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Information Behavior of Online Small Groups Engaged in Math Problem Solving

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A glimpse at the Virtual Math Teams (VMT) chats...

finding information

identifying information need

construction of meaning

The Virtual Math Teams (VMT) project is an NSF-funded research program that investigates the innovative use of online collaborative environments to support effective K-12 mathematics discourse. Students come to VMT chat environment and work in small groups on solving math problem. Being in such virtual environments where they are connected with people in the same group and other groups, how is information behavior like in such a social context of collaboration?

PoW Library

Ask Dr. Math®

Google
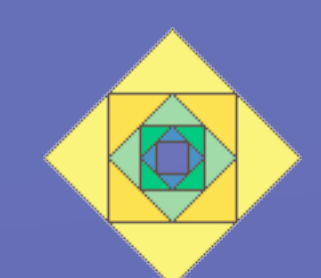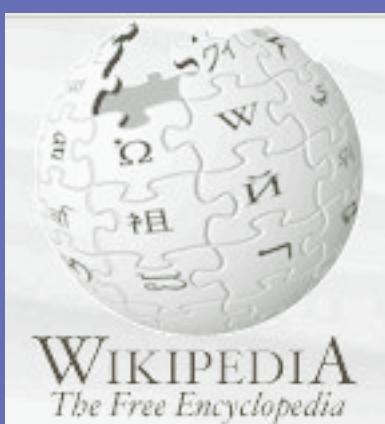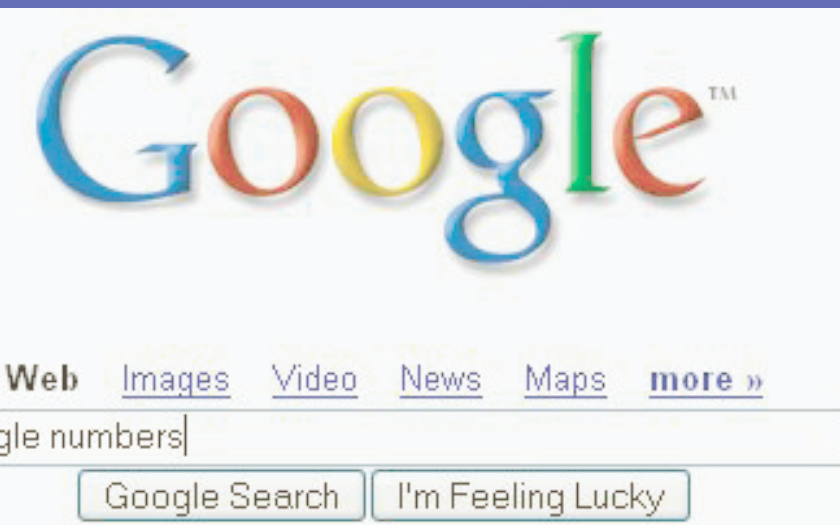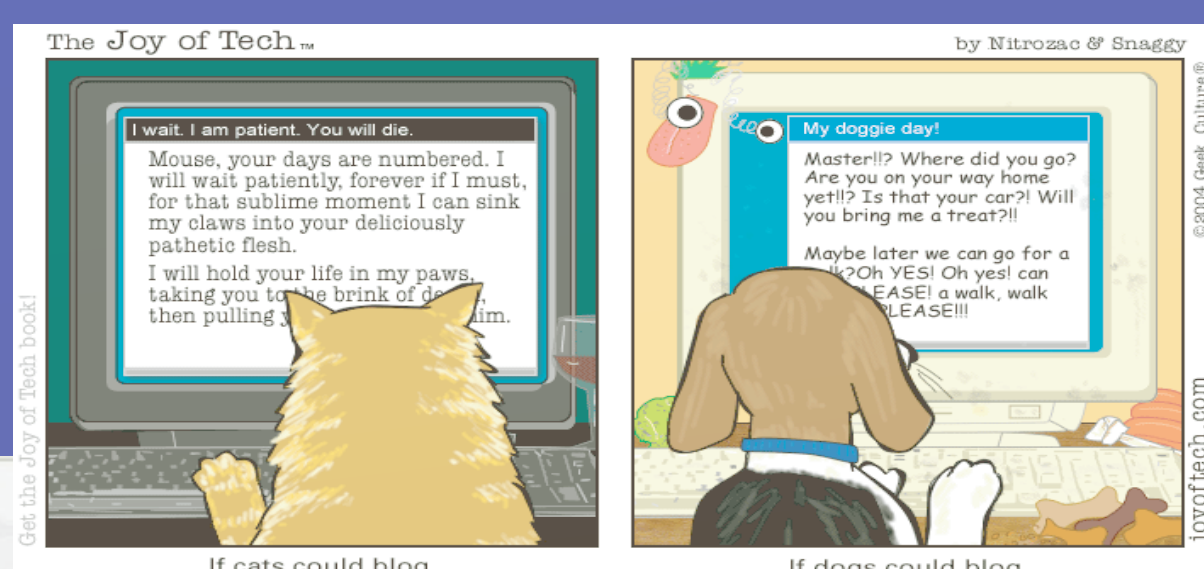
Research Questions

● What information do students need when they work in small groups on solving a math problem within virtual environments?

● How do students as a group construct their information needs and find information to satisfy them? What are the methods used by them?

● How is information behavior interwoven in the group's problem solving and knowledge construction process?

● How can access to information facilitate co-construction of knowledge in an online learning community? How can the information resources and collaboration environment be designed to help students to learn mathematics collaboratively?

Why study online small groups?

● Small groups of learners in VMT environment exhibit distinctive patterns in their information practices

● Information behavior of social groups in a networked world is not well studied

● It helps us understand social groups' information practices and informs the design of digital libraries and CSCL environments

Analyzing small group's information behavior

Online environment provides access to enourmous digital resources on the Web. At the same time, group is treated as a primary resource of information by the participants. Negotiation of information needs, seeking information, constructing meaning, and use of information take place in the small group -- a synergistic information ground. We've taken an *analytical approach* to analyze participants' information practices from an *interactional perspective*.

When encountering the need for information, participants in most cases turn to the group for help. Using online resources is also observed as a common practice.

Students seem to have expectations for online resources to provide them straight answers.

In reality, such expectation may break down...

SUP: what does itmeans by edgelengths?
SUP: jone of the 3 sides?
AVR: edgelength means length of a side

NISH: hope this doesnt sound too stupid, but wuts a summation
137:   The sum of all terms from a to b
Jason: http://en.wikipedia.org/wiki/Sigma_notation
Jason: don't worry nish, you'll learn all about it next year
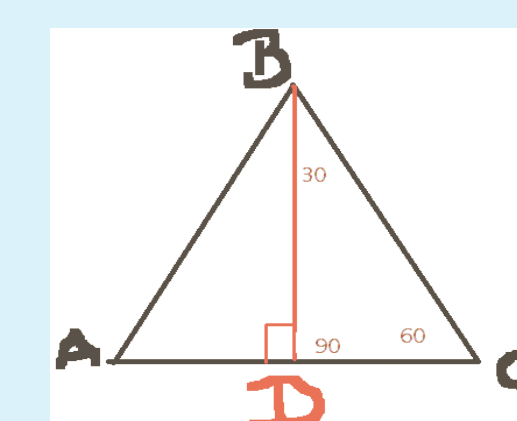
SUP: is there a formula for a 60/60/60?
AVR: I have no idea
AVR: I think once we find the formula it should be pretty easy
AVR: I don't think there's a formula, though
PIN: search google
AVR: I think we find it some other way
AVR: that's what I'm doing
...
AVR: Okay, guys, I don't think there's a formula to find the height

There are observable tactics that participants use to pose their information questions, such as offering a candidate answer or calling for participation.

Similar information questions can be addressed differently, which has consequential effects on the participation framework.

An *information problem* emerges as an outcome of the group interaction, which need participants to negotiation and resolve.

AME   I disagree   7:34:38
KIM   it says, "They are usually 50 meters
         by 25 meters, when looking from the top   7:36:30
HOL   ?   7:36:50
KIM   then, "the picture below shows the depths" 7:37:59
AME   yeah but whats the height?   7:38:19
HOL   height from what perspectiv   7:38:58

AME   The height of the olympic pool is 25 right?   7:32:31
KIM   rereading   7:32:50
HOL   height is 2m   7:33:33
AME   wha?   7:33:39
KIM   I think we're looking at a side view - so
         the heights are given in the picture   7:33:44

Theoretical framework and methodologies

- Social Constructionism and Group Cognition
- Group as the unit of analysis
- Ethnomethodologically informed conversation analysis
- Micro analysis and case study
- Design-based research

For more information, please visit: **mathforum.org/vmt**
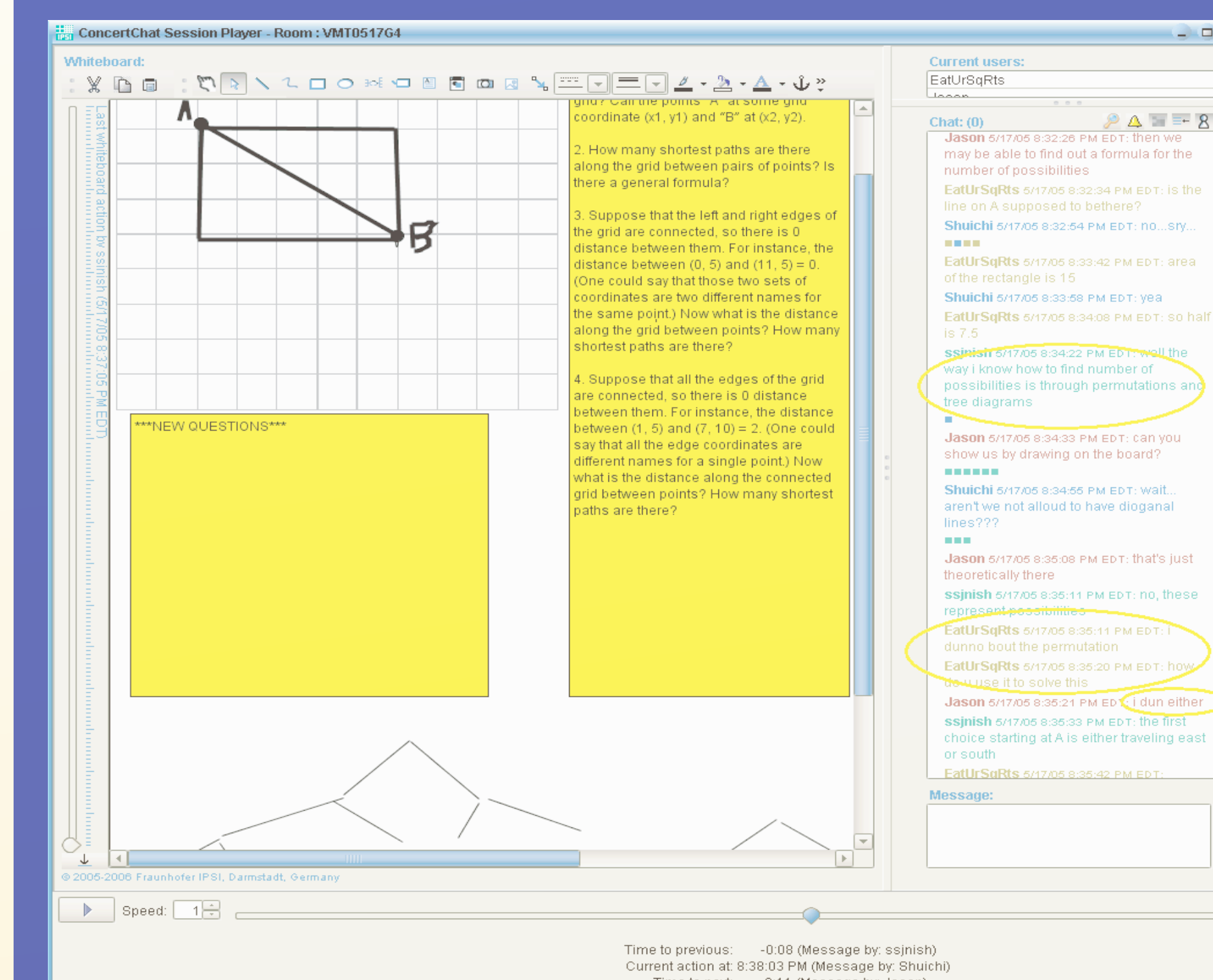
Use of information

When information is brought in, participants need to do the work of constructing the meaning in order to apply it locally to their problem. Information is not a static object but interactionally constructed through social interactions.

This excerpt shows a case where information (permutation) brought in by ssjnish is not ready for others to apply to the problem, participants thus engage in constructing the meaning of it. We see the use of the shared whiteboard as a tool to illustrate the idea by drawing a tree diagram.

more on findings of what information participants need in such environment:

problem-oriented information

task and procedure oriented inforamtion

socially oriented information

Summary of findings:
* Some phases of social information behavior are formulated including information problem formulation, information question posing, information resource usage, and meaning making.
* A range of member methods or social practices for interactively accomplishing these phases are analyzed and identified.
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