Resources for Connecting Levels of Learning

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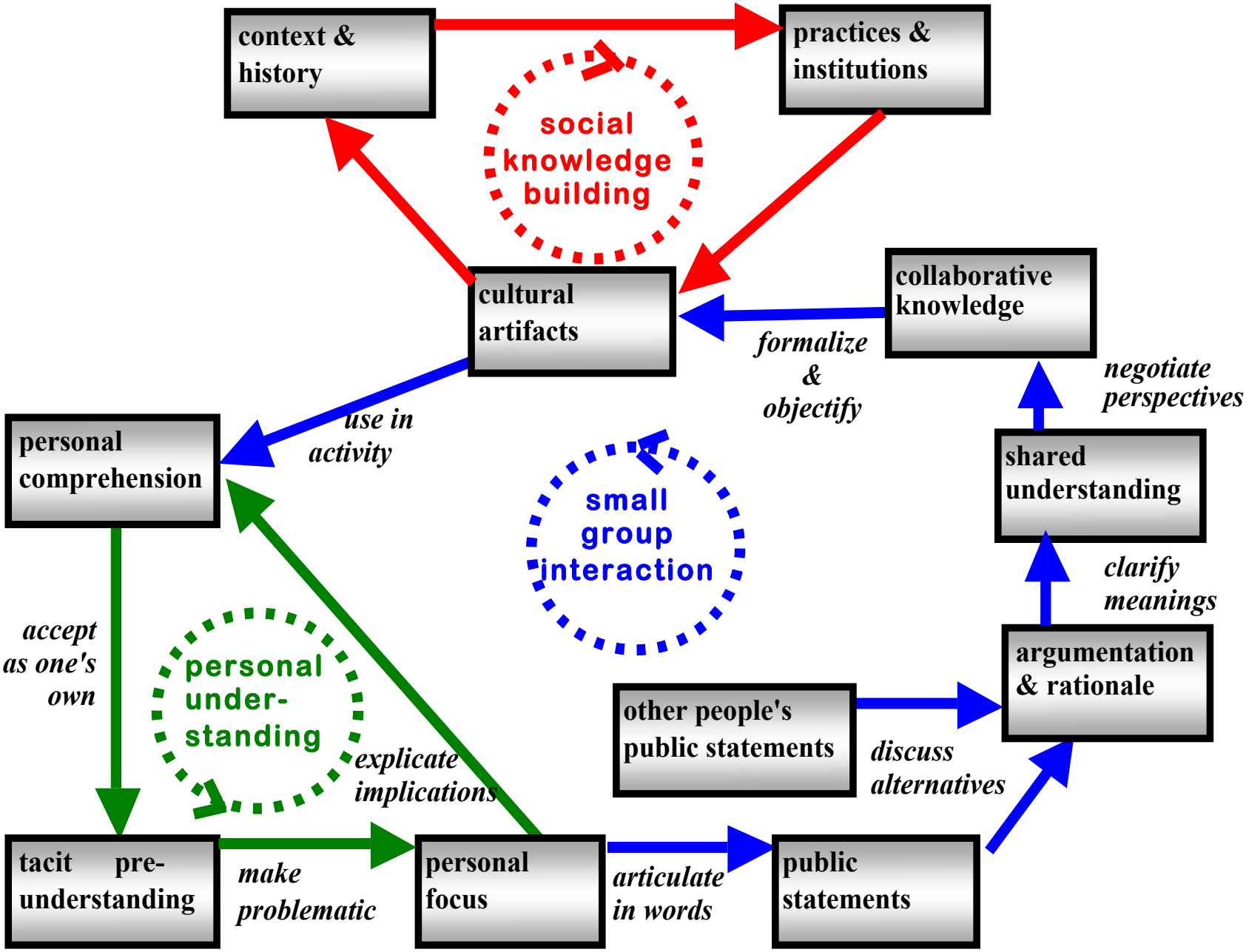
The Problem of Connecting Levels

- **CSCL research at the individual, small-group and community units of analysis**
- **But focus is on only one of these units.**
- **No data-based analysis of how the three levels are connected.**
- **Levels are connected by *interactional resources*, which can move between the levels.**

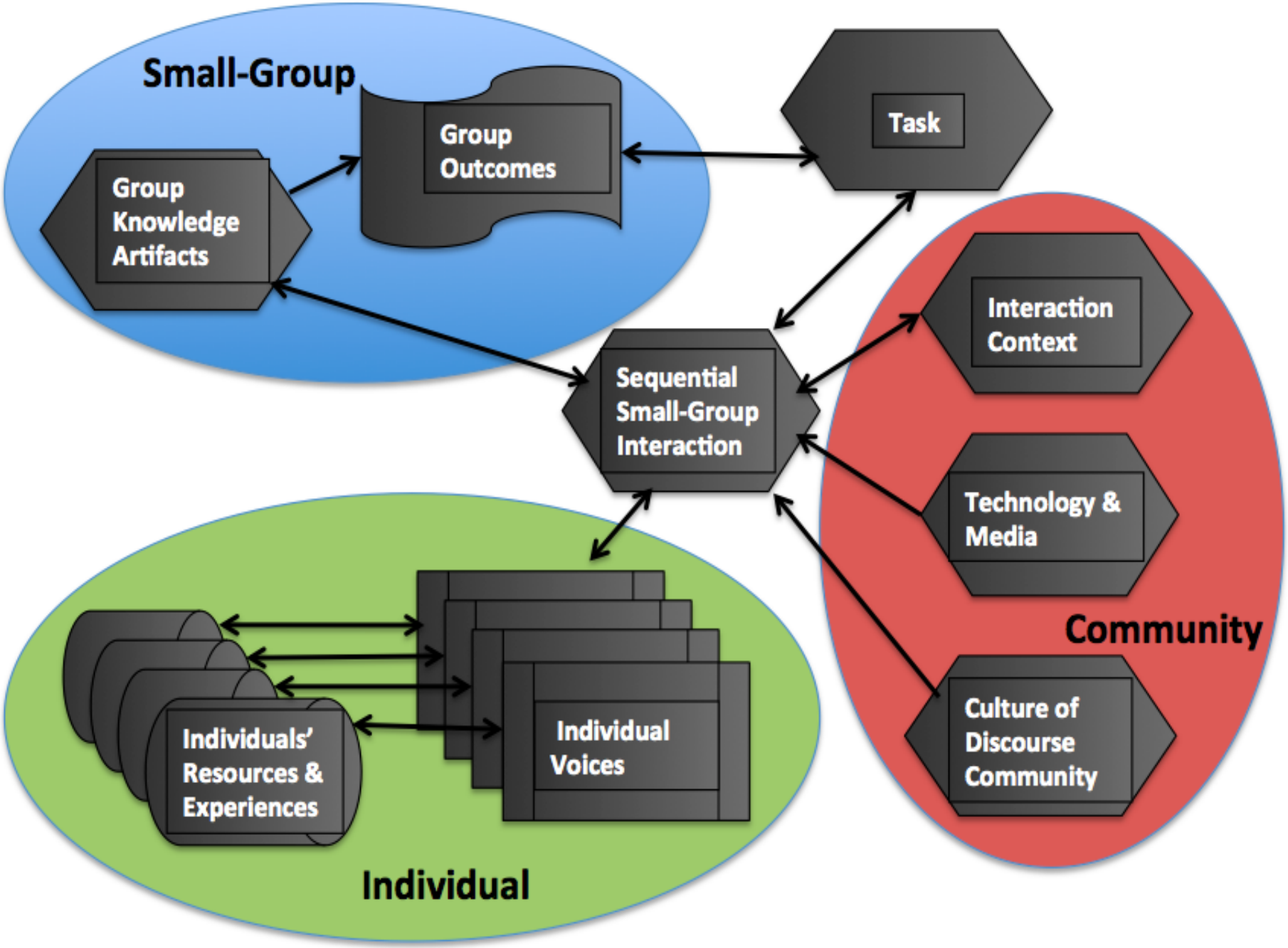
Resources Connecting Levels

- **Issue for CSCL: how collaborative knowledge building takes place**
- **Understand the role of individual cognition and of societal institutions in the small-group meaning-making processes**
- **Let's focus on resources in meaning making, which are externalized & internalized**
- **The ramps or vehicles that move from parking spots to side streets to superhighways**


context & history
practices & institutions
social knowledge building
cultural artifacts
collaborative knowledge
formalize & objectify
negotiate perspectives
use in activity
personal comprehension
small group interaction
shared understanding
clarify meanings
accept as one's own
personal under-standing
argumentation & rationale
other people's public statements
discuss alternatives
explicate implications
tacit pre-understanding
make problematic
personal focus
articulate in words
public statements

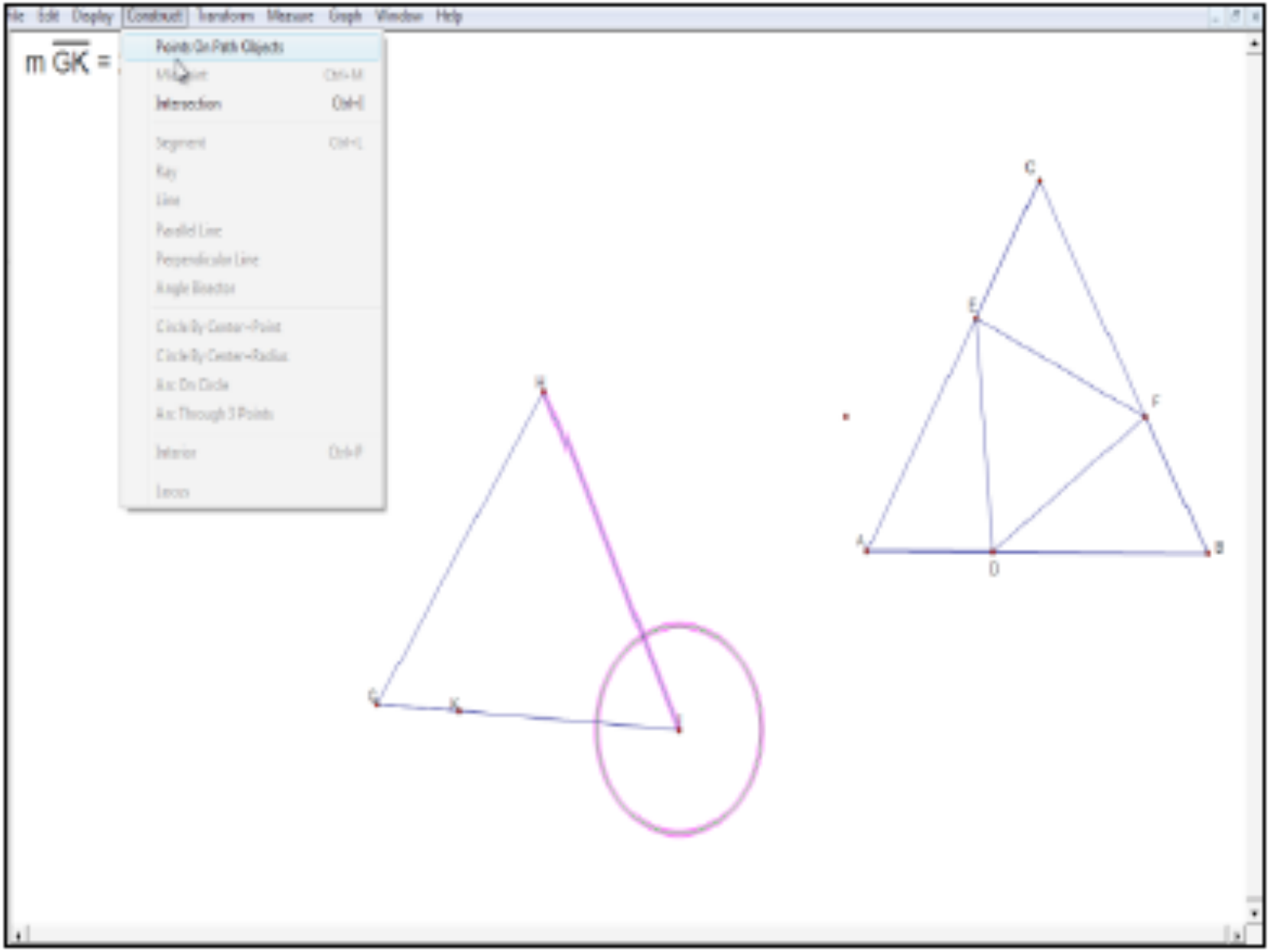
The Theory of Connecting Levels

- **Artifacts, language, practices are embodiments of human, social, cultural, historical meaning**
- **They are created in small-group interaction**
- **They mediate small-group interaction**
- **They are understood & interpreted by individuals**
- **They are sedimented & preserved & transmitted in communities**


Small-Group
Group Outcomes
Group Knowledge Artifacts
Task
Interaction Context
Sequential Small-Group Interaction
Technology & Media
Community
Culture of Discourse Community
Individuals' Resources & Experiences
Individual Voices
Individual

The Study of Resources

- **We can see interactional resources in the sequential small-group interaction**
- **We can trace where resources come from and where they go for individuals and communities**
- **We can create experimental data that captures the details of how resources work**
- **We can analyze how groups bring in resources, understand them, enact their use, modify them and preserve them for communities**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Points On Path Objects
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Parallel Line
Perpendicular Line
Angle Bisector
Circle By Center+Point
Circle By Center+Radius
Arc On Circle
Arc Through 3 Points
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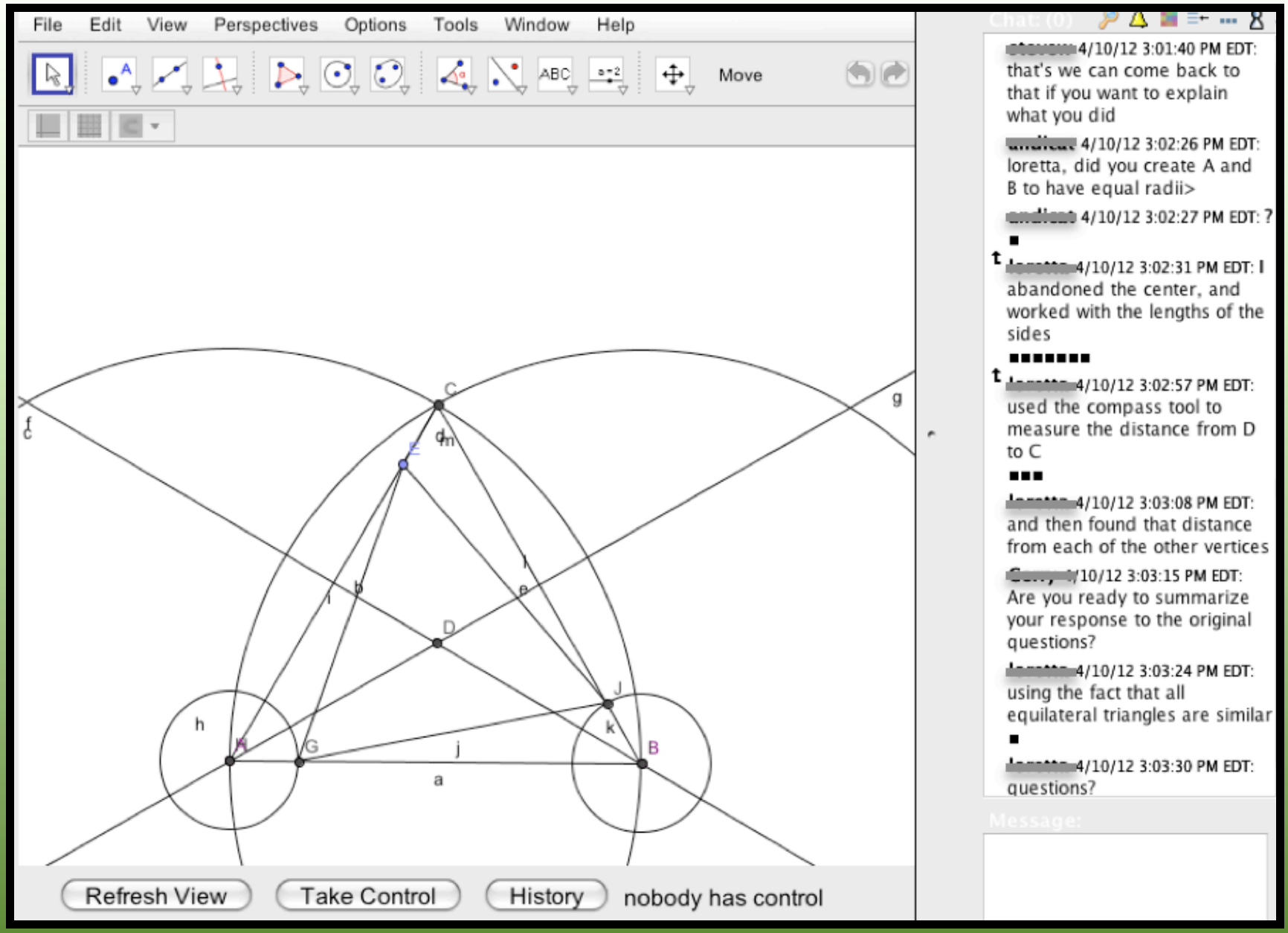
The Experiment of Dynamic-Geometry Resources

- **Explore the diagram of two inscribed triangles by dragging their vertices**
- **Discuss the dependencies that are built in**
- **Construct the diagram using the dependencies**
- **Analyze the spatio-graphical and the geometry theoretical resources the students use**
- **How do they collaboratively use the resources?**
- **How do they make sense of & with them?**


File Edit View Perspectives Options Tools Window Help
Move
C
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A
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a
Refresh View
Take Control
History
nobody has control
4/10/12 3:01:40 PM EDT: that's we can come back to that if you want to explain what you did
4/10/12 3:02:26 PM EDT: loretta, did you create A and B to have equal radii>
4/10/12 3:02:27 PM EDT: ?
4/10/12 3:02:31 PM EDT: I abandoned the center, and worked with the lengths of the sides
4/10/12 3:02:57 PM EDT: used the compass tool to measure the distance from D to C
4/10/12 3:03:08 PM EDT: and then found that distance from each of the other vertices
/10/12 3:03:15 PM EDT: Are you ready to summarize your response to the original questions?
4/10/12 3:03:24 PM EDT: using the fact that all equilateral triangles are similar
4/10/12 3:03:30 PM EDT: questions?
Message:

The Resources in VMT

- **How do the American students make sense of the technology resources?**
- **How do the Turkish students change the graphical resources like labels for their meaning making?**
- **What kinds of resources can the VMT project make available for teachers & students?**
- **What can we analyze in a data session on these experiments?**

For further information

- This paper: http://GerryStahl.net/pub/resources.pdf
- These slides: http://GerryStahl.net/pub/eidwt.ppt.pdf
- Curriculum: http://GerryStahl.net/pub/activities.pdf
- On geometry: http://GerryStahl.net/pub/euclid.pdf

About the course for teachers:

- http://vmt.mathforum.org/vmt/courses.html

Access the new VMT-with-GeoGebra system:

- http://vmt.mathforum.org/VMTLobby

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