“A Model of Collaborative Knowledge-Building”

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beyond discussion & chat

collaborative knowledge-building goes beyond sharing personal opinions; it is a complex process within community contexts
communities support & restrict collaboration
a model of knowledge-building as a typical process of social activities

interplay of individual cognition & social knowledge construction
personal comprehension

accept as one's own

make problematic

use in activity

explicate implications

clarify meanings

negotiate perspectives

formalize & objectify

formalize & objectify

articulate in words

articulate in words

make problematic

explicate implications

social knowledge building

personal understanding

personal understanding

tacit pre-understanding

personal belief

public statements

public statements

other people's public statements

argumentation & rationale

shared understanding

cultural artifacts

collaborative knowledge

formalize & objectify

use in activity

clarify meanings

negotiate perspectives
a model of knowledge-building as the mediation of individual & group activities

artifacts in the world provide mediating resources
The mediation of social knowledgebuilding

**Personal perspective**
- Tacit understanding of the social lived world
- Experiencing breakdowns of understanding
- Reinterpreting meaning structures
- Articulating one’s understanding
- Formally structuring knowledge

**Mediating tools and systems**
- Discussion: verbal statements & visual cues
- Representations in communication media
- Artifacts: physical, symbolic, cultural
- Personal external memory devices
- Organizational memory systems

**Synergistic group understanding**
- Sharing perspectives
- Exchanging arguments & rationale
- Clarifying meanings
- Negotiating conflicts
- Formally structuring knowledge

Mediating tools and systems

Artifacts: physical, symbolic, cultural
- Personal external memory devices
- Organizational memory systems
a model of knowledge-building as the use of resources by agents within social contexts

the local technology, community and society define affordances
technology: confined by social practices, subject to negotiation
### Activities Contributing to Social Knowledge-Building

<table>
<thead>
<tr>
<th>Personal activities &amp; understanding</th>
<th>Group discussions</th>
<th>Exchange of rationale &amp; argumentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducting actions in the world</td>
<td>Sharing perspectives</td>
<td>Clarification of meanings</td>
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<tr>
<td>Experiencing breakdowns of understanding</td>
<td>Designing cultural artifacts</td>
<td>Negotiation of agreements &amp; disagreements</td>
</tr>
<tr>
<td>Communicating publicly</td>
<td>Writing down shared understanding</td>
<td>Formally representing knowledge</td>
</tr>
<tr>
<td>Articulating one’s understanding</td>
<td>Externally storing knowledge</td>
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</tbody>
</table>

### Artifacts: The Physical Context

<table>
<thead>
<tr>
<th>Personal external memory devices</th>
<th>Public statements</th>
<th>Cultural artifacts</th>
<th>Organizational memory systems</th>
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### The Community’s Cultural Context

<table>
<thead>
<tr>
<th>Community roles</th>
<th>Accepted practices</th>
<th>Cultural norms</th>
<th>Shared jargon</th>
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<tbody>
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### The Societal Context

<table>
<thead>
<tr>
<th>Social rules</th>
<th>Social interests &amp; motivations</th>
<th>Power relations</th>
<th>Shared language</th>
<th>Social structures</th>
</tr>
</thead>
</table>
models of knowledge-building can provide a framework for software design & assessment

what activities should collaboration software support beyond sharing personal opinions & information?
# some technology components of knowledge-building environments

<table>
<thead>
<tr>
<th>Knowledge-building activities</th>
<th>Forms of computer support</th>
<th>Prototype systems</th>
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<tr>
<td><strong>A</strong> articulate in words</td>
<td>discussion forum</td>
<td>DynaClass</td>
</tr>
<tr>
<td><strong>B</strong> discuss alternatives</td>
<td>personal &amp; group perspectives</td>
<td>WebGuide</td>
</tr>
<tr>
<td><strong>C</strong> argumentation &amp; rationale</td>
<td>argumentation graph</td>
<td>InfoMap</td>
</tr>
<tr>
<td><strong>D</strong> clarify meanings</td>
<td>interactive glossary</td>
<td>DynaGloss</td>
</tr>
<tr>
<td><strong>E</strong> negotiate perspectives</td>
<td>negotiation support</td>
<td>WebGuide</td>
</tr>
<tr>
<td><strong>F</strong> formalize &amp; objectify</td>
<td>interactive bibliography</td>
<td>DynaSource</td>
</tr>
</tbody>
</table>
WebGuide: supporting discussion, reflection, negotiation, knowledge management, in perspectives
Gerry's personal

heading: DISCUSSIONS (in: group on: 03/21/2000)
- comment: Switching from Title View to Content View doesn't work properly.
  *comment: Do not forget to "refresh" the display. (by: Gerry in: group on: 03/23/2000)
  *comment: It is a "new" feature. (by: Gerry in: group on: 03/29/2000)

heading: PROPOSALS (in: group on: 03/21/2000)

heading: Negotiation (by: Group in: group on: 03/21/2000)
- comment: Student project in Dortmund (by: Gerry in: group on: 03/23/2000)
- comment: Group project on WebGuide negotiation (by: Gerry in: group on: 03/29/2000)

heading: Other new features (by: Group in: group on: 03/21/2000)

heading: New components (by: Group in: group on: 03/21/2000)
- resource: Persona component (by: Group in: group on: 03/21/2000)
- resource: Glossary component (by: Group in: group on: 03/21/2000)
- resource: Bibliography component (by: Group in: group on: 03/21/2000)
- resource: Perspectives component (by: Group in: group on: 03/21/2000)

heading: New functionality (by: Group in: group on: 03/21/2000)
- comment: Email (by: Group in: group on: 03/21/2000)
- comment: Printing (by: Group in: group on: 03/21/2000)
representing perspectives: personal, small team, whole group

support for discussion among perspectives, comparisons, negotiation, group knowledge management
knowledge-building as multiple perspectives interacting
web of perspectives: a flexible hierarchy of computational sharing among groups & individuals
future work: system building

integration of computer support for discussion, perspectives, negotiation, bibliography, glossary, scaffolding, simulations, ….
future work: collaboration analysis & system evaluation

micro-ethnographic analysis of videos of classrooms engaged in collaborative knowledge-building, with & without technology
for further information:

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http://www.cs.colorado.edu/~gerry/publications/conferences/2000/