

# Opportunities for Intelligent and Adaptive Behavior in Collaborative Learning Systems



June 14, 2010

## Schedule

- 2:00 - Workshop intro
- 2:20 - Participant intro
- 2:40 - Rapid-fire poster/demo intro
- 3:00 - Posters/demos
- 3:50 - (Break)
- 4:00 - Small group discussions
- 5:00 - Full group discussion
- 6:00 - (end)

## Discussion Themes

- Modeling and Assessment
- Collaborative Context
- Scale and Sustainability

## Workshop goals

- Map the current state of the field
- Set a research agenda
- Build a research community

## Multiple Approaches

- Agents acting synchronously with human collaborators

Miao, Yu, Chen, & Tao; Walker, Rummel, & Koedinger; Kumar & Rosé

- Modeling asynchronous discussion and support

Kang, Kim, & Shaw; Asterhan & Schwartz

- Using models of problem-solving to directly support collaboration

Johan & Bull; Bader-Natal

**Assisting the facilitator:  
Striking a balance between  
intelligent and human support of  
computer-mediated discussions**



**Christa Asterhan  
Baruch Schwarz**

# Assisting the facilitator: Striking a balance between intelligent and human support of computer-mediated discussions

- **Human** expertise, adaptiveness and flexibility:  
Especially for–
  - ill-defined learning activities that involve multiple agents
  - focus on informal reasoning
  - controversial topics (emotions and personal values)
- **Intelligent** support for human facilitator
  - moderation of multiple groups simultaneously
  - difficulty to navigate large amounts of information
- **Argonaut** is designed to provide intelligent support for human facilitators of multiple group discussions.

File Edit View Windows

Select טענה טיעון (טענה + נימוק) שאלה מתנגד מתקשר מסכים

Message from Moderator

אני חושב... לעצור את שיבוט יכו

אני מסכים איתך ששיבוט יכול להציל חיי אדם!

למה החיים של מ יותר מאלה של מ המשובטים שייצג

חיים, שמתי לב שלא נימקת את דעתך. אנא תן נימוק...

OK

האם לדעתכם שיבוט צריך להיאסר וול

בשכן, זה ממש חועל נפש הרי בחר שברגע נשים משובטים יתייחסו כמו לאנשים סוג ב' ויקחו בריס!

אתה מדבר שטויות, מאיפה כל כך חוץ מזה, אתה יודע? לשבט איברים בנפרד?

אין לי בעיה עם שיבוט איברים בלבד, אבל את מאוד תמימה אם את חושבת שבוזה זה יעצר.

# View from discussant's EUE

Group relations

haim david dalia

User Activity

Shape use (miniatur)

Link use (miniatur)

Message/Annotation Pointer Highlight Lock Terminate Intervention Replay Time Span

Intervention type

Image

Popup Annotation Message

No Image

Screenshot File... Library Clear

Text

Please provide reasons for your claims.

Send!

עצמך "עול מג של כסף" לגרמנים ומזאת משתמע - זילזול בחיים שלך! זה אסור. צריך להילחם בהם ולמות בכבוד מאשר שהם יהרגו אותנו ללא כבוד.

אבל המוות הוא לא וודאי...

# Combining peer-assistance and peer-assessment in a synchronous collaborative learning activity



Ari Bader-Natal

# Combining peer-assistance and peer-assessment in a synchronous collaborative learning game

<input type="checkbox"/> Factoring	2	Teachit!	50%
<input type="checkbox"/> Interpretation of tables	2		50%
<input type="checkbox"/> Fractions	7		57%
<input type="checkbox"/> Triangles	5		60%
<input type="checkbox"/> Ratios and proportions	11	Teachit!	64%
<input type="checkbox"/> Counting methods	3		67%
<input type="checkbox"/> Estimation	3		67%
<input type="checkbox"/> Operations on Radical Expressions	4	Teachit!	75%
<input type="checkbox"/> Lines	1		100%

Review Mode: Review and discuss, continue when ready 1:00

ready a member? [Sign In](#)

**Question**

A flagpole stands 5 feet tall at a 90 degree angle in front of a school. The shadow it casts is 8 feet from the flagpole's top to the ground. If the flagpole lies 15 feet from the school, how far is the distance from the shadow's end to the school?

**Choices**

A  $\sqrt{39}$

B 7

C  $15 - \sqrt{39}$

D  $\sqrt{89}$

E 13

**Markus** ready 5002

**shekar** In Progress 992

**Friedrich E.** In Progress 8533

Grockit Messages

Welcome to Grockit! You can talk through questions with other players here. Enjoy!

Messages & Discussion

**Friedrich E.:** i don't know but i just gess lol

**Markus:** lol :-)

**Markus:** Ride on

**Friedrich E.:** this is though

**Markus:** :-) I guessed

**Friedrich E.:** does a has to be >0

**Friedrich E.:** any number raised to 0 give u 1

**shekar:** true

**shekar:** i'm confused

**Friedrich E.:** so we should care less about a

**Friedrich E.:** ?

**Markus:** Yes but a was > than 0

**Markus:** Sorry X>0

**Friedrich E.:** ok

**Friedrich E.:** what the f

**Friedrich E.:** lol

**Markus:** ?

**Friedrich E.:** i hate those figures

**Markus:** :-)

**Friedrich E.:** they make my guesses harder

**Markus:** Have a nice day ! :-)

**Markus:** Bye

Be nice, all conversations are logged. [Share](#)

School



## Evaluate Jane J.'s Teach-It

Skill Covered in this Teach-It:

### Probability

For each of the following questions please answer honestly. There is no penalty for a low score. If there was not enough a high score Jane will have the opportunity to offer the Teach-It

How well do you feel Jane answered questions for

4 = thoroughly | 3 = satisfactorily | 2 = inconsistently | 1 =

4 3 2 1

How well do you feel Jane explained concepts?

4 = thoroughly | 3 = satisfactorily | 2 = inconsistently | 1 =

4 3 2 1

How well did Jane help you understand the skill

4 = definitely helped | 3 = somewhat | 2 = minimally | 1 =

4 3 2 1

Feedback to be shared exclusively with Jane (optional)

Submit Your Evaluation



GMAT Prep

Profile

GMAT Community

Groups Users Content Courses

## GMAT Teachit!

### Quantitative: Properties of Inequality

Taught by:



Daniel P.

Review this Teachit



Teachit approved!

October 23, 2009  
2:18pm - 3:07pm  
(48 minutes)

3 people participated:



Robert G.

He's very helpful and always eager to interact and explain concepts. He's not afraid to admit when he's not sure about something and that's great! I enjoy Grockiting especially when he's online. Thanks Daniel! Keep up the good work.



Martin Sobo

Daniel is extremely adaptable, receptive, determined, talented and encouraging. I have enjoyed his Teachit and have learnt quite a lot from him.



Eric B.

Daniel led a great session, and really did a nice job explaining the fundamentals. Congratulations on a job well done!

Quantitative

Mau 178

dav 162

var 159

view top

Verbal

Ven 255

Ari 181

Jul 111

view top

Featured

Jim

And

Mar

all instructions

Invite you



# Promoting Collaboration and Discussion of Misconceptions Using Open Learner Models



Rasyidi Johan  
Susan Bull

Rasyidi Johan & Susan Bull

AniMis provides additional step-by-step representation of learner misconceptions as a starting point to promote collaboration and discussion

C Programming

has been implemented

Chemistry

memory	do-while code	output
x = 2	int x = 1; do { printf("%d",x); x+; }while(x<2); printf("%d",x);	1

Animate

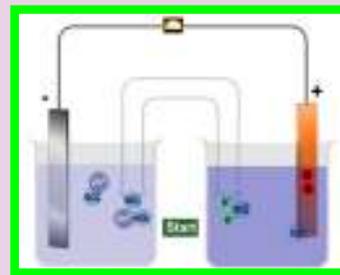
Simulation of the execution of a do-while loop concept

memory	do-while code	output
x = 1 x < 2	int x = 1; do { printf("%d",x); x+; }while(x<2); printf("%d",x);	

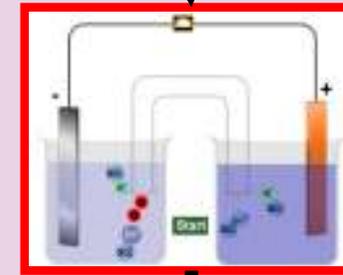
Animate

do-while code	Descriptions of execution
int x = 1; do { printf("%d",x); x+; }while(x<2); printf("%d",x);	<ol style="list-style-type: none"> <li>1. Declare a variable x and assign a value of 1 to variable x</li> <li>2. When the compiler reaches the 'do' keyword, it will execute the statement in the 'do-while loop'               <ol style="list-style-type: none"> <li>2.1. Print value of variable x, which is 1 and add value of 1 to variable x</li> </ol> </li> <li>3. When the compiler reaches the end of the loop, it will go to the 'while' keyword and check condition of (x&lt;2)</li> <li>4. If the condition is FALSE then it will exit the loop and print the value of variable x, which is 2.</li> </ol>

Description of a do-while loop concept



Simulation of the chemical reactions taking place inside the cell, causing the flow of electrons and producing electricity



The anode releases a positive ion into solution while the electrons travel through the connecting wire towards the cathode and the ions (positive and negative) flow from the salt bridge to balance the electrolytes charges in both side (anode and Cathode).

Description of correct concept

Observed students spontaneously discuss their understanding and learner models with peers, therefore we believed that OLMs could be useful in prompting collaboration and discussion of misconceptions.

# Modeling Successful vs. Unsuccessful Threaded Discussions



Jeonhyung Kang

Jihie Kim

Erin Shaw



Information Sciences Institute

## Modeling Successful versus Unsuccessful Threaded Discussions

Jeonhyung Kang, Jihie Kim, and Erin Show  
[www.ai.isi.edu/pedtek](http://www.ai.isi.edu/pedtek)

June 14 2010



USC **Viterbi**  
School of Engineering

# Objectives

**Question Answer**

**Problems get resolved**

**Question Un-resolved**

### Operating Systems (CSCI402x\_20102)

Home > CSCI402 > Forums > Looking for a group > Looking to form new group or join existing group.

Display replies in nested form | Move this discussion to ... | Move

Looking to form new group or join existing group.  
by [redacted] Wednesday, 26 May 2010, 12:43 AM

Hi Everybody,

I am looking to join an existing team or willing to start a new team. I am a senior in the Computer Science Games undergraduate degree and have completed all of the other programming classes. I have been in many team-oriented classes/projects prior to this class.

Although I am definitely aiming to get an A in this course, I would need members that are also motivated because of my other obligations this summer such as other classes and work. I live fairly near campus, and can work from both home or campus.

You can send an e-mail to [tsung@usc.edu](mailto:tsung@usc.edu) if you wish to contact me.

Thanks everyone and good luck.  
-Tony

[Edit](#) | [Delete](#) | [Reply](#)

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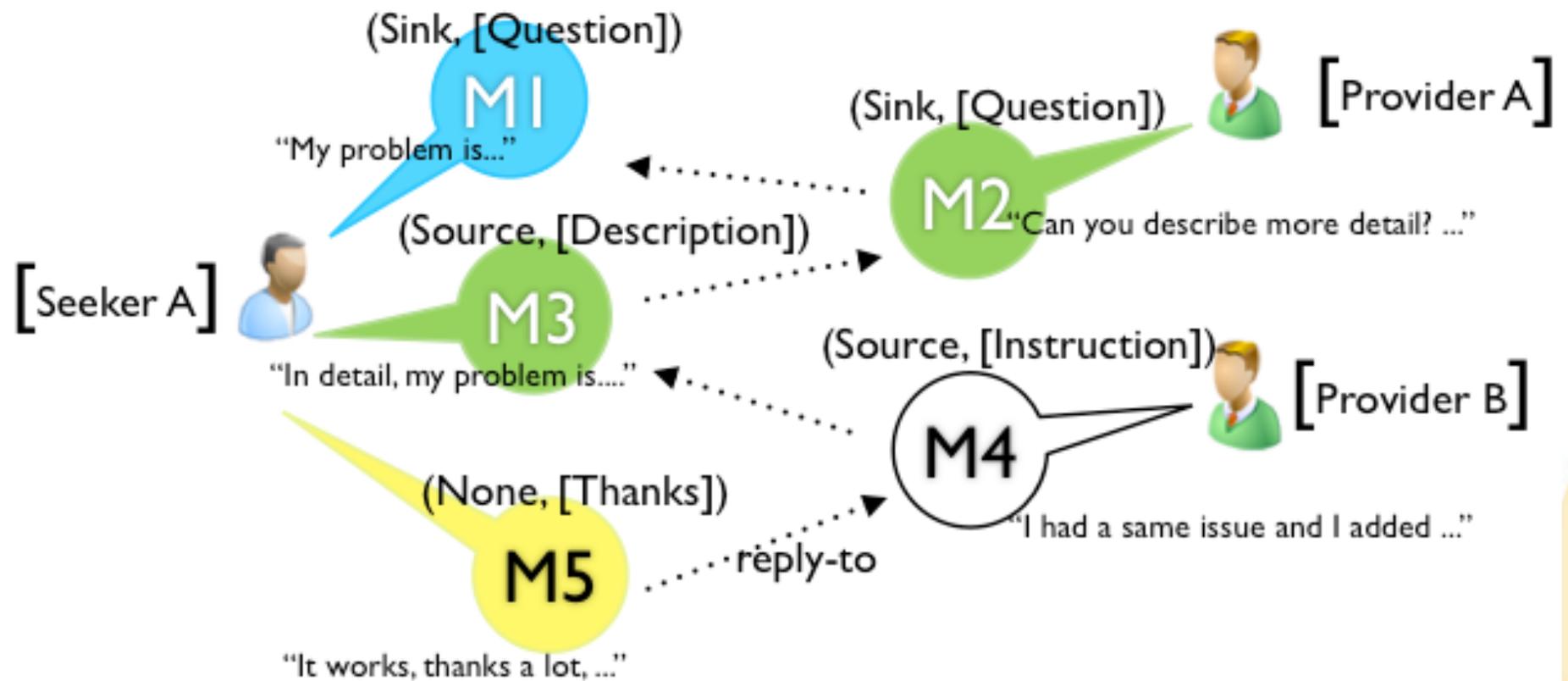
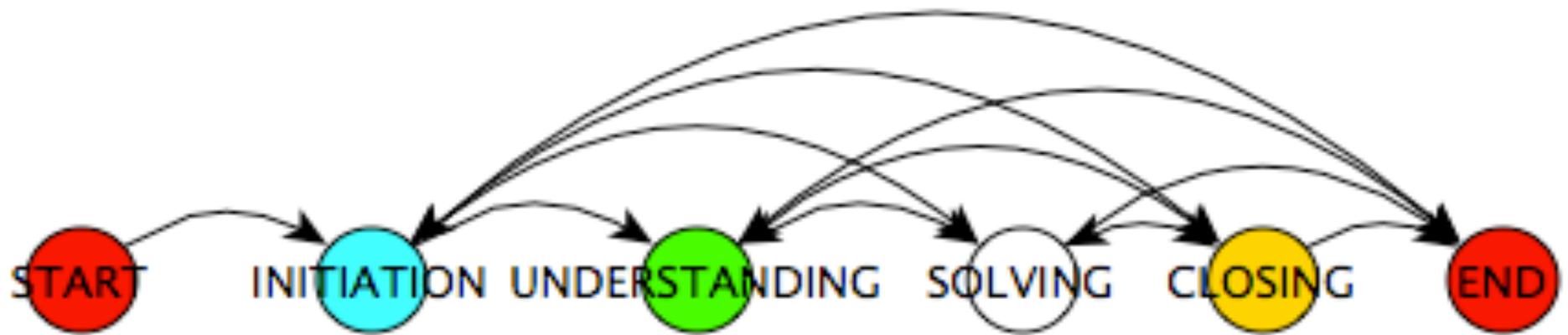
Re: Looking to form new group or join existing group.  
by [redacted] Wednesday, 26 May 2010, 05:52 PM

Hi,

We already have two persons in our group, and both of us are Chinese, I am major in Computer Science and the other is major in Computer Engineering. Both of us are graduate students, are you interested in joining our group? Thanks.

[Show parent](#) | [Edit](#) | [Split](#) | [Delete](#) | [Reply](#)

Moodle Docs for this page  
You are logged in as [Joonhyung Kang](#) (Logout)  
[CSCI402](#)



# Conversational Tutors with Rich Interactive Behaviors that support Collaborative Learning



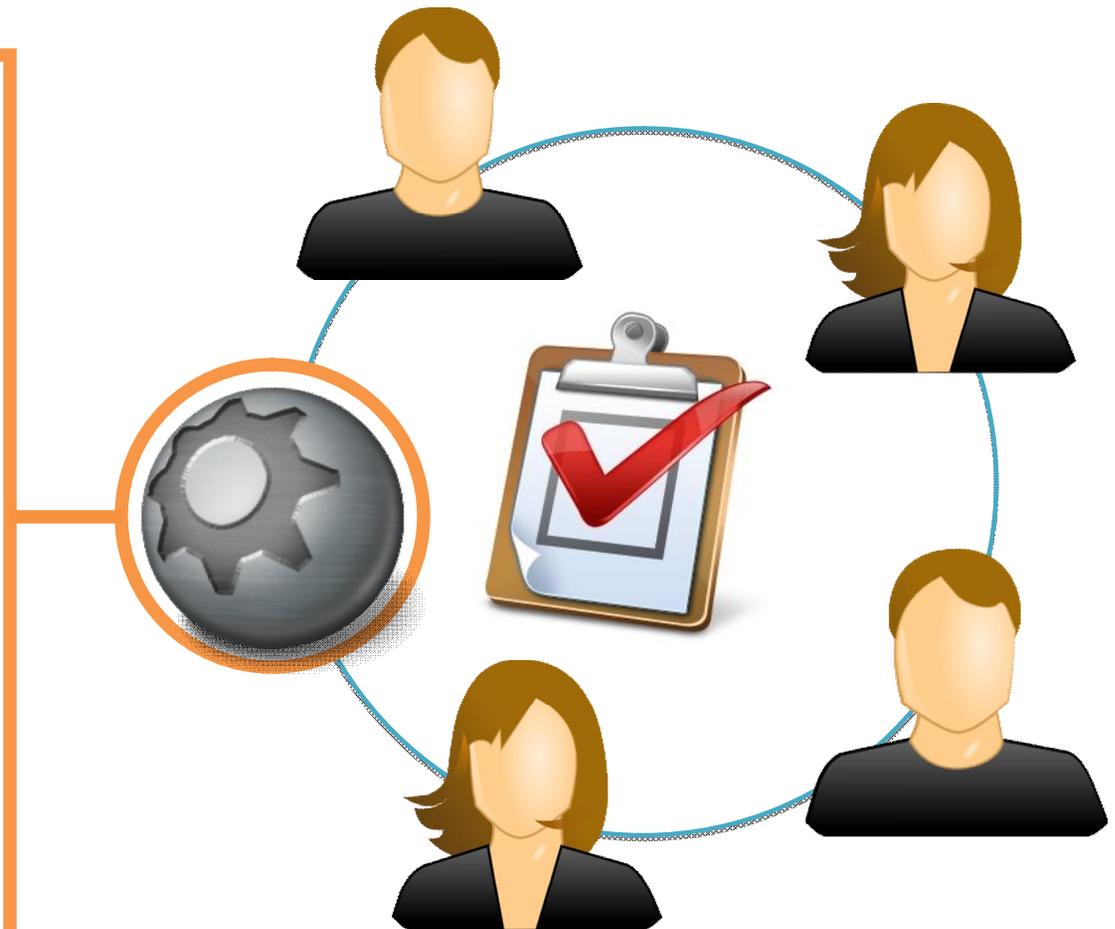
Rohit Kumar  
Carolyn Rose

# Conversational Agents that Support Collaborative Learning



Rohit Kumar, Carolyn P. Rosé

- **Implementation**
- **Interactive Behaviors**
  - **Instructional**
  - **Social**
- **Roles**
  - **Tutor**
  - **Peer Learner**
- **Benefits**



# Agents for Collaborative Learning in Virtual Worlds

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Chunyan Miao

Han Yu

Zhiqi Shen

Xuehong Tao

# Agents for Collaborative Learning in Virtual Worlds

Chunyan Miao, Han Yu, Zhiqi Shen, Xuehong Tao

Nanyang Technological University, Singapore

- Serves as a student of the learner in the learning-by-teaching process
- Creates the illusion of misconception and prompt deeper reflection on knowledge points
- Raises concerns on conflicting rules to the collaborating students



# Assessing, Modeling, and Supporting Helping Behaviors in Computer-Mediated Peer Tutoring



Erin Walker  
Nikol Rummel  
Ken Koedinger

# Assessing, Modeling, & Supporting Helping Behavior in Computer-Mediated Peer Tutoring

Erin Walker, Nikol Rummel, Ken Koedinger

How can we implement adaptive support for computer-mediated peer tutoring?

How does adaptive support impact student use of the collaborative environment?

## Intelligent tutoring of collaborative learning

- deep learning, support when needed
- explore idea in context of peer tutoring environment

Iterated in vivo experimentation: alternating between design, implementation, and evaluation; using interdisciplinary methods.

### In this poster

1. Automatically assessed 4 collaborative skills using multiple input sources
2. Implemented multiple types of adaptive support
3. Students improved quality of help given

Assisting the facilitator: Striking a balance between intelligent and human support of computer-mediated discussions . . . . .

*Christa Asterhan, Baruch Schwarz*

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*Ari Bader-Natal*

Promoting Collaboration and Discussion of Misconceptions Using Open Learner Models . . . . .

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Modeling Successful vs. Unsuccessful Threaded Discussions . . . . .

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*Erin Walker, Nikol Rummel, Ken Koedinger*

# small group discussions



June 14, 2010

## Topic: Modeling & Assessment

- Which interactions do we want to encourage/discourage in collaborative learning systems?
- How can we assess the effectiveness of interaction?
- How can we model a group's domain understanding?
- Should problem-solving be supported in a collaborative scenario?

## Topic: Collaborative Context

- How can we incorporate context in intelligent support?
- What roles should computer support take on?
- How can we encourage students to monitor & support themselves?

## Topic: Scale & Sustainability

- Which techniques used in collaborative learning systems improve with scale? Which do not?
- What lessons can we share to expedite the development process?
- How can we leverage existing architectures in building new systems?

## Discussion Questions

- Where is the current work within this theme? What are the holes?
- Where should we be focusing our attention?
- How do we build a community? How do we interface with other communities?

## Grounding Questions

- How does your work relate to the theme?
- What are the specific challenges that you have faced within this theme?
- What are the specific solutions that you have found?

# full group discussion



June 14, 2010

## Discussion Questions

- Where is the current work in adaptive collaboration support? Where are the holes?
- Along each theme, where should we be focusing our attention? How relevant are the themes as we move forward?
- How do we build a community? How do we interface with other communities?
- Overall, what benefits do we get adding collaboration to intelligent tutoring? What benefits do we get adding intelligent tutoring to collaboration?

# Opportunities for Intelligent and Adaptive Behavior in Collaborative Learning Systems



June 14, 2010