Advanced topic in CSCW: Intersubjectivity

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Outline

• Intersubjectivity: Sub processes in cooperative work and collaborative learning

• Partly explicit, partly tacit

• Expanding a group of collaborators shared social reality

• An analysis based on a case study in open source software development

• Key concept: *Shared prolepsis*
Intersubjectivity, what is it about?

• Building shared understanding for two people to be able to communicate (tacit and explicit)
• Necessary for bridging the known and the new in communication (Rogoff et al., 1993).
• Increasingly considered an essential aspect of learning (i.e. Matusov, 2001) and of complex work (to be shown in this lecture)
• A common building block for CSCW and CSCL, but only partly related to computers
• Useful concept for understanding interaction (and predicting success) in new social media
Related work: Two positions

• Social construction of reality (Berger & Luckmann)
  – Shared social reality (this is the ground for intersubjectivity according to Rommetveit (1978)
  – Neither private (subjective) nor public (objective), but something in between, shared by two or more people who (get to) know each other

• Grounding in communication (Clark et al.)
  – Shared subjective reality rather than social reality
  – Deliberately contributing to creating shared meaning rather than adapting to a social reality
Grounding principles

• Despite their differences intersubjectivity and grounding in communication share concerns:
  – It is not to possible to “peek” into each others’ private worlds to infer beliefs and intentions
  – The goal is least collaborative effort, i.e. to “believe that the partners have understood what the contributor meant to a criterion sufficient for the current purpose” (Clark & Schaefer, 1989)
  – “Speakers are likely to spend just enough effort as is needed for the current purpose..” (Clark & Brennan, 1991)
Related concepts

• Shared object of activity (Engeström)
• Common artifact under construction (Fischer et al., 1994)
• Shared prolepsis (Rommetveit, 1978)
• Grounding in computer-mediated communication (Clark & Brennan, 1991)
• Grounding in CSCL (Baker et al. 1999)
• Intersubjective learning (Suthers, 2005)

• Our concern in this talk: “Intersubjectivity in CSCW”
Context for the talk

• LIKE project at Faculty of Education, UiO: “Comparative studies of learning and knowledge development in different professional fields”

• Pål Fugelli, PhD project, he studied work practices in open source software development (OSD):

• The paper presented here:
Case study

- Open source software development
- Mod_perl module of Apache web server software
- A 6 month case study of project developers mailing lists
- Conceptual framework based on Rommetveit’s notion of intersubjectivity in terms of shared prolepsis
Rommetveit’s notion of shared prolepsis

- Ragnar Rommetveit was a Norwegian social psychologist who is now retired from University of Oslo.
- According to him, every communicative act builds upon the commitment to “a temporarily shared social world" (Rommetveit, 1974).
- A concept for understanding turn taking from a shared social reality position is “prolepsis,” an concept originating in ancient Greek, meaning “anticipation”.
- He created a graphical model of the shared social world in terms of spatial, temporal and interpersonal dimensions.
The spatial-temporal-interpersonal co-ordinates of the act of speech

Intersubjectivity as expansion in 3 dimensions. Adopted from Rommetveit (1979)
Prolepsis

• Shared prolepsis describes what is presupposed or taken for granted by participants prior to interaction
• It reveals itself in indirectly, e.g. as vague utterances, incomplete sentences or more or less deliberately inserted cues or hints,
• What is incomplete is of such a nature that it invites to co-construction of new meaning
• It thus expands the space of shared social reality
Example given by Rommetveit

• "Today, I walked with one of the psychologists here past the Mayflower cinema in Eugene, where Bergman’s latest film movie is being shown. He asked me whether I had seen it. I said no, and asked if he had. He said yes, he had. I asked him how he liked it, and he said ‘I liked it very much, but Mary Ann did not”

• Here it is implied that the friend has a wife and her name is Mary Ann

• It illustrates a “proleptic instance,” which is knowledge constructed in the situation, but not explicitly stated

• It points towards a future event (a meeting of three)
Shared prolepsis in cinema production

• In some movies, there are peripheral cues embedded in early scenes (an artifact or a situation) that hints towards a later scene
• Sometimes referred to as “flash-forward”
• The cues are deliberately inserted, but will often be perceived as subtle or invisible by the viewers (unless trained to discover them)
• Shared prolepsis has the same function in speech: adding something to a conversation that indirectly informs about another situation
Exercise 2: Flash-forward techniques in cinema

• Do you know of any movies that makes use of flash forward techniques in this manner, i.e. as subtle cues for the viewers

• Do you know of any moves that makes use of flash forward techniques in a more direct manner, experimenting with the technique?
Adoption of shared prolepsis for computer-mediated communication

• Theoretical framework proposed by Fugelli (2010) in his thesis

• For simplicity, one dimension is about “CSCW” and the other “CSCL”
Application of the theory

• The extended framework for intersubjectivity makes claims regarding the relation of complex (distributed, knowledge intensive) work and learning
  – Not all knowledge can be stated explicitly
  – It requires “situated” knowledge development

• Roughly speaking, the vertical axis aligns with CSCW (e.g. mapping the groupware time/place matrix), and the horizontal axis CSCL (evolution of a shared knowledge object)
How can this contribute to understanding in CSCW

• The study shows that complex, distributed work (OSD) involves “knowledge work”
  – Learning to become a new member in the project
  – Learning to sustain membership in the community

• Subtle cues (proleptic instances) can explain transitions and development of knowledge

• Methods employed
  – Mixed methods approach
    • Quantitative method: Social network analysis
    • Qualitative method: Message content analysis
Mixed methods approach

• An approach in social science research that combines the collection and analysis of quantitative and qualitative data
• It is desirable and feasible because it gives a more complete view of the phenomenon under study
• Allows for combing macro (high) level data with micro level (detailed) data
• Two examples of possible combinations
  – First explore the data qualitatively to identify variables/factors, next test the variables in a quantitative study, or
  – First carry out a quantitative study, then follow it with a qualitative one to obtain more specific information

Social network analysis

• Social network analysis views social relationships in terms of network theory consisting of nodes and edges (links)
• Nodes are the individual actors within the networks, and ties are the relationships between the actors.
• The resulting graph-based structures are often very complex, and reveal a high level structure

Source: http://en.wikipedia.org/wiki/Social_network_analysis
Social network diagram of friendship links in Facebook

Message content analysis

• Content analysis or textual analysis is a methodology in the social sciences for studying the content of communication
• Babbie (2003) defines it as "the study of recorded human communications, such as books, websites, paintings and laws."
• It is “a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding” (Stemler, 2001), but is not limited as to the types of variables that may be measured or the context in which the messages are created or presented
• Can be used with grounded theory (open coding, template analysis) – more about thus tomorrow!

Source: http://en.wikipedia.org/wiki/Content_analysis
Data analysis

• 215 members in the mod_perl project
• Of them, 202 were peripheral participants (learners, less experienced developers)
• 13 were core members (expert developers, some also good educators)
• 6 months data collection period
• 1154 postings during that time
Overall pattern

• Findings
  – The two groups (core and periphery) were quite stable and distinct
  – Questions (problem descriptions) were the main form of communication from peripheral to core group members
  – There were more communication among core group members than among peripheral members

• Content analysis by selecting postings from core group (n=2) and peripheral group (n=10)
Degree centrality: The most active members in the mod_perl community

- Degree centrality is “the number of ties incident upon a node” or “the sum of each row in the adjacency matrix representing the network” (Borgatti, 2005, p. 62).

<table>
<thead>
<tr>
<th>Participant</th>
<th>OutDeg</th>
<th>InDeg</th>
<th>NrmOutDeg</th>
<th>NrmInDeg</th>
</tr>
</thead>
<tbody>
<tr>
<td>dev-12</td>
<td>62</td>
<td>40</td>
<td>28.972</td>
<td>18.692</td>
</tr>
<tr>
<td>dev-29</td>
<td>29</td>
<td>19</td>
<td>13.551</td>
<td>8.879</td>
</tr>
</tbody>
</table>

- **OutDeg**: Number of messages sent
- **InDeg**: Number of messages received
- **Note**: The messages that did not receive any response are not taken into account in the computation and represented with count zero

From: Fugelli (2010)
Sociogram ego network of dev-12

From: Fugelli (2010)
Message content analysis

- To supplement the structural information (how the network is organized and flows) with qualitative (micro level) data, content analysis was performed on selected messages.

- It revealed two main roles of participants:
  - issuer of initial problem (iiP), and
  - more competent practitioner (mcP).

- The often vague or imprecise postings by iiPs triggered knowledge construction by mcPs:
  - reformulating the vague questions
  - filling in the blanks, picking up the ‘cues’
Extract 1 (shortened for space reasons, see paper)


1-2 Hello @all,

3-5 we are just transferring our Intranet Server which used Apache 1.3 and mod_perl1 from SLES8 to SLES10 with Apache2 and mod_perl2.

6-7 The switch has to go quick and we can’t redesign all of our old mp1 programs to mp2, so we try to use the compat module. But I have no luck with it.

8-10 I tested my config with SELS10, Opensuse 10.3 and Ubuntu but i hit everytime the same problem. I searched the Mail Archvie and the Documentation, but no luck.

11-13 [code]

14 I get the following output...

15-16 Software error:

17 Can't locate object method "request" via package "Apache" at /usr/lib/cgi-bin/test1.pl line 4.
Extract 2 (first part)

[Line]  Reply from dev-81, 13 Feb 2008 22:00:56 GMT

1-5 Of course, what I forgot to mention below - and sorry if you know that already - is that whichever perl modules you pre-load in your main Apache server config via the startup.pl script, you do not need to "use" anymore in all your perl scripts or Apache/mod_perl handlers. [...]  

6  Reply from dev-19, 14 Feb 2008 14:13  

7-11 This is the first time that NOT using "use" because it was preloaded is mentioned. In fact, how would the modules compile (while testing for example)? Wasn't preloading supposed to do the exact opposite? [...]I'm at a loss here.

12  Reply from dev-12, 14 Feb 2008 15:51:22 GMT:

13-16 [...] I think that was just a wording mistake. When the process forks, the loaded modules are shared by the operating system's copy-on-write feature. I believe that's what he was trying to say.
Extract 2 cont’d (shortened for space reasons)

17    Reply from dev-81, 18 Feb 2008 09:40

18-21 Well, it was not exactly what I was trying to say, but undoubtedly this reflects my incomplete personal understanding of the process anyway, and I stand ready to be educated.

22-30 ....

31-36 P.S. What I really meant originally, is that if the speed to make it work was of the essence, it might be easier to (find/grep) and remove the various use Apache-xO from the multiple modules or cgi scripts, and put them all in the startup script. Then later one could go back and refine things, if it makes a difference.

37    Reply from dev-12, 18 Feb 2008 19:55:03 GMT

38-40 Your technical understanding is correct, but in practice most pages remain shared. You can help this by using a tool like Apache::SizeLimit that kills off processes after a while.
Analysis

• In the above conversation the functionality of the startup.pl script’s “use” statement is brought to shared attention between two nucleus group members (dev-81, dev-12)
• With reference to previous postings, dev-19 notes that the statement’s preloading function is intended applied in the reverse manner (line 7-10).
• It appears that the functioning of the “use” statement is not sufficiently understood by the “experts”
• A central nucleus group member (dev-12) attempts a repair sequence, but dev-81 who initiated the reply to dev-186 turns down dev-12s suggestion
• At the end of the excerpt dev-81s explanation is approved by dev-12,
• At this stage possibly the common understanding among the experts is brought to a new level, making the previous implicit and partly mistaken view explicit.
• The new understanding thus provides both an expansion of the intersubjective space of the dialogue and a clarification of the partly misunderstood feature
• The incomplete information served as a proleptic instance in the discussion
Summary of findings

• The study corroborate findings reported in the OSD literature:
  – Two distinct groups of participants
    • Peripheral participants (novice developers)
    • Core members (expert developers)
• The findings differ from previous studies
  • Two types of roles associated with the groups
    – Identifying problems with the software as seen from use (download and install)
    – Solving the problems and extending shared knowledge
    – Proleptic instances as triggers of knowledge development
  • Little cross over from peripheral to core group
    – Steep learning curve
Exercise 3: In plenum

• Can you think of a situation from your own research where intersubjectivity (of applicable) is minimally present, and a situations where it is maximally present

*Note*: According to Rommetveit, intersubjectivity is always partially present (never completely lacking nor completely fulfilled) as we aim to share our tacit backgrounds and reach into the private worlds of each other
Summary of today’s two lectures

• Basic concepts in CSCW
  – Communication, coordination, collaboration
  – Time/place matrix
  – Awareness and critiquing

• Three generation of groupware
  – Pre-web
  – Early web
  – Social media
Summary of today’s two lectures cont’d

• Empirical research methods
  – Mixed methods approach
  – Virtual ethnography

• Case study in OSD
  – Applying the mixed methods approach
  – Using a conceptual framework for analysis based on intersubjectivity and shared prolepsis
  – Identifying knowledge development as a dimension to be added to complex work in CSCW
  – Building common understanding by following up on cues present in incomplete understanding