
Contextual Collaboration in Virtual Environments



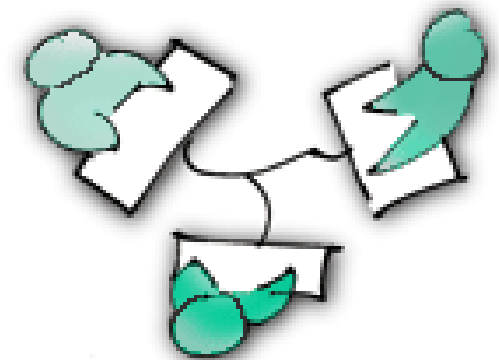
Fraunhofer Integrated Publication
and Information
Systems Institute

Martin Wessner, Fraunhofer IPSI

Shaping Collaboration – Geneva, Dec 11, 2006

<http://www.ipsi.fraunhofer.de/concert>

- ▶ Background: CSCW/CSCCL/Interdisciplinary Collaboration
- ▶ What do you mean with “support”?
 - From Enabling to Actively Supporting Collaboration
- ▶ Modelling, Providing and Using the Collaboration Context
 - Collaboration Level
 - Organisational Level
- ▶ Examples
 - Towards Collaboration: Expert finding, Group Formation
 - During Collaboration: Awareness, Coherence
 - After Collaboration: Turning Collaboration into Knowledge Artefacts
- ▶ Conclusions and Next Steps

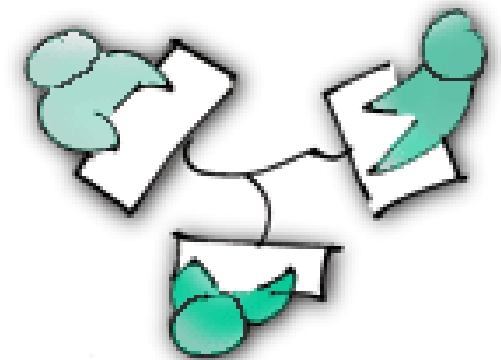


▶ Research Fields:

- CMC: Computer-Mediated Communication
- CSCW: Computer-Supported Cooperative Work
- CSCL: Computer-Supported Collaborative Learning
- Knowledge Management

▶ CSCx at Fraunhofer IPST

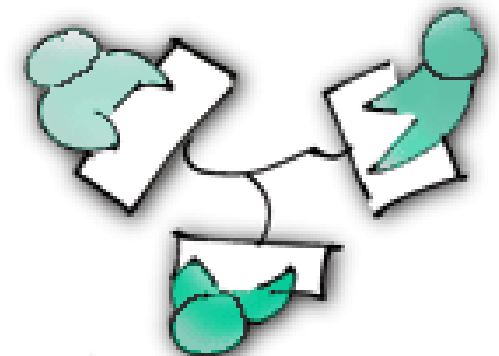
- Projects/Systems: Sepia, Dolphin, Poliwork, Vital, L³, ConcertStudeo, ConcertChat, APOSDLE
- Interdisciplinary Team: CS, Psychology, Education, Information Science, Graphical Design



- ▶ What do we mean with “supporting”?
 - Room Analogy: What does this room enable? What does it support? How?

- ▶ In order to support collaboration you have to know something about what
 - is planned to be going on,
 - is going on,
 - was going on.

- ▶ A CSCx system should have some context knowledge



Context is the set of characteristics which are relevant for a person in a specific situation in order to achieve a specific goal.

-> To define the context we need an analysis of the person, the situation and his or her goals.

Approach:

- ▶ A collaborative learning or work process is treated as a sequence of individual and collaborative activities.
- ▶ Differentiate between two levels of context: The collaboration level includes the context during the collaboration, the organizational level includes the context before and after a collaboration.

Collaboration level context (during the collaboration)

- ▶ Results of previous activities
- ▶ Performing of the activities themselves
- ▶ Establishing context from different collaboration channels
- ▶ Team members and their roles in the collaboration. Roles in the organisation, roles in the task.
- ▶ Collaboration process
- ▶ Material

Organisational level context

Characteristics with respect to the embedding of the collaboration in the overall organisation or work process.

▶ Preparation of a collaboration:

- formation of the group
- provision of material
- provision of task/collaboration method
- setup of the collaboration with respect to the technical infrastructure and tools.

▶ Post-processing of a collaboration:

- Post-process and store relevant information about the collaboration and its results for later individual or collaborative use.
- update organisational knowledge management system
- update user profiles

Example: Expert Finding/Group Formation

Project APOSDLE:

System knows about current process/task

System knows about existing and needed competences

-> System provides relevant peers and experts

APOSDLE Sidebar

Context

Task


4.3. Interpret Activity Model and Integr.
[change ...](#)

Competencies


13 Knowledge Strategic Dependency M
20 Ability to produce i* Model


Resources

Procedures & Examples

 [How to do it?](#)

 [i*SD modelling template](#)

 [How have others done it?](#)

 [Full description of the SeCSE-...](#)
... filled out SD model for the SeCS

Facts & Definitions

Concepts & Models


People

Ask an Expert

 [Martin Brown](#) 
  [Andrea Weber](#) 
  [Rainer Schultz](#) 


Initiate
collaborat

Contact Peers


 [Peter Meyer](#) 
  [Anna Smith](#) 
  [Maria Sproull](#) 

Pending
request

Profile

 Collaboration Status

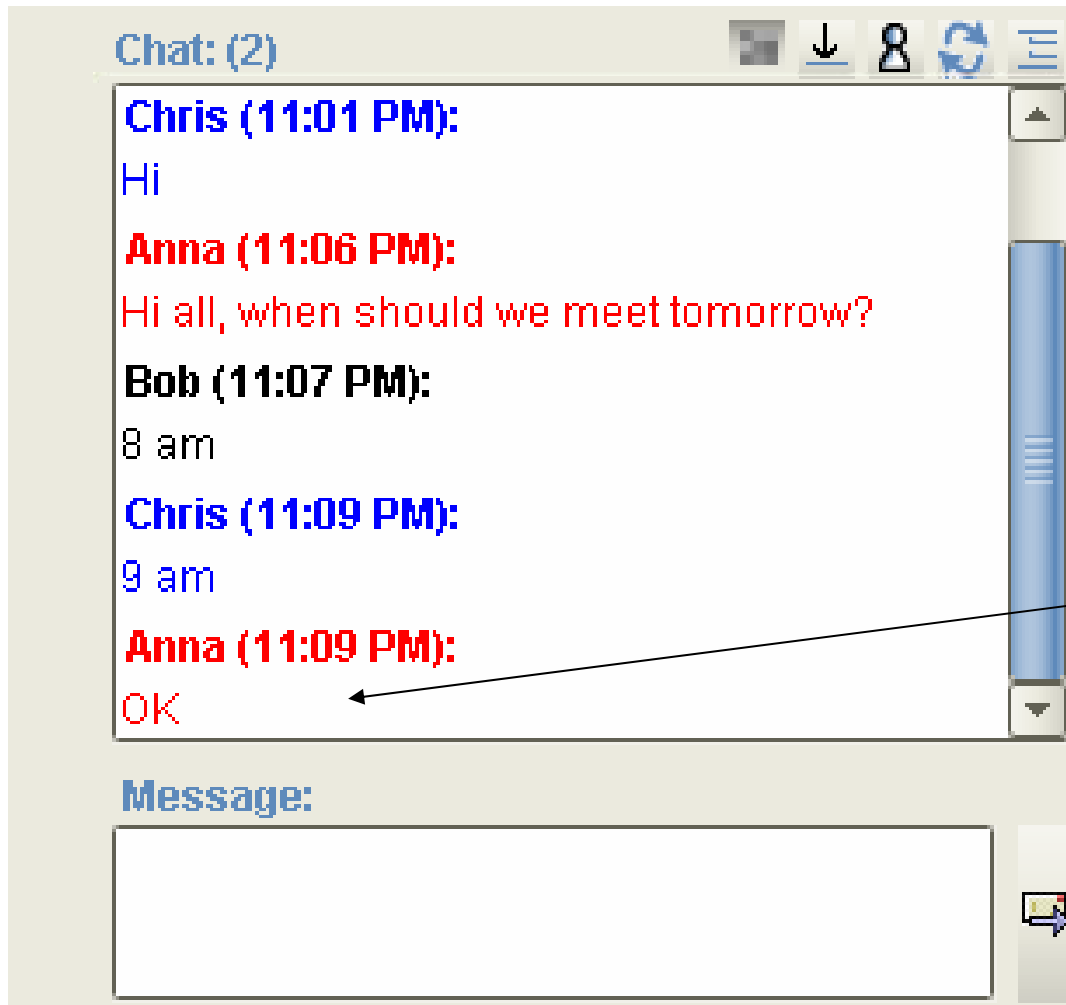
available

 [User Profile](#)

Framework ConcertChat provides

- **Dual Interaction Spaces**
- **Explicit References**
- **Awareness**
- **History/Persistence**
- **Optional: Role Awareness**
- **Optional: Graphical Representation of Process**

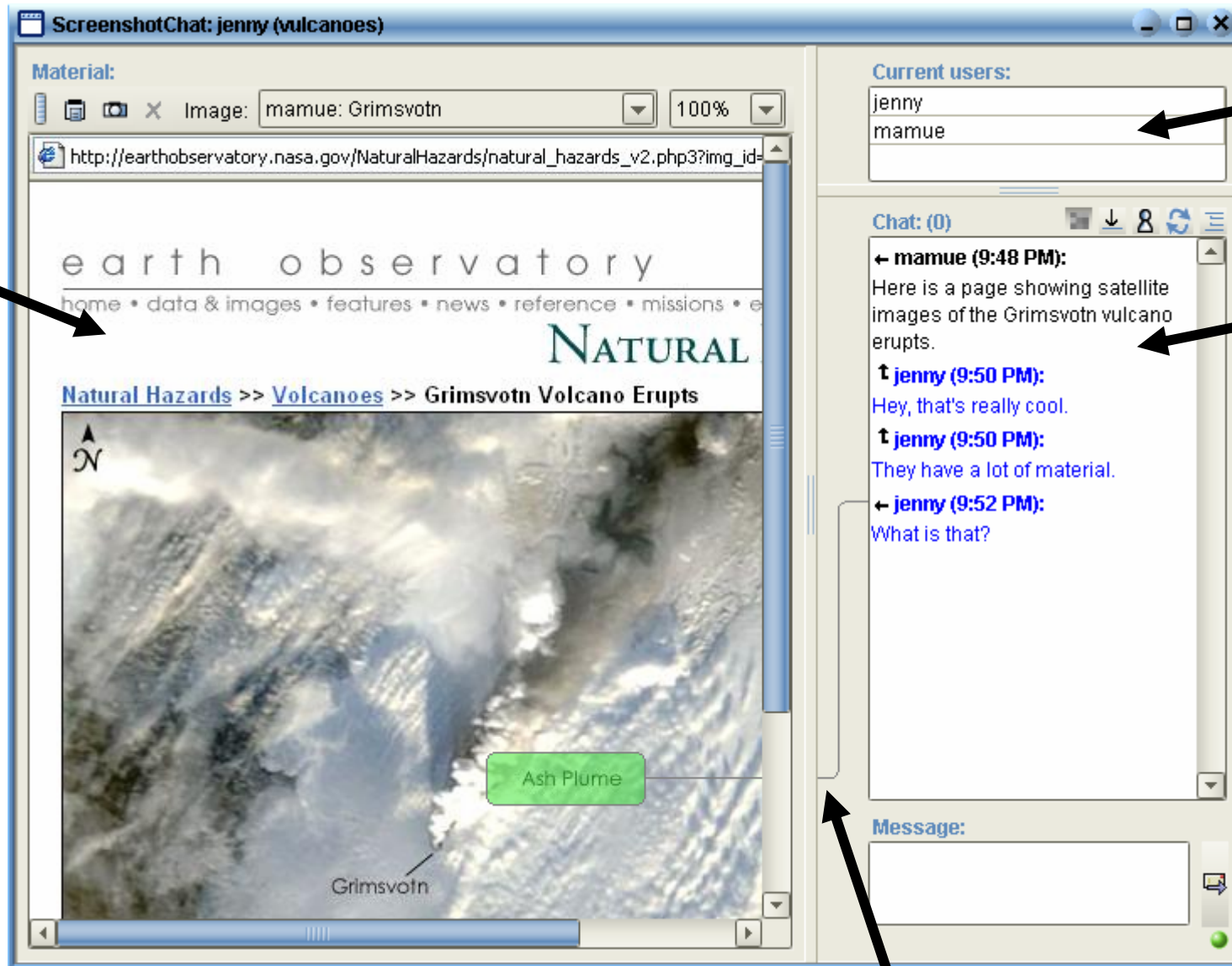
Anna:



What is ok for Anna?

Dual Interaction Space/Explicit Referencing

Shared Material
e.g. a screen shot



User list

Chat area

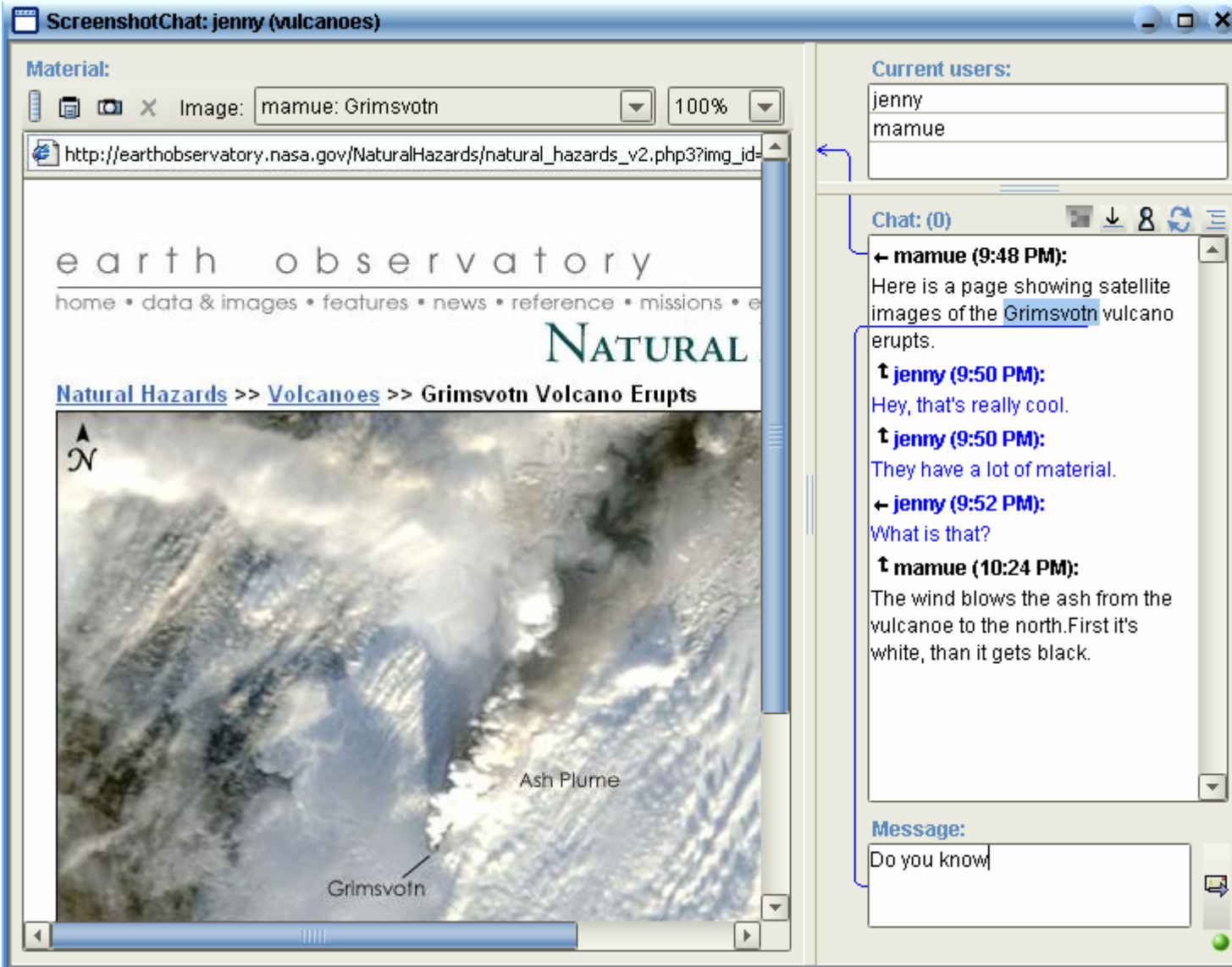
Reference to
shared material



The screenshot shows a chat window titled "ScreenshotChat: jenny (vulcanoes)". The main content area displays a satellite image of a volcano with an ash plume. The image is titled "Natural Hazards >> Volcanoes >> Grimsvotn Volcano Erupts" and includes labels for "Ash Plume" and "Grimsvotn". The chat log on the right shows the following messages:

- ← mamue (9:48 PM):** Here is a page showing satellite images of the Grimsvotn volcano erupts.
- ↑ jenny (9:50 PM):** Hey, that's really cool.
- ↑ jenny (9:50 PM):** They have a lot of material.
- ← jenny (9:52 PM):** What is that?
- ↑ mamue (10:24 PM):** The wind blows the ash from the volcano to the north. First it's white, than it gets black.

The chat window also shows a "Current users:" list with "jenny" and "mamue", and a "Message:" input field at the bottom.



The screenshot shows a web browser window titled "ScreenshotChat: jenny (volcanoes)". The browser displays a page from NASA's Earth Observatory website. The page title is "Natural Hazards >> Volcanoes >> Grimsvotn Volcano Erupts". The main content is a satellite image of the Grimsvotn volcano with an ash plume. Labels "Ash Plume" and "Grimsvotn" are visible on the image. A north arrow is in the top left corner of the image. The browser's address bar shows the URL: http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php?img_id=. The browser's title bar shows "Material:" and the image name "mamue: Grimsvotn".

On the right side of the browser window, there is a chat interface. The "Current users:" list shows "jenny" and "mamue". The "Chat: (0)" window shows the following messages:

- ← mamue (9:48 PM):** Here is a page showing satellite images of the Grimsvotn volcano erupts.
- ↑ jenny (9:50 PM):** Hey, that's really cool.
- ↑ jenny (9:50 PM):** They have a lot of material.
- ← jenny (9:52 PM):** What is that?
- ↑ mamue (10:24 PM):** The wind blows the ash from the volcano to the north. First it's white, than it gets black.

At the bottom of the chat window, there is a "Message:" input field with the text "Do you know".

ScreenshotChat: jenny (volcanoes)

Material:


Image: mamue: Grimsvotn 100%

http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php?img_id=

earth observatory
home • data & images • features • news • reference • missions • e

NATURAL

Natural Hazards >> Volcanoes >> Grimsvotn Volcano Erupts



Ash Plume

Grimsvotn

Current users:
jenny
mamue

Chat: (0)

← mamue (9:48 PM):
Here is a page showing satellite images of the Grimsvotn volcano erupts.

↑ jenny (9:50 PM):
Hey, that's really cool.

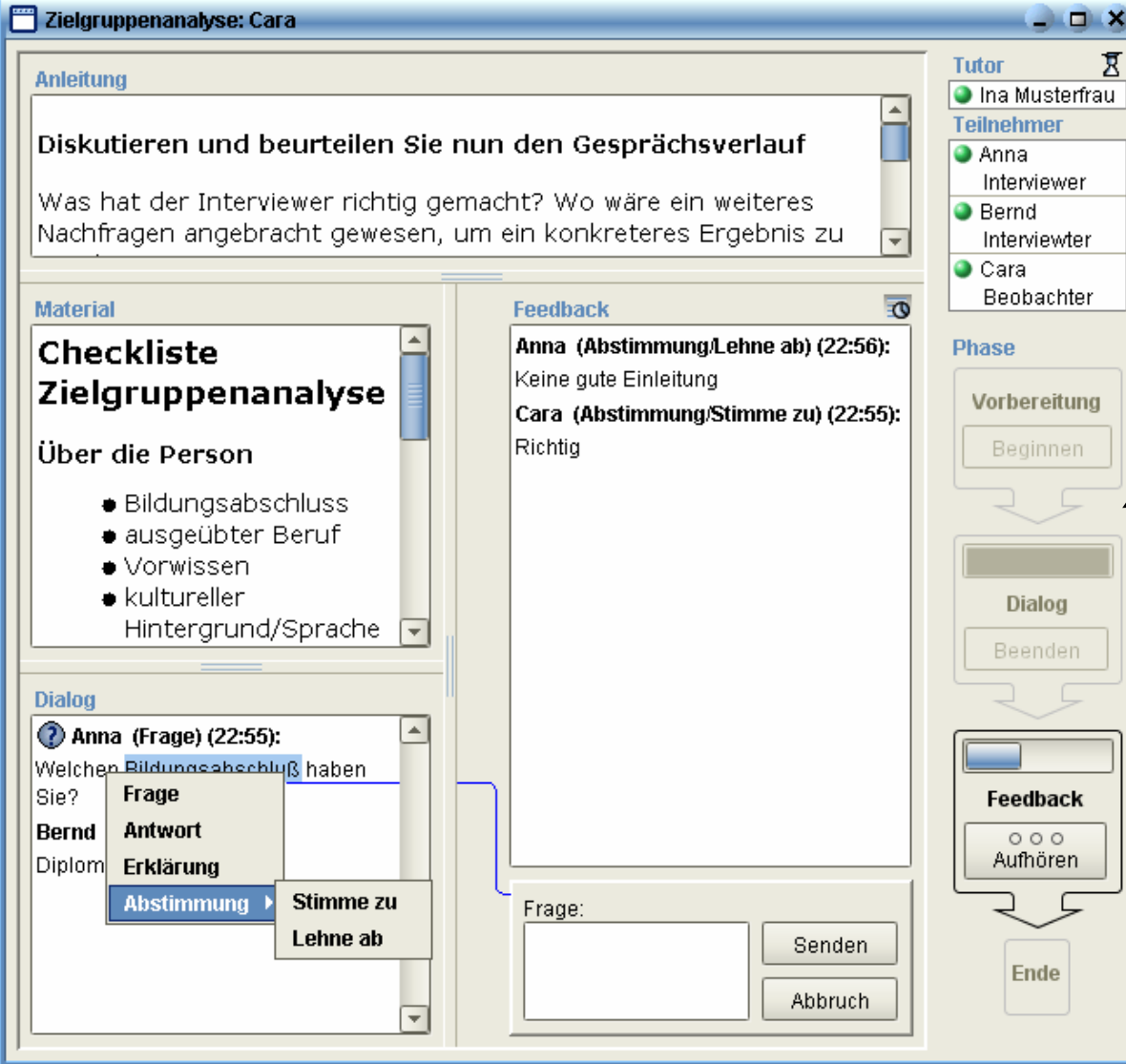
↑ jenny (9:50 PM):
They have a lot of material.

← jenny (9:52 PM):
What is that?

↑ mamue (10:24 PM):
The wind blows the ash from the volcano to the north. First it's white, than it gets black.

↑ jenny (10:28 PM):
Do you know, where this is located?

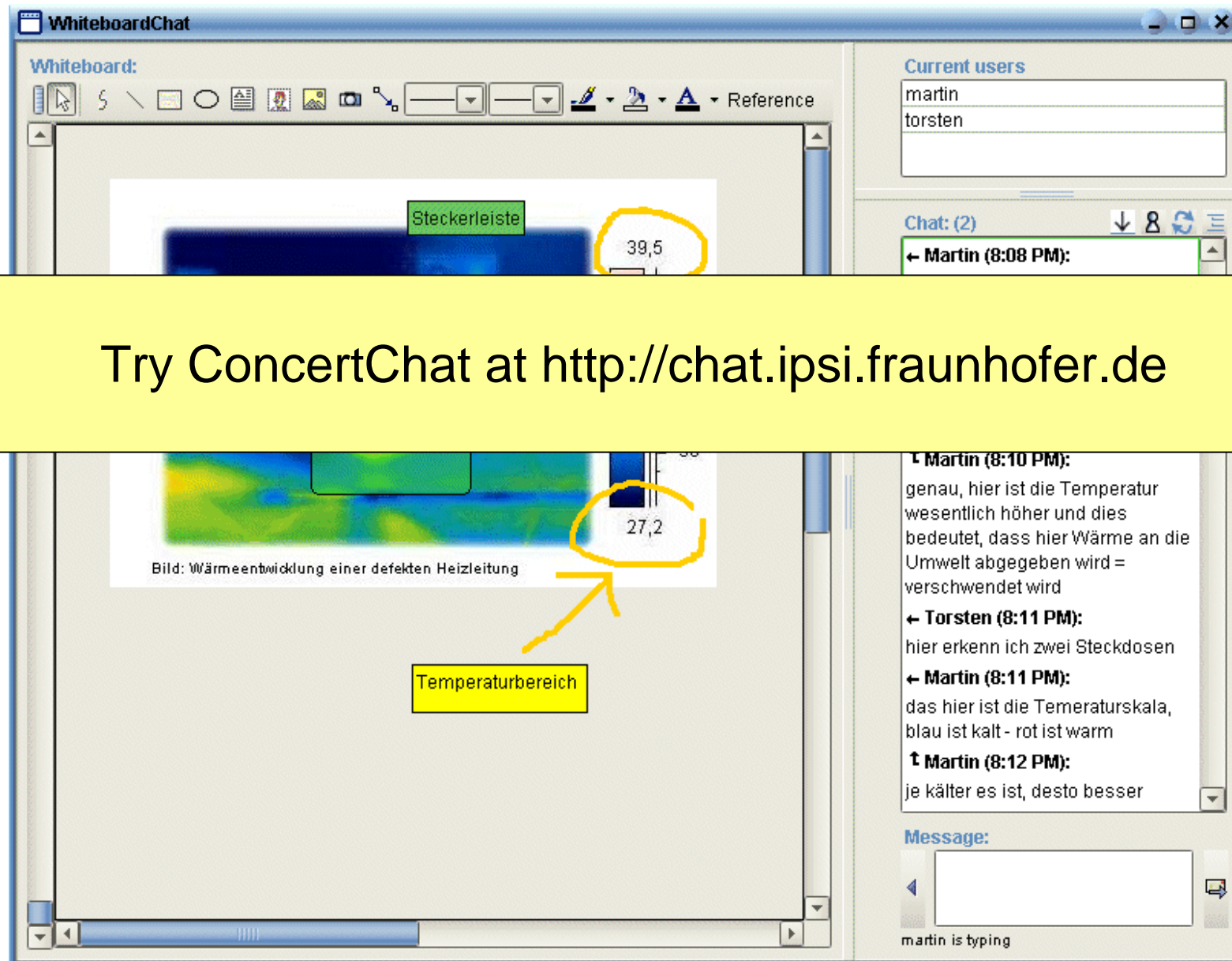
Message:



The screenshot shows a software window titled "Zielgruppenanalyse: Cara". It is divided into several sections:

- Anleitung:** Contains instructions: "Diskutieren und beurteilen Sie nun den Gesprächsverlauf" and "Was hat der Interviewer richtig gemacht? Wo wäre ein weiteres Nachfragen angebracht gewesen, um ein konkreteres Ergebnis zu...".
- Material:** Features a "Checkliste Zielgruppenanalyse" with a sub-section "Über die Person" containing a list of criteria: "Bildungsabschluss", "ausgeübter Beruf", "Vorwissen", and "kultureller Hintergrund/Sprache".
- Dialog:** Shows a chat log with a question from Anna: "Welchen Bildungsabschluss haben Sie?". A context menu is open over the question, listing options: "Frage", "Antwort", "Erklärung", and "Abstimmung". The "Abstimmung" option is selected, and a sub-menu is open with "Stimme zu" and "Lehne ab".
- Feedback:** Displays feedback from participants: "Anna (Abstimmung/Lehne ab) (22:56): Keine gute Einleitung" and "Cara (Abstimmung/Stimme zu) (22:55): Richtig". Below this is a text input field for a question and buttons for "Senden" and "Abbruch".
- Right Panel:** Contains a "Tutor" section with "Ina Musterfrau", a "Teilnehmer" list with "Anna Interviewer", "Bernd Interviewter", and "Cara Beobachter", and a "Phase" section with a flowchart. The flowchart has three main stages: "Vorbereitung" (with a "Beginnen" button), "Dialog" (with a "Beenden" button), and "Feedback" (with an "Aufhören" button). The "Vorbereitung" stage is currently active, and an arrow from the text "Process Information" points to it. Below the flowchart is an "Ende" button.

Process Information



The screenshot shows a web browser window titled "WhiteboardChat". The main area is a whiteboard with a heatmap image. A green box labeled "Steckerleiste" is overlaid on the heatmap. A yellow circle highlights a value of "39,5" on the heatmap. Below the heatmap, the text "Bild: Wärmeentwicklung einer defekten Heizleitung" is visible. A yellow box labeled "Temperaturbereich" has an arrow pointing to a value of "27,2" on the heatmap. The right sidebar contains a "Current users" list with "martin" and "torsten", and a chat window with messages from Martin and Torsten. The chat messages are: "← Martin (8:08 PM):", "↑ Martin (8:10 PM): genau, hier ist die Temperatur wesentlich höher und dies bedeutet, dass hier Wärme an die Umwelt abgegeben wird = verschwendet wird", "← Torsten (8:11 PM): hier erkenn ich zwei Steckdosen", "← Martin (8:11 PM): das hier ist die Temeraturskala, blau ist kalt - rot ist warm", and "↑ Martin (8:12 PM): je kälter es ist, desto besser". At the bottom of the chat window, it says "Message:" and "martin is typing".

Try ConcertChat at <http://chat.ipsi.fraunhofer.de>

Previous studies

- ▶ Referencing functionality in chats supports collaborative learning using chat communication (Mühlpfordt & Wessner 2005).
- ▶ Role and process awareness have positive effects on collaborative learning (Münzer & Xiao 2005).

Tools & Projects

- ▶ Various chat tools based on the ConcertChat Framework
- ▶ Example: Usage in the Virtual Math Teams (VMT) Project at Drexel University, Philadelphia, USA: Support distributed teams of students working on math problems
- ▶ High acceptance, broad usage of referencing functionality, persistency allows synchronous and asynchronous use

Again from Project APOSDLE:

System knows about collaboration context and collaboration

-> System enriches collaboration log -> collaboration log is turned into knowledge artefact

-> System captures information to update user profiles

Collaboration in Context

APOS/DLE Sidebar

- Context
- Task
 - 4.3. Interpret Activity Model and Integr...
[change ...](#)
- Competencies
 - 13 Knowledge Strategic Dependency M...
 - 20 Ability to produce i* Model
- Resources**
- Procedures & Examples
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- Facts & Definitions
- Concepts & Models
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- Ask an Expert
 - + [Martin Brown](#)
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 - nd [Rainer Schultz](#)
- Contact Peers
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 - nd [Anna Smith](#)
 - + [Maria Sproull](#)
- Profile
 - [Collaboration Status](#)
available
 - [User Profile](#)

S

When the collaboration is finished its transcript is stored with concepts and keywords.

Concepts and keywords for the collaboration

Concepts found by APOSDLE-Platform:
 Subgroups
 Rescue

Keywords negotiated in the group:
 Methods
 ...

The Transkript is available (after identifying concepts and keywords) as supportive document.

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Collaboration Level Improvements

- ▶ Awareness, persistency, coherence, multiple interaction spaces ...
- ▶ Still ge

Organizat

- ▶ Needs

Current R

- ▶ Improv
collabo

Thank you!

Contact:

martin.wessner@ipsi.fraunhofer.de



Outlook:

- ▶ Activity awareness, persistency, explicit references ... hopefully become standard for synchronous collaboration applications
- ▶ New application areas, bridging multiple interaction spaces
- ▶ Highly effective collaboration in specific domains and settings

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