantic/pragmatic means

Social actors regulate their production of higher-level actions using the higher-level discourse structure called semantic/pragmatic means. We refer to a semantic/pragmatic means as a higher-level discourse structure since it serves a structuring function of higher-level actions. Semantic/pragmatic means are pronounced lower-level actions such as beat gestures, utterances, deictic gestures or other pronounced lower-level actions. They are produced when social actors restructure their focused attention/awareness and serve a dual function:

1. A means functions semantically by marking the end of a foregrounded higher-level action (or the beginning of a new higher-level action), facilitating the organization of higher-level actions in the performers own mind.
2. A means functions pragmatically by communicating the upcoming occurrence of a shift in foregrounded higher-level action to the other participants. (Norris, 2004:117)

Thus, means both structure the mind of the social actor producing them, and indicate to others that a shift in foregrounded higher-level action has, or is about to occur.

2.4 Modal configurations

Norris defines modal configurations as ‘the hierarchical configuration of lower-level actions (or their chains) in relation to other lower-level actions (or their chains) within a higher-level action’ (Norris, in 2016: 125). As pointed out above, lower-level actions are mutually constitutive with higher-level actions. Analysis of modal configuration requires an analysis of the various lower-level actions that are mutually constitutive of a higher-level action and how they relate to one another. In a sense the notion of modal configurations ‘explodes’ higher-level actions into their mutually constitutive lower-level action components, and addresses the relationships between them. Modal configurations (Norris, 2009, 2014, 2016 b) are highly analytical, and the relationship between lower-level actions (and/or chains of lower-level actions) can be analysed as hierarchical through the meaning that is produced. The lower-level actions that are most important to the meaning produced are defined as most important to the construction of the higher-level action. Norris (2016 b) points out that when analyzing modal configurations analysts are working backwards, as the meaning of higher-level actions must be determined first; and forwards as the higher-level action progresses in situ. Analysts must focus on higher-level actions to establish the meaning produced, rather than, for example, attempting to focus on an isolated lower-level action such as a single gesture. While the analysis may eventually come to focus on a single gesture, it must operate within the framework of meaning produced by/through a higher-level action (Norris, 2004, 2011). Yet, higher-level actions do not have to be extensive (such as a conversation), they can be very brief moments in interaction that can be delineated by a beginning and an end (Figure 18 & 20 illustrate this in detail).

2.5 Site of engagement

The concept of the site of engagement was first proposed by Scollon (1998: 11) as the ‘... window opened up through the intersection of social practices...’ Later, Norris and Jones (2005) defined the site of engagement in various ways, one of which is of particular importance to this article:

The ‘real time window’ opened through the intersection of social practices and mediational means that enables a mediated action to occur. Norris and Jones (2005: 139)

A site of engagement is thus that moment in real time, enabling mediated action to occur, which is brought about through various social practices as well as through multiple mediational means/cultural tools. Simultaneously, and following this train of thought, each mediated action that is occurring necessarily has to be linked to various social practices as well as to multiple mediational means/cultural tools. Because each mediated action occurs in a site of engagement, and because each site of engagement is linked to social practices as well as discourses (Norris, 2014), the concept of the site of engagement invites the researcher to explore mediated actions in connection with practices and discourses, thus moving between micro, intermediate and macro analyses.

The site of engagement from which the data for this article originates incorporates two social actors (physical and psychological) who are participating in a research project and are working on four different tasks together¹, their historical bodies, multiple mediational means/cultural tools such as the rooms, the furniture, the papers and pens, the time, the place, as well as the two researchers who have organized the session and who are present throughout. Because the participants responded to an advert that tried to enlist social actors to take part in the study, Matt and Steve are clearly taking part in a research project.

¹ Because here, we would like to make the point of an action being embedded in a larger scale action, we do speak generally about the tasks. Also, because three of the tasks will not be relevant for this article, a description of each one would be outside of the scope of the article. The relevant task, task 4 is described in the section, where we discuss it in detail.

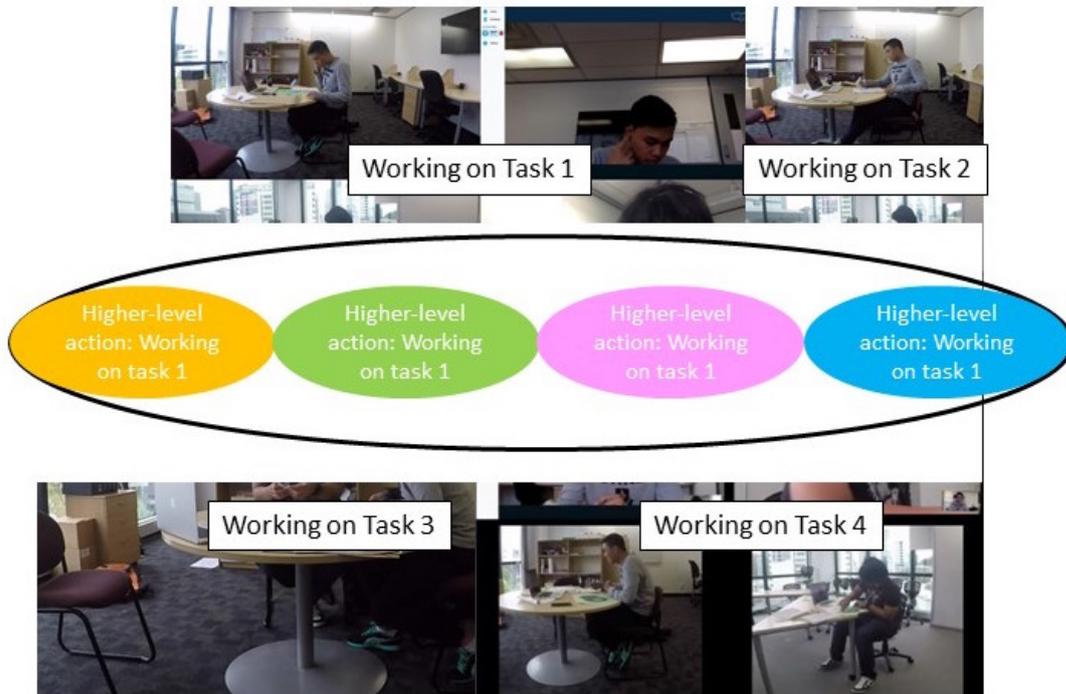


Figure 1: Large scale action in this site of engagement: Participating in a research project.

This site of engagement thus includes the large scale action (Norris, in press) participating in the research project which is made up of completing four tasks (Figure 1).

2.6 Scales of action

We speak of scales of action when investigating the (always) numerous levels of higher-level actions involved (Norris, in press; Pirini, 2015).

Each higher-level action is linked to other higher-level actions; each higher-level action is also a part of larger scale higher-level action. While some of the higher-level actions are sequential (as the four tasks in Figure 2), others are simultaneous; all of them are integrated with yet other higher-level actions (on an even larger scale, the higher-level action of the two participants studying at the university; on a smaller scale, the higher-level action of taking classes before and/or after the research project) and the higher-level actions and their integration can be different for each social actor (each student may be taking different classes, driving or walking to the university, etc.). All (inter)action is part of processes that link to other processes in time, space and cognition (Norris, in press). However, for this article, we are interested in how social actors work on tasks and what we can learn about their multimodal (inter)actions as they negotiate knowledge. For this, we want to narrow our site of engagement.

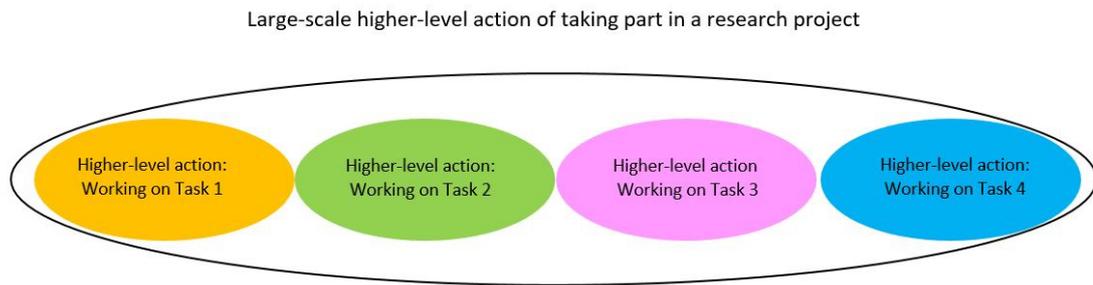


Figure 2: Large scale higher-level action: Participating in a research project.

2.7 Site of engagement: Working on four different tasks together

The site of engagement working on four different tasks together comprises the real time mediated actions that take place as soon as the participants have entered into the large scale higher-level action of participating in a research project. This site of engagement is thus framed by the larger site of engagement shown in Figure 1, which is comprised of the large scale higher-level action of participating in a research project (Figures 1 & 2) as well as the researchers, the rooms, etc. The ‘opened window’ has now been narrowed a little (Norris, 2016 b) and we can engage in studying the site of engagement working on four different tasks together (Figure 3).

This site of engagement links to practices such as the practices of team work or negotiation, video conferencing or working with physical objects such as pens and paper, and institutional practices such as sitting at a desk or table in a classroom; the mediated actions performed also link to, establish and re-establish, and/or change discourses such as the discourse of work or the institutional discourse. Only when considering practices and discourses that make the particular mediated actions possible, can we truly understand the significance of the micro analyses discussed below. However before turning to a micro analysis, we would like to investigate an intermediate level of analysis, and for this, we will again narrow the ‘opened window’.

2.8 Site of engagement: Working on Task 4

The two students, Mat and Steve, have completed three tasks: one via Skype only being able to see the other but not the self, one per Skype audio-only, and one face-to-face (in that order). All tasks are structured similarly, and while we are not able to go into detail about each task here, the 4th task, called the Garden-task, is constructed as follows: The participants each are handed an envelope with instructions and various cut-outs of flowers (blue, red, yellow), a half-drawn map of a garden, and pens. They are given about 5 minutes to individually read the instructions and then they have about 15 minutes to complete the garden by placing the flowers, which all have different requirements (such as shady or sunny, wet or dry), drawing a fence around the pond and the very wet areas in the garden, and drawing a path that is supposed to encircle the garden in a way that the individuals living in the home (indicated on the map) can also easily reach a swing that is attached to a tree close to a wet area. There is no correct way of dealing with this task and therefore, the participants have to negotiate each one of these aspects. One other difficulty is induced: the participants cannot show each other their drawings. This constraint induces a heightened need for explaining by the participants.

For task 4, Mat and Steve are asked to work via Skype, and one of them has moved into a different room, where a laptop and camera are already set up. At this point (Figure 4), Mat and Steve are comfortable and they together know what they are doing.



Figure 3: Site of engagement working on four different tasks together.

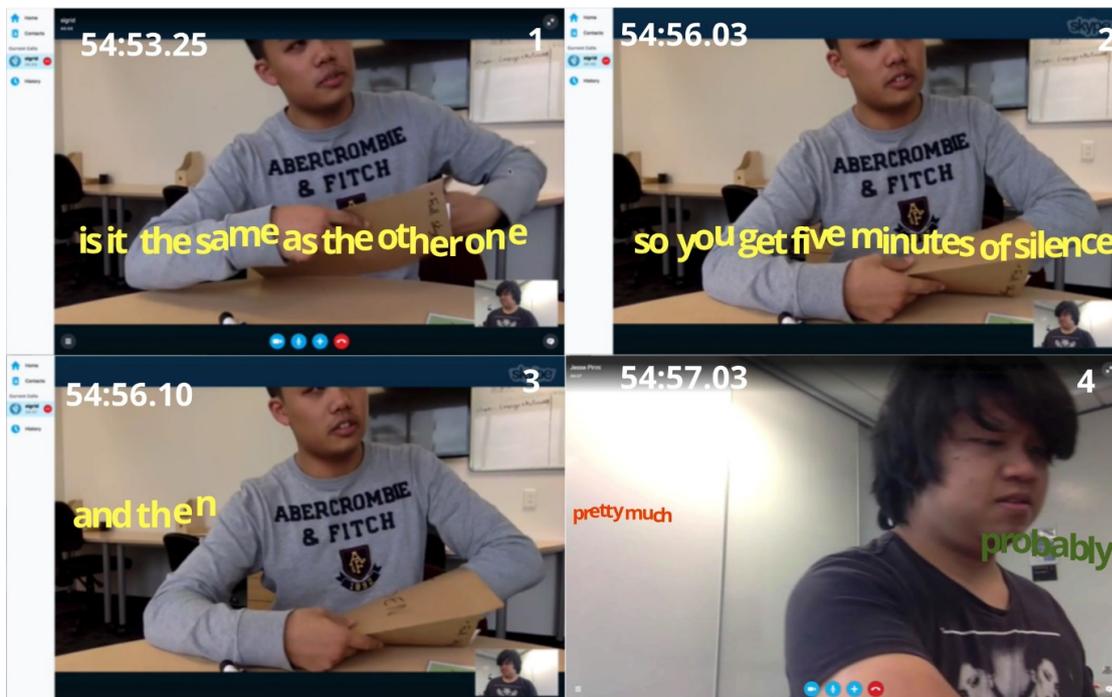


Figure 4: Mat and Steve are comfortable working on their tasks together.

When Mat asks the researcher in his room ‘is it the same as the other one’, Steve who cannot hear the researcher’s confirmation, answers confidently in a lowered tone of voice with ‘probably’. It is this site of engagement, their working on Task 4, which we have analyzed in detail to gain a better understanding of how social actors multimodally negotiate disagreements and communicate knowledge when working on a task together. Strikingly, we found two very different ways:

1. Either Mat or Steve had found the best answer and communicated this knowledge to the other; the other in turn immediately took this knowledge as the best answer and adjusted their own answer accordingly. Importantly the moment that a knowledge shift occurs for Mat or Steve is not linguistically marked.
2. Mat and Steve had found different best answers, but both were aware that either answer could be correct; in this case a disagreement results and an answer is negotiated until one convinced the other of their own ‘best answer’.

While we find much work in the literature where disagreements and their resolutions are discussed (Holmes and Marra, 2004; Marra, 2012; Angouri, 2012; Goodwin et al, 2002; Wodak et al, 2011), there is much less literature that engages with communicating knowledge as in our first finding. We believe the reasons for scholars so far not having studied this kind of knowledge communication lies in the fact that this way of communicating knowledge is unmarked and does not rely heavily on language, but rather is produced in largely non-verbal ways.

3 LITERATURE

Without going too deeply into the abundant literature on video conferencing, negotiation and disagreements, we will present only some literature to illustrate the breadth and depth of this area of research.

3.1 Video conferencing

Our participants communicate via Skype in the (inter)action that we focus on here. The role of video conferencing has been extensively reviewed by Loenhoff & Schmitz (2015) in their recent edited volume examining how children in isolation communicate via video conferencing with friends and family. Norris (2016 a) and Geenen (forthcoming) apply multimodal (inter)action analysis to video conferencing between family members. However, here we are primarily focused upon communicating knowledge, shifting attention, and negotiating disagreements in (inter)action in general as well as via video conferencing technology.

3.2 Negotiating disagreements

Disagreements are often associated with conflict, especially from a management and organization perspective (Rahim, 2011; Kennedy & Pronin, 2008). Simultaneously, a more complex view of disagreements and sociocultural competence continues to develop in the literature (Marra, 2012; Angouri, 2012). This strand of literature shows that social actors produce disagreements in many different ways. Depending on the strategy taken, conflict can be avoided or addressed. In their work on leadership in meetings, Holmes and Marra (2004) develop a continuum of disagreement strategies from least to most confrontational: Conflict avoidance; diversion; resolution through negotiation; and resolution by authority. This continuum highlights the range of strategies that good managers employ when dealing with disagreement. In addition, disagreements do not necessarily equate to conflict. In many settings disagreements are encouraged, and indeed are an expected part of social practice. Several authors have examined disagreements in different cultural settings (Schiffrin, 1984; Kakava, 1993; Blum-Kulka et al, 2002; Marra, 2012;

Goodwin et al, 2002; Tannen & Kakava, 1992). Findings show that disagreements may be discouraged or encouraged depending on the cultural setting. Coming from a linguistic perspective, all of these studies focus primarily on the use of language in negotiations.

3.3 The role of knowledge in disagreements: Epistemic status

McCrae (2009: 166) defines disagreement as ‘a difference of opinion between two or more people’. Marra (2012) notes that this simple definition highlights the multiparty nature of disagreements. She shows that the initial proposal of a particular viewpoint only becomes a disagreement with the participation of other social actors. Learning the role of disagreement, and how to disagree is an important skill for participation within a community of practice (Lave and Wenger, 1991). Thus disagreements are interactive phenomena through which social actors produce differences in opinion, and express differences in knowledge.

Differences in knowledge about events, states, situations and so forth are a central aspect of interaction, and the changing state of information often drives interactions (Kastberg, 2007; Schiffrin; 1986, Heritage, 2012). Social actors develop their understanding of what they expect others to know, how certain they are about knowledge, and how relevant particular information is in a given interaction. Building on Kamio (1997), Heritage introduces the notion of epistemic status, defined as a state ‘in which person’s recognize one another to be more or less knowledgeable concerning some domain of knowledge as a more or less settled matter of fact’ (Heritage, 2012, p. 32). Epistemic status operates in concert with epistemic stance (Heritage, 2012). Epistemic stance concerns how speakers produce themselves as knowledgeable through turns at talk. While epistemic stance and epistemic status are related, they must be distinguished from one another since speakers may produce themselves as more or less knowledgeable through their talk.

Heritage (2012) shows a range of ways that knowledge imbalances are implicated in conversational sequences. Speakers may request information, positioning themselves in a position of less knowledge (K-). Continued requests for information, or taking up epistemic stances that are K- can initiate topics, achieve topic shifts, and achieve continuation of a sequence. Conversely speakers may initiate a story or announcement, positioning themselves as knowledgeable about some topic (K+).

In order to manage knowledge in interaction, social actors are required to demonstrate the changing state of their knowledge, and to develop awareness of the knowledge of other social actors. Studies into language show that knowledge shifts can be demonstrated through discourse markers (Schiffrin, 1986), sometimes referred to as tokens (Heritage, 1984). The discourse marker ‘oh’ has been implicated in information management during interactions, firstly as a marker of the speaker’s attention towards a particular moment, and in turn as a marker to a hearer that some change might have occurred. Both Schiffrin (1986) and Heritage (1984) share a similar view of ‘oh’ as a discourse marker indicating that a speaker has shifted their knowledge state in some way. Heritage (2012) also argues that assessments can indicate a change in knowledge state, since assessing a topic suggests sufficient knowledge about that topic.

Multimodal markers of knowledge state changes have not been explored widely in the literature. In a study on language learners Jakonen and Morton (2015) show students seeking information, and then returning to their work once they have received a suitable answer. Taking a similar approach Serk and Jacknick (2015) explore smiles in epistemic interactions, showing that smiles maintain affiliation and promote progressivity of talk. While there is some sense of multimodal production of knowledge change through facial expression, gaze shifts, posture shifts and returning to a task, the multimodal analysis is subjugated to spoken language. The primacy of spoken language in these analyses reflects the theoretical basis of conversation analysis (Haddington, Mondada & Nevile, 2013). Again taking a strongly linguistic perspective, these studies show that aspects of discourse provide resources for knowledge management that speakers and hearers orientate towards.

3.4 Knowledge Communication

Morek (2015) claims that:

Explanations provide answers to the why, how or what of concepts, conditions, actions or events... i.e. they provide verbal explications of meanings, features, logical or functional relations. Therefore, they are usually linguistically complex in the sense that they involve the construction of coherently structured units above the sentence level. If successful, explanations result in comprehension and knowledge gains on the part of the addressee. (Morek, 2015: 2)

The above characterization considers knowledge communication to be: 1) Produced through spoken language; and 2) Operating in a flat or linear fashion, transmitting knowledge from speaker to addressee.

However, the literature on knowledge communication explicitly rejects transmission models of communication, such as the sender-receiver model, in favor of transactional models based on co-construction (Kastberg, 2007). Furthermore, Kastberg (2007) points out that all forms of human organization are in fact communicative. This assertion clearly aligns with the notion of (inter)action in multimodal (inter)action analysis.

When focusing on ways of knowing we find that knowledge is not only produced through spoken language (Pirini, 2015, 2016). Indeed, we argue that in order to gain deep insight into organizational knowledge communication, we need to embrace a holistic multimodal perspective. We demonstrate this in the examples below.

4 ANALYSIS 1: MAT COMMUNICATES & STEVE ACCEPTS KNOWLEDGE

In this example, Mat and Steve are working through adding paths to their garden; and Mat explains what he did. Figure 5: Audio Transcript 1 illustrates their talk, time stamps before the lines indicate the starting points of the utterances, and time stamps within the lines indicate the snapshots taken for the multimodal transcript (Figures 6, 8, 9, 11, and the first image in Figure 12).

In lines 1 to 16, Mat explains where he placed his path, making use of "so" in lines 13 and 15 indicating a causal relationship (Schiffrin, 1986) and linking the layout of his path to the requirements of the task.

In line 17 of Figure 5, we see Steve making a noise 'engh' to which Mat responds with 'what are you doing' (line 18), he continues with 'ahre you rubbing ouhhut' (line 19). In line 20, Mat continues with 'ok so'. Steve overlaps (line 21-22) saying 'I didn't get the swing' indicating that his knowledge regarding the task has shifted, and he has reduced the knowledge asymmetry between himself and Mat (Kastberg, 2007). Mat verbally closes off this higher-level action with a discourse marker (Schiffrin, 1987) 'hm well' in line 23, displaying his recognition of Steve's shifted knowledge state.

While we can make sense of what is happening here by just looking at the talk in this (inter)action, we in fact miss where and how Steve accepts Mat's placement of the garden path as the correct placement by only investigating the mode of language. Only when examining this excerpt multimodally, can we understand how the acceptance of knowledge is performed by Steve and Mat.

Figure 6 illustrates the moment from beginning of line 9 (left in Figure 6) and lines 10 & 11 from Figure 5: Audio Transcript 1 (right in Figure 6). Here, we see Steve (to the right in the images) listen to Mat and gaze at his own image of the garden (Figure 6 Image 1) and grab a paper towel (Figure 6 Image 2).

Here, between 05:25.00 and 05:28.28 Steve's primary modal configurations change (Figure 7). Whereas Steve was listening to Mat and looking at his image of the garden (Figure 6 Image 1 & Figure 7 left), producing a spoken language-gaze modal aggregate, he changes his modal configuration, producing (hierarchically primary) an object handling-gaze modal aggregate (Figure 6 Image 2 & Figure 7 right).

Here, Steve has taken on Mat's knowledge about where to place the path as correct and has determined

1	5:15.10	Mat:	um
2	5:16.08		wha- wha I did
3	5:17.09		is that
4	5:18.15		I made one path
5	5:19.19		looping around the fish pond
6	5:21.13		around the flowers
7	5:22.08		and then around the greenhouse
8	5:24.08		and
9	5:25.00		(1, 5:25.00) having path loop around the fishpond
10	5:27.13		on the top right
11	5:28.22		hand side (2, 5:28.28) of the fish pond
12	5:30.00		allowed me to the (3, 5:30.23) tree as well
13	5:31.12		so I get to see the
14	5:32.16		the swing (4, 5:32.23)
15	5:32.28		so
16	5:33.08		things (5, 5:33.18) that will grow
17	5:36.04	Steve:	engh
18	5:36.23	Mat:	what are you doing (6, 5:37.06)
19	5:37.14		ahhre you rubbing ouhhut (7, 5:38.12)
20	5:39.25		(8, 5:39.00)(9, 5:39.25) ok so
21	5:40.10	Steve:	\sum_I
22	5:40.21		(10, 5:40.21) didn't get the swing
23	5:42.06	Mat:	(11, 5:42.28) hmm well

Figure 5: Audio Transcript 1: Mat and Steve are adding paths to their garden.



Figure 6: Steve listens to Mat & grabs a paper towel.



Figure 7: Steve’s primary modal configuration at 05:25.00 (left) and at 05:28.28 (right).



Figure 8: Mat continues to explain and Steve continues to rub out.

that his own path was incorrectly drawn. Rather than verbalizing this, Steve picks up a paper towel and begins to rub out his own path. At this point, Mat is 13 seconds into his explanation of where he placed the path and it takes 8 more seconds before Steve makes a noise ‘engh’ and Mat asks ‘what are you doing’. Here, we see that the actual up-take of Mat’s path had occurred non-verbally and had occurred before a verbal noise or any talk occurred.

Figure 8 illustrates the ongoing verbal/non-verbal interchange.

Steve in fact does not verbalize his ‘engh’ until he is almost finished rubbing out his path and it is this vocalization (last image Figure 8) that draws Mat’s attention so that he asks ‘what are you doing’ (Figure 9).

It is here that Mat realizes that Steve has accepted his positioning of the path as knowledge. Both Mat’s and Steve’s facial expressions of a happy smile indicate this realization of Mat having been acknowledged as the one who knows. The multimodal analysis shows that Steve’s indication of a shift in knowledge through spoken language (line 17: engh, line 21, 22: I didn’t get the swing) is not equivalent to his multimodal shift in knowledge, which occurs much earlier.

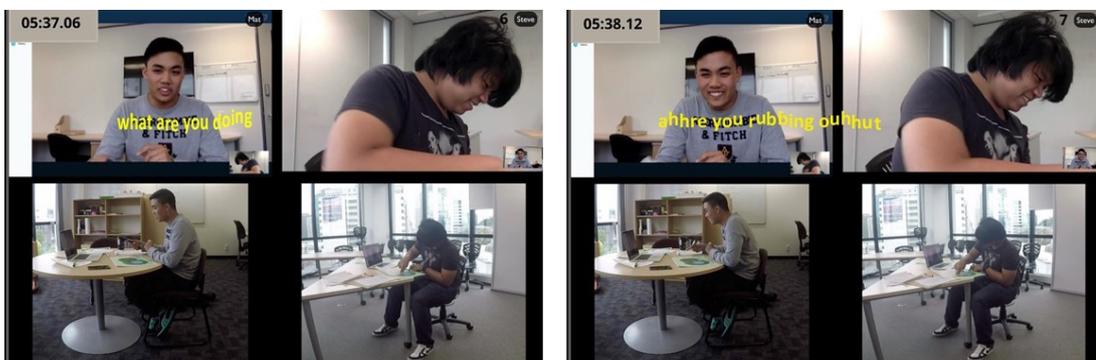


Figure 9: Mat realizes that Steve has taken his explanation as knowledge.

24	5:45.16	Mat:	(12, 5:44.09) um
25	5:46.10		so (13, 5:46.03)
26	5:46.22		my red flower
27	5:47.06		is (14, 5:47.22) between
28	5:48.23		you (15, 5:48.28) can see the
29	5:49.10		that two arrow
30	5:50.02		like the (16, 5:51.00) double ended arrow
31	5:51.19		after (17, 5:52.09) damp soil
32	5:52.23		between (18, 5:53.08)
33	5:53.20		the shade
34	5:54.11		(19, 5:54.13) and
35	5:55.00		the damp soil
36	5:55.27		see that
37	5:55.07	Steve:	the what
38	5:57.25	Mat:	(20, 5:57.15) you know where the damp soil
39	5:59.05		meets the shade
40	6:01.02	Steve:	the damp soil meets t-

Figure 10: Audio Transcript 2: Shifting focused attention.

5 ANALYSIS 2: SHIFTING FOCUSED ATTENTION

5.1 Mat changes his focus to the next mini-task

Only after both participants have realized that Mat's garden path has been acknowledged by Steve as the correct answer, Mat says 'ok so' (Figure 5: Audio Transcript 1 line 20); and after Mat says 'hm well' (Figure 5: Audio Transcript 1 line 23) the exchange continues as shown in Figure 10: Audio Transcript 2.

Mat's discourse marker 'ok so' (line 20) is a semantic/pragmatic means (Norris, 2004, 2011) which occurs with Mat leaning back and indicates that Mat is changing his focus to the next higher-level action (Figure 11), the next mini-task of placing a red flower into the garden.

Mat, who already is focused upon the next mini-task waits for Steve to finish rubbing out, playing with the pen in his hand and gazing with a little unease back and forth from his garden to Steve (the screen), waiting for Steve to focus on placing the red flowers (Figure 12) as he says 'hm well' (line 23 in Figure 5: Audio Transcript 1).

5.2 Mat tries to get Steve to also change his focus to the next mini-task

Since Steve continues to rub out, Mat produces another means, a much louder 'um so' (Figure 10: Audio Transcript 2 lines 24 & 25) and continues with 'my red flower' (line 26) with lowering intonation, indicating more to come (Tannen, 1984). Here, the 'um so' is a semantic/pragmatic means that has the function to compel Steve to change his focus as well (Figure 13).

However, while Mat moves on to explain where he placed his red flower (Figure 10: Audio Transcript lines 26-36), Steve picks up his pen and re-draws his garden path (Figure 13).

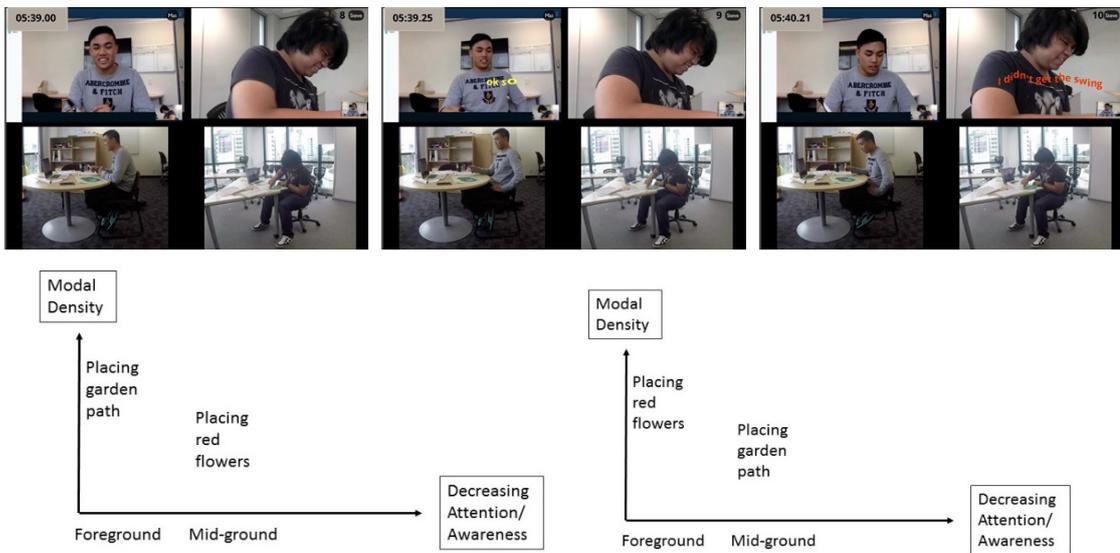


Figure 11: Mat's shift in attention indicated by his semantic/pragmatic means 'ok so'.

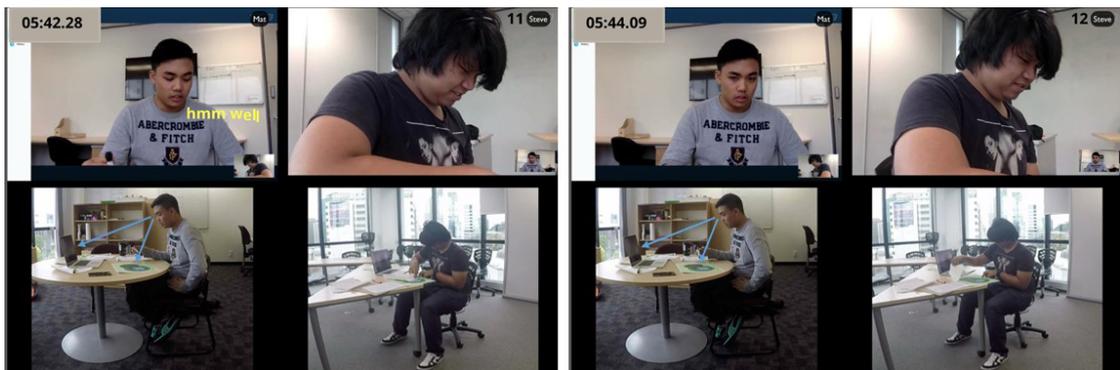


Figure 12: Mat waits for Steve to shift his attention.



Figure 13: Mat produces another semantic pragmatic means to draw Steve's focused attention to placing the red flower.



Figure 14: Mat performs another semantic/pragmatic means to force Steve's change in focus.

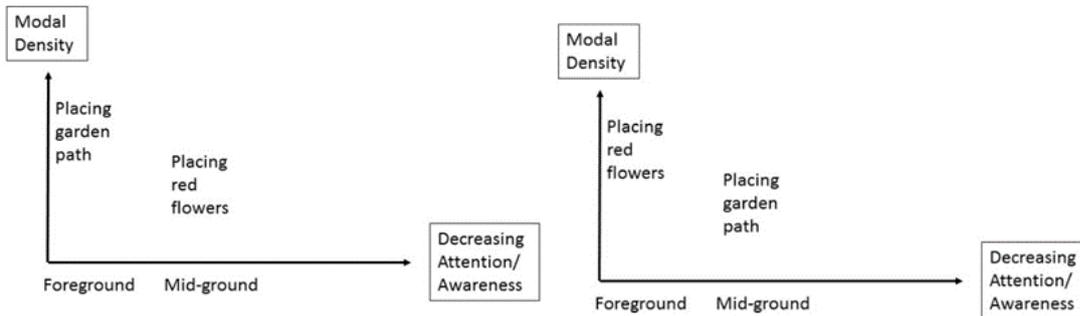
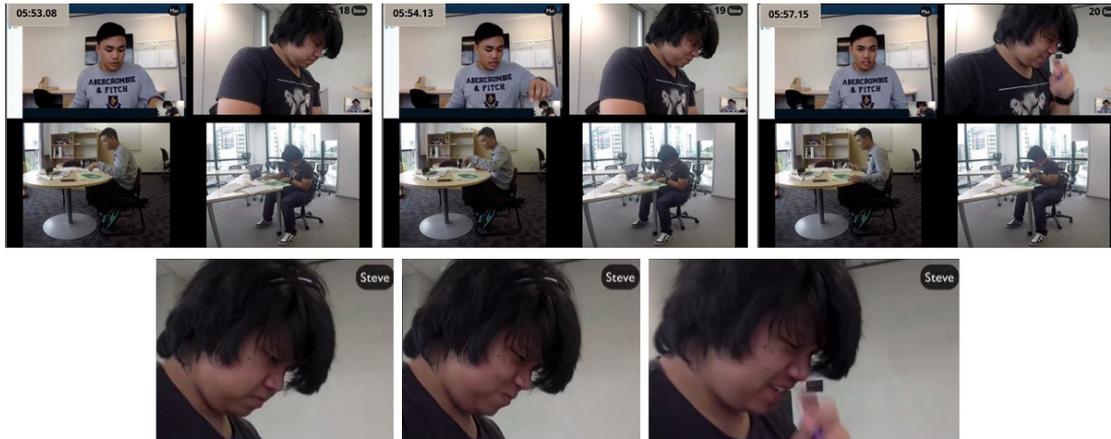


Figure 15: Steve changes his focus from the garden path to placing the red flower.

5.3 Mat again tries to get Steve to change his focus

Mat then performs another semantic/pragmatic means (waving both hands in front of the screen) to force Steve to change his focus from drawing the garden path to placing the red flower (Figure 14).

Yet, even though Mat has waved his arms in front of the screen to get Steve's focused attention, Steve continues to draw his path.

5.4 Steve changes his focus

Steve does shift his attention a moment later, but indicates through his semantic/pragmatic means of pouting his lips as indicated in the middle in Figure 15, that he is changing focus on his own terms.

Had Steve changed his focus because of Mat's attempts to force a shift, Steve would not have performed his own semantic/pragmatic means, but rather, would have taken on one of Mat's semantic/pragmatic means as his means to shift his focus.

37 5:55.07 Steve: the what
38 5:57.25 Mat: (20, 5:57.15) you know where the damp soil
39 5:59.05 meets the shade
40 6:01.02 Steve: the damp soil meets t-
41 6:02.05 Mat: [meets the shade(y dough?)
42 Steve: [yeah yeah
43 6:03.12 Mat: [and then you have that
44 Steve: [SNIFF
45 6:04.06 Mat: gap between the two arrows
46 6:07.07 Steve: yeah
47 6:07.28 Mat: yeap
48 6:08.01 I put my
49 6:08.18 red flower there (21, 06:08.29)
50 6:09.18 Steve: red flower
51 6:10.03 I put my blue flower there
52 6:11.21 Mat: (22, 6:11.08) red flowers need
53 6:13.11 (23, 06:13.05) damp soil and shade
54 6:14.26 Steve: yeah b- it's not in the shade (24, 06:15.20)
55 6:16.11 Mat: it is
56 6:16.22 you push it in (25, 06:17.24)
57 6:19.16 Steve: (26, 06:19.14) huh
58 6:20.05 Mat: It's in the shade (27, 06:20.15)
59 6:20.21 you push it into the circle
60 6:21.22 [of shade
61 [oh ok (28, 06:22.12)

Figure 16: Audio Transcript 3: Negotiating disagreement.

6 ANALYSIS 3: MAT AND STEVE: NEGOTIATING DISAGREEMENT

Now, Steve has changed his focus to placing the red flower and the following exchange occurs (Figure 16).

Holmes and Marra (2004) suggested a continuum of disagreements and the example we present here can be characterized as resolution through negotiation. In this instance, Mat and Steve are working on placing red and blue flowers on a garden patch. Each flower has specific needs to grow and as they are discussing a particular part in the garden, Mat (Figure 17, Image 21) explains 'yep I put my red flower there'. Here, in Image 21, we can see that both participants are gazing at the (image of) their identical gardens, are moving pieces with their left hands/fingers and holding a pen in their right hands. In Image 22, we see that Steve has now moved his left hand, produced a fist and placed it on his left upper leg disagreeing also in the verbal mode as he says 'red flower... I put my blue flower there'. In Image 23, we see how Mat is now going back to the instructions, using them as his authority to convince Steve of the correct placement of his red flowers as he reads 'red flowers need damp soil and shade'. Steve listens as he scratches his head (Image 23) and as soon as Mat has finished reading, both participants look at the screen and each other (Image 24), with Mat looking at Steve with a neutral facial expression and Steve smilingly saying 'yeah b- it's not in the shade' with his left hand again positioned on his upper leg and



Figure 17: Disagreement.

elbow facing outward.

When we now have a look at the modal configurations (Figure 18) for both Mat and Steve, we find that both participants communicate their points through a whole number of modes. The most relevant ones are indicated in the graph.

Mat begins by saying (represented in yellow) ‘yeah I put my red flower there’. Here, he is explaining to Steve and in doing so is also using a gaze and object handling modal aggregate, moving his flowers (Figure 18, Line 1). While Mat is explaining, Steve is listening to Mat (represented by the yellow spoken language circle) and moving a flower toward and gazing at the spot that Mat is describing, building an object handling-gaze modal aggregate. Here, the modal configuration for both participants are similar: Mat is speaking and Steve is listening to the spoken language, and both are moving flowers in their garden, looking at the map.

Then, Steve (Figure 18, Image 2) says (represented in red) ‘red flower, I put my blue flower there’, gazing from the spot further to the left of the screen and placing his left fist on his left upper leg, thus producing a spoken language-gaze-hand/arm movement modal aggregate. Mat listens to Steve and as he listens, shifts his gaze to the instructions. Here, in Line 2 of Figure 18, Steve is disagreeing with Mat. His objection is produced through the production of a strong interlinking of lower-level actions: Steve speaks at a faster pace, emphasizing ‘red flower’ verbally and emphasizing ‘blue flower’ nonverbally by placing his left fist on his left leg and moving his gaze sideways. It is the coming together of these lower-level actions, each with a different starting point that produce (or are produced by) this mini higher-level action of disagreeing, building the modal aggregate. None of the lower-level actions that Steve produces in this highly interlinked way can individually produce the same meaning that they produce together.

In Line 3, Mat in turn produces a strong modal aggregate when he tries to convince Steve. Mat begins to read out loud (represented in yellow) ‘red flowers need damp soil and shade’ as he is bending low over the text, he points to the words he is reading, building two modal aggregates: firstly, a written language/text-gaze-spoken language-gesture modal aggregate; and secondly a posture-hand/arm movement modal aggregate as he is synchronizing his left hand/arm with Steve, placing it on the table (instead of the upper leg) and sticking the elbow far out. As shown in Pfänder and Schumann (forthcoming), such synchronization can have a bonding function in (inter)action. While, Steve is not looking at the screen,

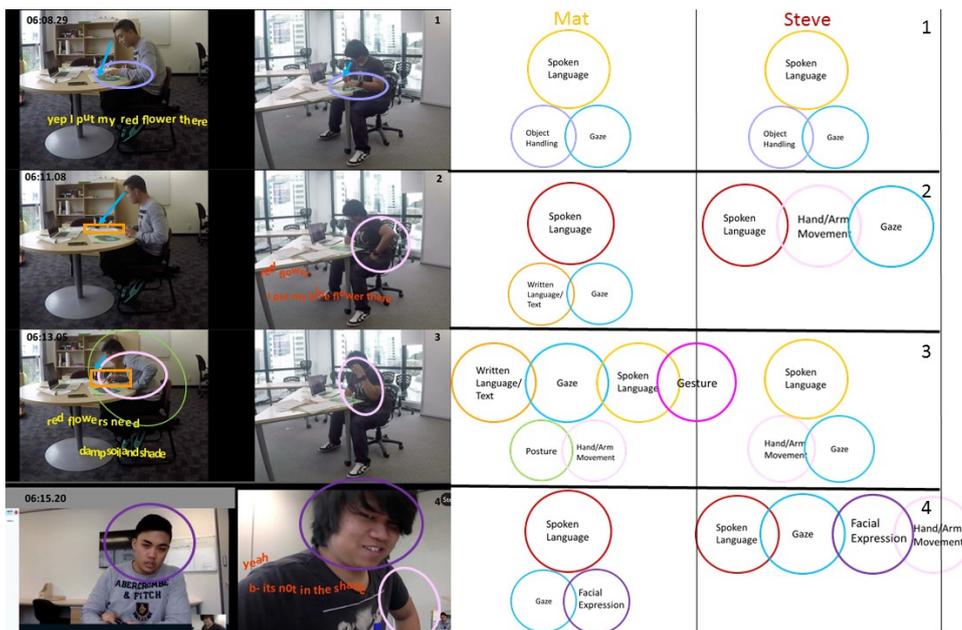


Figure 18: Modal configurations for Mat and Steve as they disagree.

he is likely to notice this synchronized movement in his peripheral vision (but we cannot be sure). What we can be sure of is that Steve listens to Mat (represented in yellow) and simultaneously continues to look at the spot and scratches his head, forming a gaze-hand/arm movement aggregate.

When Steve looks up as illustrated in Line 4 and says ‘yeah b- it’s not in the shade’, he produces a spoken language-gaze-facial expression-hand/arm movement modal aggregate, looking at Steve through the screen smilingly and holding his left hand on his upper leg. At this time, Mat is listening and produces a gaze-facial expression modal aggregate, briefly looking at Steve through the screen with a neutral facial expression. Here, similar as in Line 2, Steve produces a strong modal aggregate as he disagrees with Mat.

Of course, other modes also play a role in this interaction, such as the mode of furniture, the mode of images (with the garden image being most relevant since the (inter)action could not come about without it); and certainly, Steve also displays a posture. However, the site of engagement is the office/classroom with its furniture, and in task 4 the garden image is a given. Further, here Steve does not shift his posture in a particular way and thus, it plays little importance in the disagreement itself. Whereas Mat moves his posture demonstratively illustrating that he is reading the instructions, giving his argument weight through the use of the text as his authority on the matter. Therefore, Mat’s posture does play an important part in establishing his point (Figure 18).

Similarly, when we examine the importance of gesture for each of the participants, we find that Steve communicates his disagreement quite strongly by placing his fist on his leg and positioning his elbow far out. Whereas for Mat, gesture is employed to emphasize his point by following the (authoritative) text with his index finger and by mirroring Steve’s placement of his hand/arm (Holler and Wilkin, 2011a, 2011b; Kusmierczyk, 2013). As the disagreement continues, modal configurations again change (Figures 19 & 20).

In Figure 19, we see Mat contradicting Steve’s ‘yeah b- it’s not in the shade’ (from Figure 17 Image 24), by pushing his own flower into the shade and saying ‘it is... you push it in’ (Figure 19 Image 25 and 18 line 4). Steve is still sitting with his fist on his leg and his elbow raised. Next, both participants look at each other (through the screen) and Steve says ‘huh’ with rising intonation (Image 26). Mat, who has brought his hands together is looking at the garden and reassures Steve with ‘it’s in the shade’ (Image 27) and then uses his right index finger circling the shade area of his garden and says ‘you push it into the

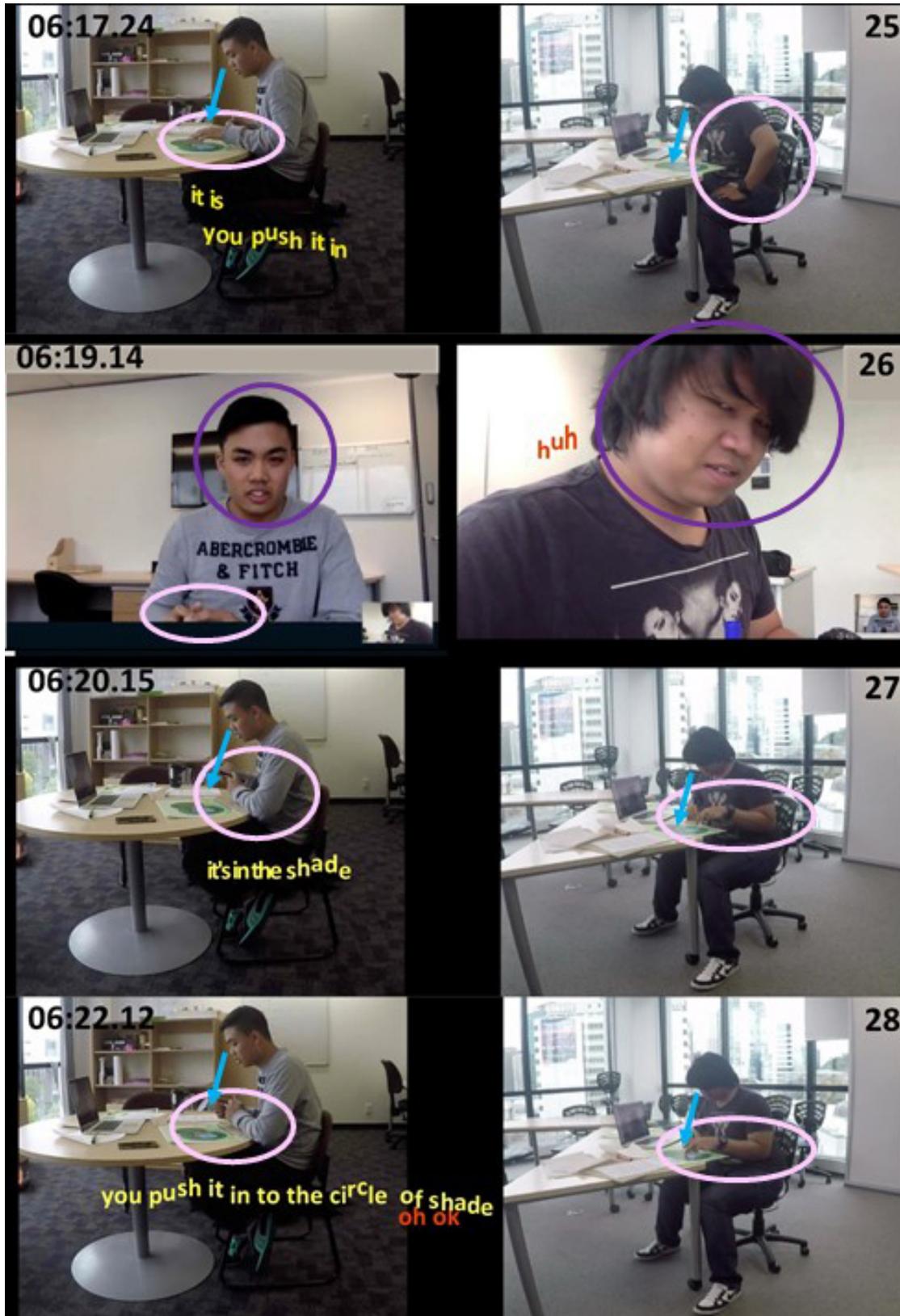


Figure 19: Resolution.

circle of shade'. Steve says 'ah ok' and the disagreement is resolved (Image 28). In Figure 20, we take a closer look at the modal configurations in this part of the excerpt.

The similarity in modal configuration in Figure 20 (Lines 6-8), which represents the resolution of the disagreement, is striking.

At first, a strong difference is still found in Line 5 (a continuation from his Line 4 in Figure 18), where Steve is producing a nonverbal modal aggregate of disagreement and is listening to Steve. Then in Line 6, Steve and Mat both look up at each other (through the screen), and they both produce a modal aggregate that is very similar in make-up: Steve speaks and Mat listens, both gaze at each other and both exhibit a similar facial expression. It is at this point that synchronization emerges. In Line 7, Mat explains and Steve listens; both are gazing at the same spot in the garden (on their individual maps); and Mat moves his hands/arms over the same place in the garden that Steve moves the flowers into as Mat ends his explanation 'you push it in to the circle of shade', and Steve says 'ah ok'. Now, the disagreement turns into a verification (but for space reasons this cannot be further discussed in this article).

7 PRACTICES AND DISCOURSES

Above, we analyzed an excerpt from a larger site of engagement (Figure 1), in which two participants took part in a research project, completing four tasks together. We used the notion of the site of engagement because the site of engagement comes about through the intersection of practices and discourses (Scollon, 1998, 2001; Norris, 2014) and as such, this notion allows the researcher to link micro findings to macro socio-cultural dimensions.

The micro analyses above are telling of how knowledge is communicated; how social actors working on a task together move from one to another focused-upon higher-level action; and how social actors disagree and resolve disagreement multimodally within segments of (inter)action. However, in order to link these micro processes in (inter)action to a larger perspective we want to take a closer look at the larger scale action, the action of taking part in the research project.

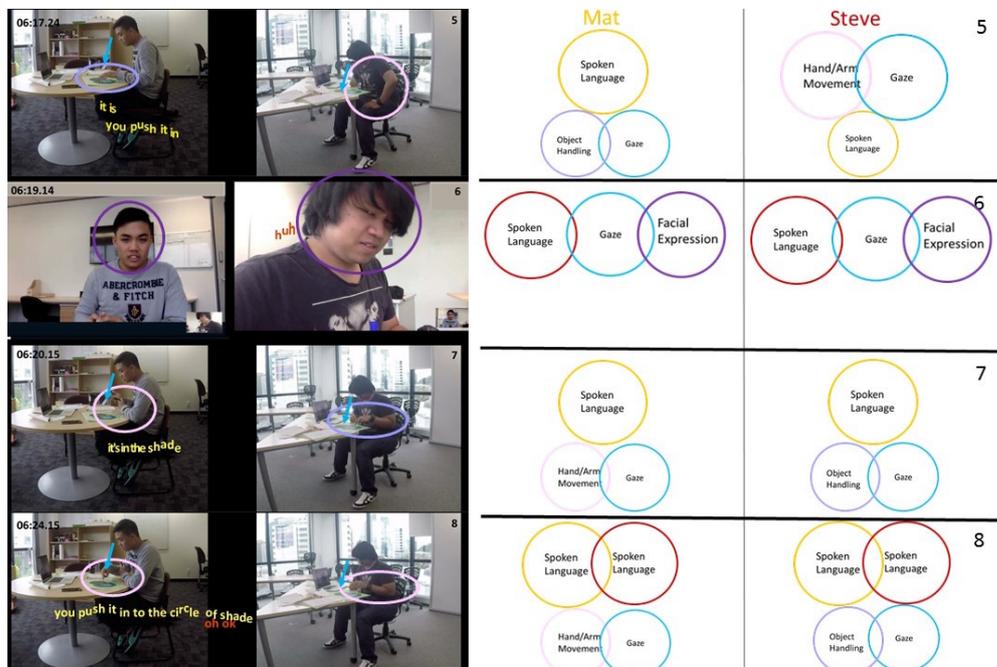


Figure 20: Modal configuration for Mat and Steve as they resolve their disagreement.

7.1 Site of engagement & large scale action of participating in a research project

The site of engagement of taking part in a research project is situated within the institutional practice of conducting research through the modes of layout, furniture and objects (cameras and recording devices). This practice of taking part in a research project links to the institutional research discourse of universities. Since the two participants are students at the university where the project was conducted, their larger scale higher-level actions within this site of engagement also link to the practice of studying at university, where students have many opportunities to take part in research projects; and to the discourse of student life at university. The practice of studying at university can be seen through the way that the participants approach the task. They draw upon their experience from working together in their classes. Some of the relevant modes for the practice of studying, and the discourse of student life include object handling of whiteboard markers, writing and spoken language.

Further, this large scale higher-level action of participating in a research project, which was conducted in an office/classroom links to the institutional practice of office/classroom use and the education discourse. These office/classroom links are most visible in the modes of furniture and layout. Other practices are also at play, some of which are the practice of using reading/writing material, the practice of completing tasks in teams, or the practice of negotiating meaning. These practices are visible in the modal configurations identified through our analyses above. Similarly, other discourses are also at play, some of which are the discourse of employment, the discourse of knowledge, or the discourse of collaboration.

When interviewed right after having finished the four tasks, Mat and Steve were asked if they do tasks like this in their everyday life (Figure 21).

202 Researcher: yeah yeah yeah
 203 ok cool
 204 um uh
 205 do you do any tasks like this
 206 in your day to day life
 207 Mat: I think so--
 208 Steve: -- yeah
 209 Mat: a lot
 210 Researcher: yeah
 211 what sort of things?
 212 Mat: um
 213 coordinating
 214 uh report writing
 215 Researcher: right
 216 Mat: uuuum (mumble 'what do we do coding together?')
 217 Steve: Quake
 218 he he he
 219 Mat: oh yeah
 220 ha ha
 221 play some games together
 222 they require coordination
 223 probably like flow diagrams
 224 put this there
 225 and this there
 226 Researcher: yeah yeah yeah
 227 ok cool any other comments
 228 or thoughts?
 229 Mat: uh nup
 230 not really

Figure 21: Audio Transcript 4: Mat and Steve talking about the task with a researcher.

Here, Mat and Steve link the four tasks that they were asked to perform to the following practices: the practice of studying/working together for university (report writing, coding); or to the practice of playing games and making flow diagrams. For each of these practices, coordinating is pointed out as important, showing the overlap in practices. Again, we can link these practices to discourses such as the discourse of studying at university or the discourse of gaming.

The micro-level analyses showing how knowledge is communicated and how attention and disagreements are negotiated can be linked through various modes to practices and discourses. These micro, intermediate and macro level links are made by starting the analysis with the concrete actions produced by the participants; but, as Scollon (2001) and Norris (2014) have argued, concrete actions come about through the intersection of practices and discourses. Mat and Steve's ways of working during each of the tasks are therefore closely interlinked with the identified practices and discourses.

8 CONCLUSION

All actions are produced through and are linked to a whole host of practices and discourses. Communicating and accepting knowledge, coordinating attention, and disagreeing are everyday occurrences, which quite often are incorrectly viewed as solely language-based (Morek, 2015; Heritage, 2012; Holmes and Marra, 2004; Marra, 2012). Taking a multimodal perspective, we have shown that communicating knowledge, coordinating attention, and disagreeing are not primarily produced through language, but rather are performed through the interconnection of always multiple modes such as gaze, gesture, posture or object handling with or without language. Language use, as shown in the first example where Steve accepts Mat's garden path as the correct one, lags much behind the action that already demonstrated Steve's acceptance of Mat's knowledge. Language use, as illustrated in the second example where Mat is trying to get Steve's focused attention, does not tell the whole story as Steve's action of quietly re-drawing the path without a word uttered could easily be misunderstood as him quietly listening to Mat's explanation of where he placed the red flower. Language, as can be viewed from the third example, is never used on its own, but rather may be used as part of an aggregate (Figures 8, 18 & 20), maybe super-ordinated within the modal configurations in a moment (Figure 18 & most of 20), or may be subordinated by the social actor within the modal configuration of a moment (Line 5 in Figure 20), as also illustrated elsewhere (Norris, 2009). This multimodal understanding allows us to gain new insight into language use in communicating knowledge, gaining attention, and disagreements as well as language use in general.

Having investigated the modal configurations in the above excerpts of disagreement and resolution, we can see that on the one hand the disagreement here was demonstrated multimodally through great variation and divergence of modal production. The resolution, on the other hand displayed an emergence and a continuation of modal synchronization between the two participants. This an area that needs to be explored more in order to examine how modal configurations and modal synchronization can give us insight into negotiating disagreements.

In this article, we have focused upon how the participants multimodally communicate and accept knowledge, how they shift their attention, and how they work through a disagreement via video conferencing technology. The multimodality discussed here, is certainly just as present in face-to-face (inter)action (Norris, 2004, 2009, 2011, 2013a, 2013b, 2013c, 2014, forthcoming). However, there certainly are also differences between video conferencing (inter)actions and face-to-face (inter)actions. One such difference is the abundant use of waving of the arms (Figure 14) in video conferencing (inter)actions, which we do not find in face-to-face (inter)actions. However, how the multimodality of communicating knowledge or working through disagreements differ in video conferencing from face-to-face (inter)actions has yet to be examined.

Taking multimodal (inter)action analysis as our methodology, the article opens up the study of knowledge communication and disagreements to new inquiry. While this article has focused upon the institutional setting (due to the data used), it has demonstrated the complexity of everyday knowledge communication, which is particularly relevant also to organizational settings.

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