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

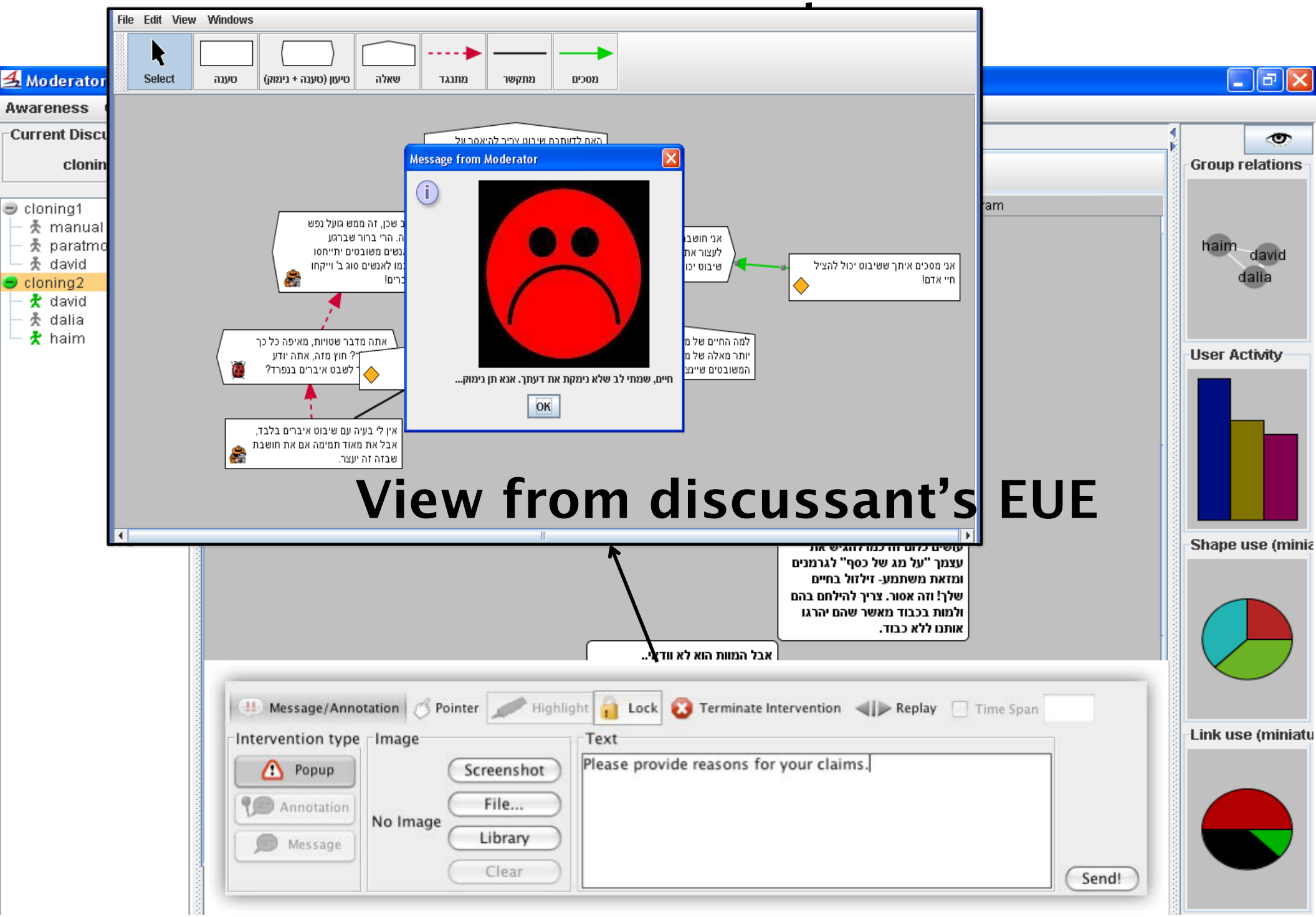
Christa Asterhan
Baruch Schwarz

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

- **Argunaut** is designed to provide intelligent support for human facilitators of multiple group discussions.

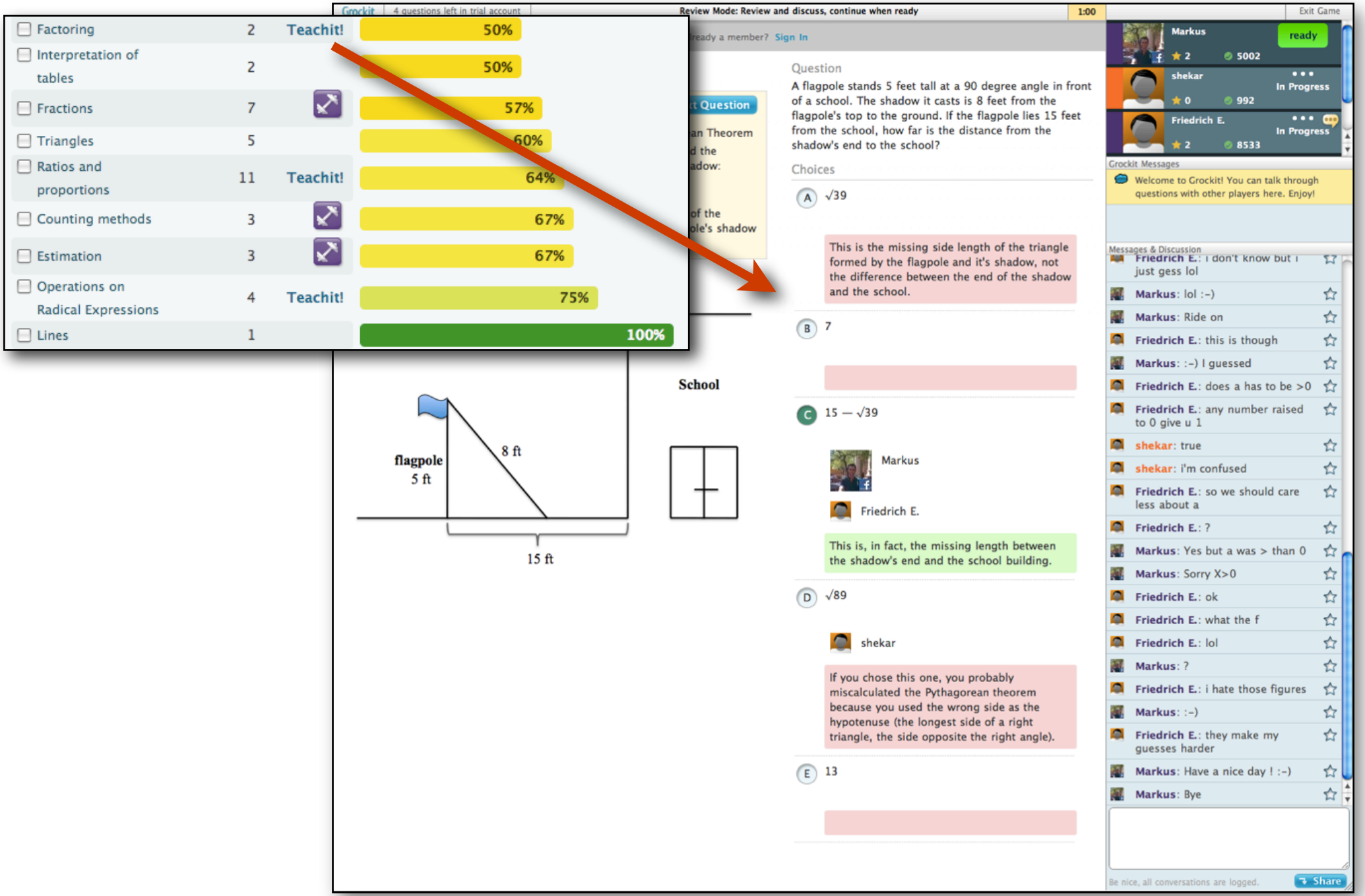


View from discussant's EUE

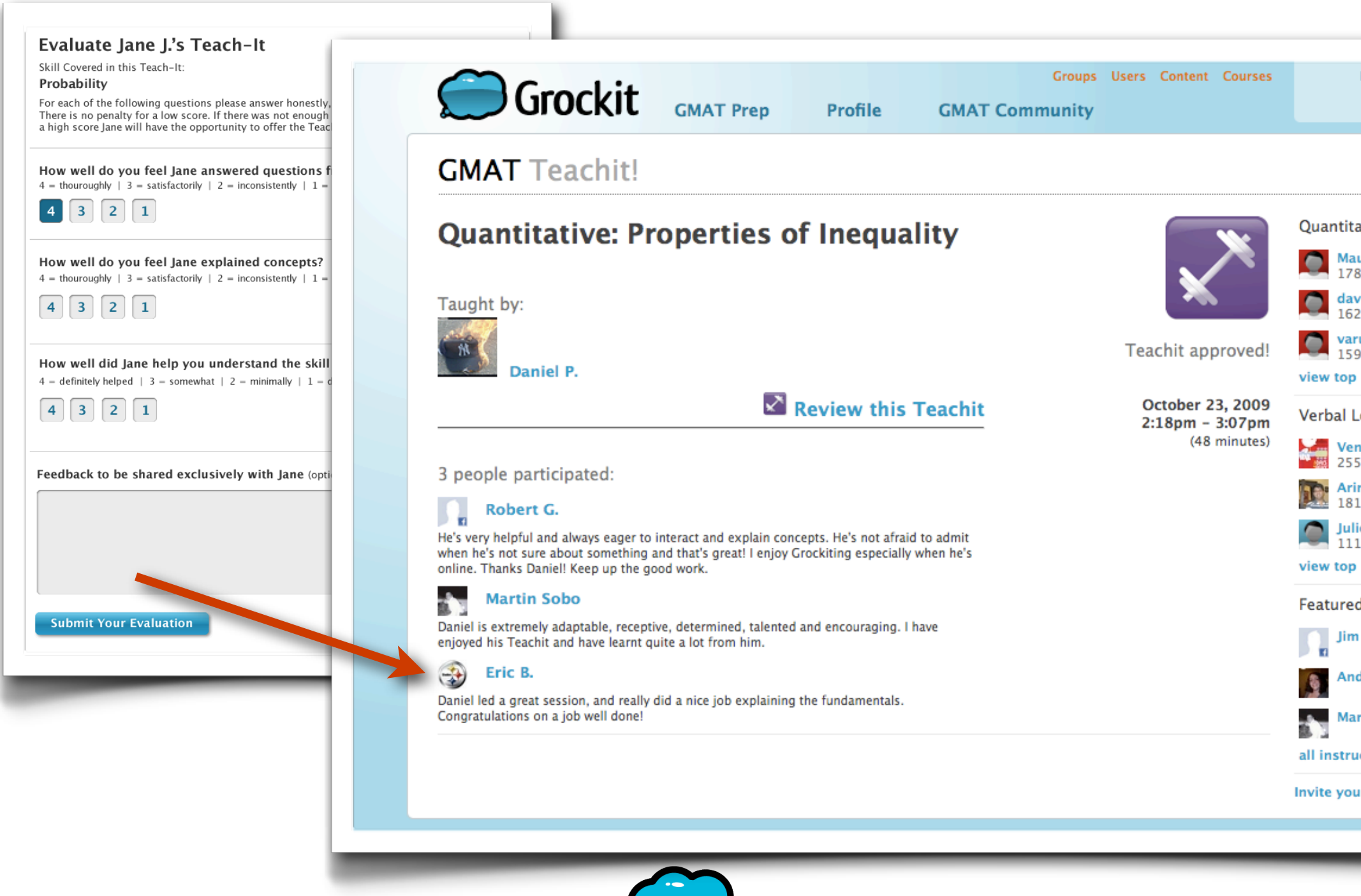
Combining peer-assistance and peer-assessment in a synchronous collaborative learning activity

Ari Bader-Natal

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



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



Promoting Collaboration and Discussion of Misconceptions Using Open Learner Models

Rasyidi Johan
Susan Bull

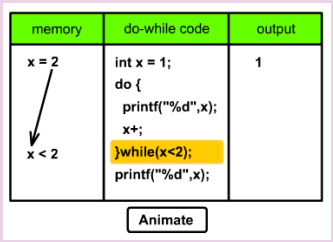
UNIVERSITY OF BIRMINGHAM

Promoting Collaboration and Discussion of Misconceptions Using Open Learner Models

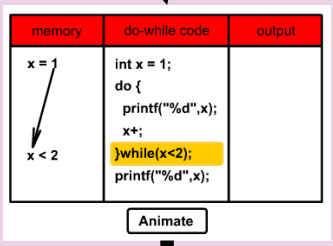
Rasyidi Johan & Susan Bull

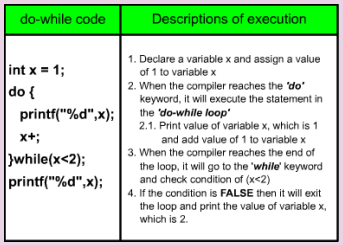
AniMis provides additional step-by-step representation of learner misconceptions as a starting point to promote collaboration and discussion

C Programming has been implemented **Chemistry**

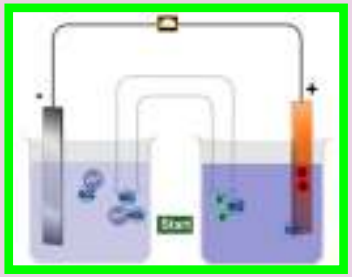


Simulation of the execution of a do-while loop concept

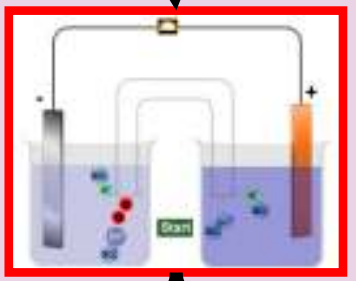




Description of a do-while loop concept



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

Modeling Successful versus Unsuccessful Threaded Discussions

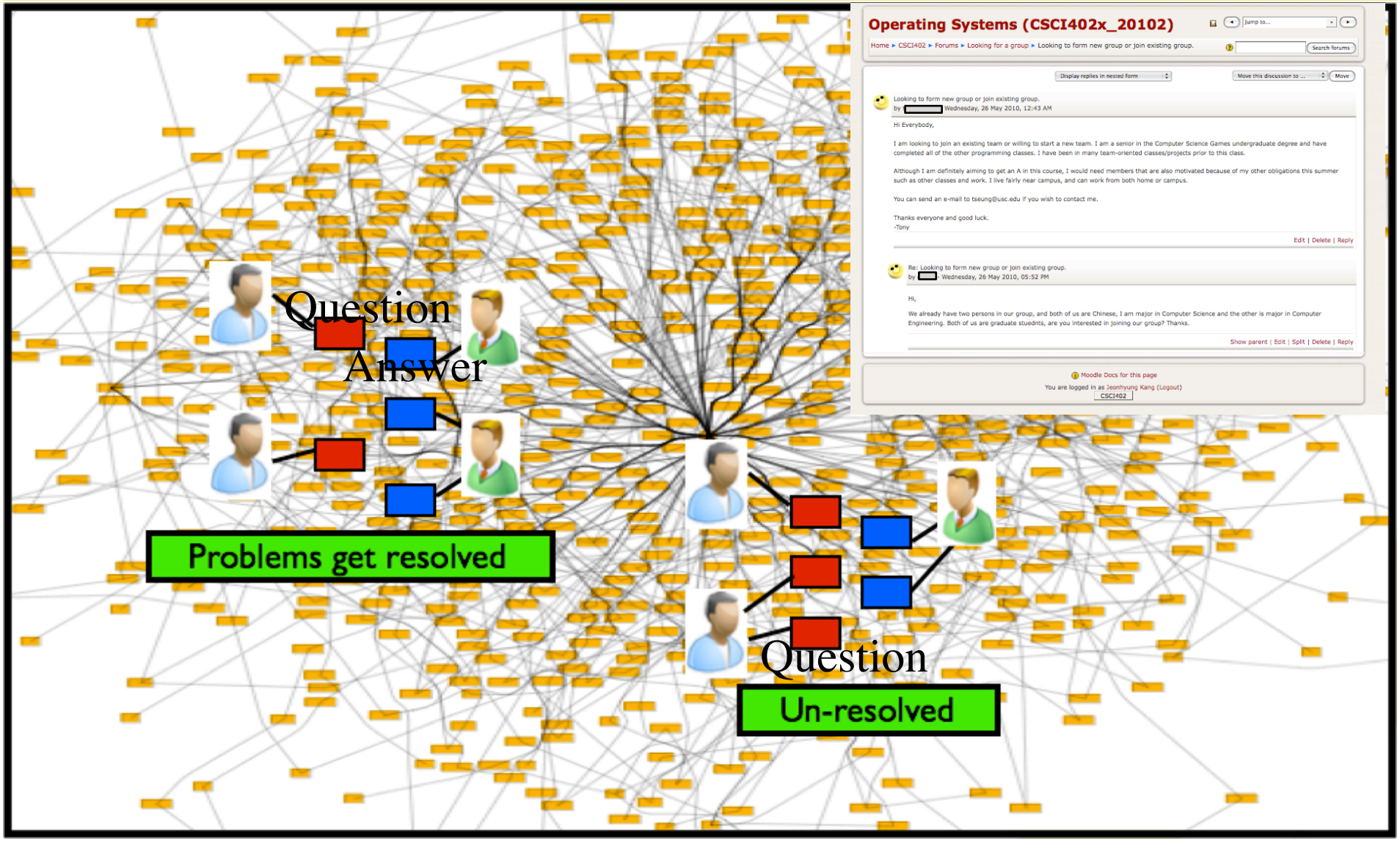
Jeonhyung Kang, Jihie Kim, and Erin Show
www.ai.isi.edu/pedtek

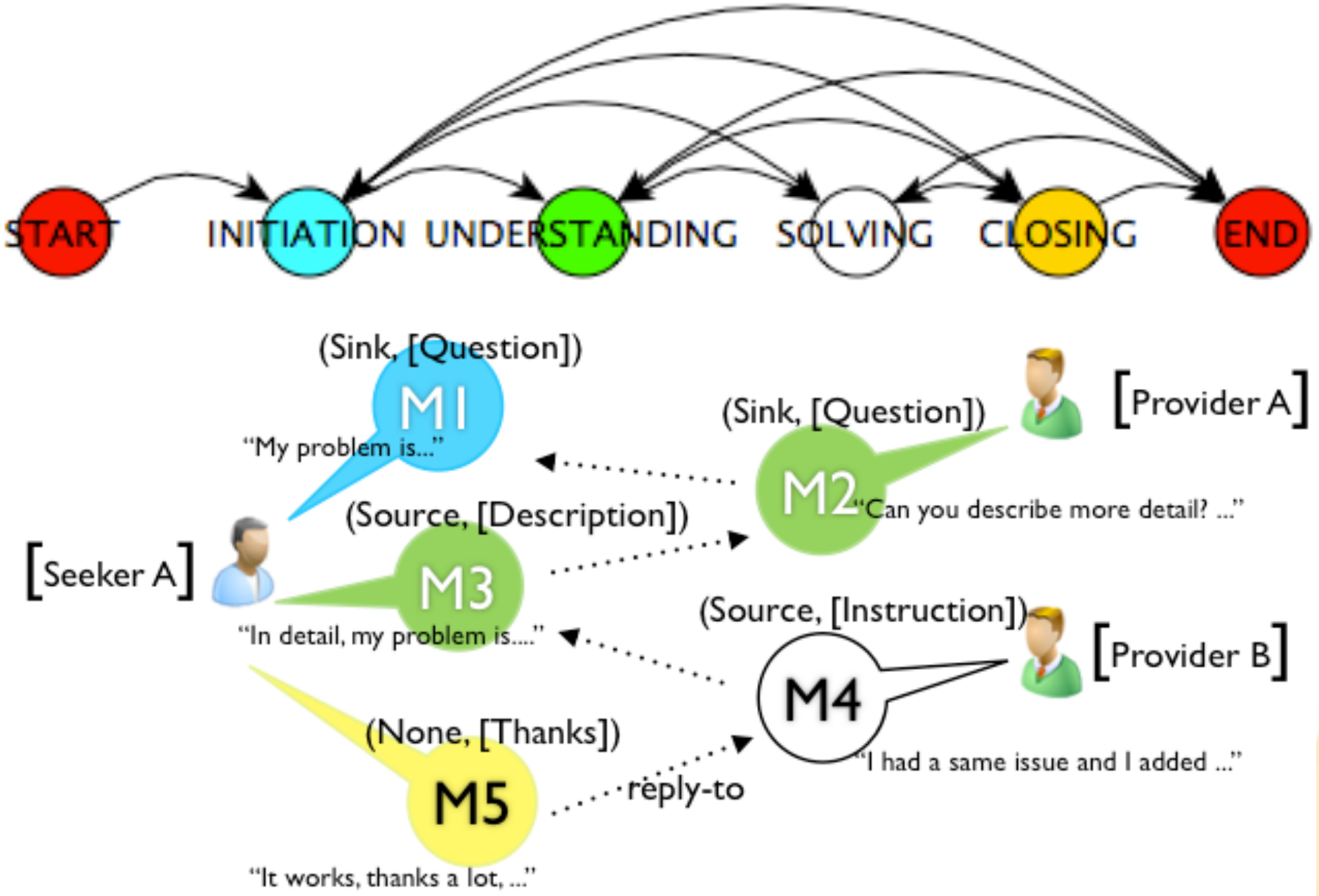
June 14 2010

USC Viterbi School of Engineering

Objectives

ISI Information Sciences Institute




START
INITIATION
UNDERSTANDING
SOLVING
CLOSING
END
(Sink, [Question])
M1
"My problem is..."
(Sink, [Question])
[Provider A]
M2
"Can you describe more detail? ..."
(Source, [Description])
[Seeker A]
M3
"In detail, my problem is...."
(Source, [Instruction])
[Provider B]
M4
"I had a same issue and I added ..."
(None, [Thanks])
M5
reply-to
"It works, thanks a lot, ..."

USC

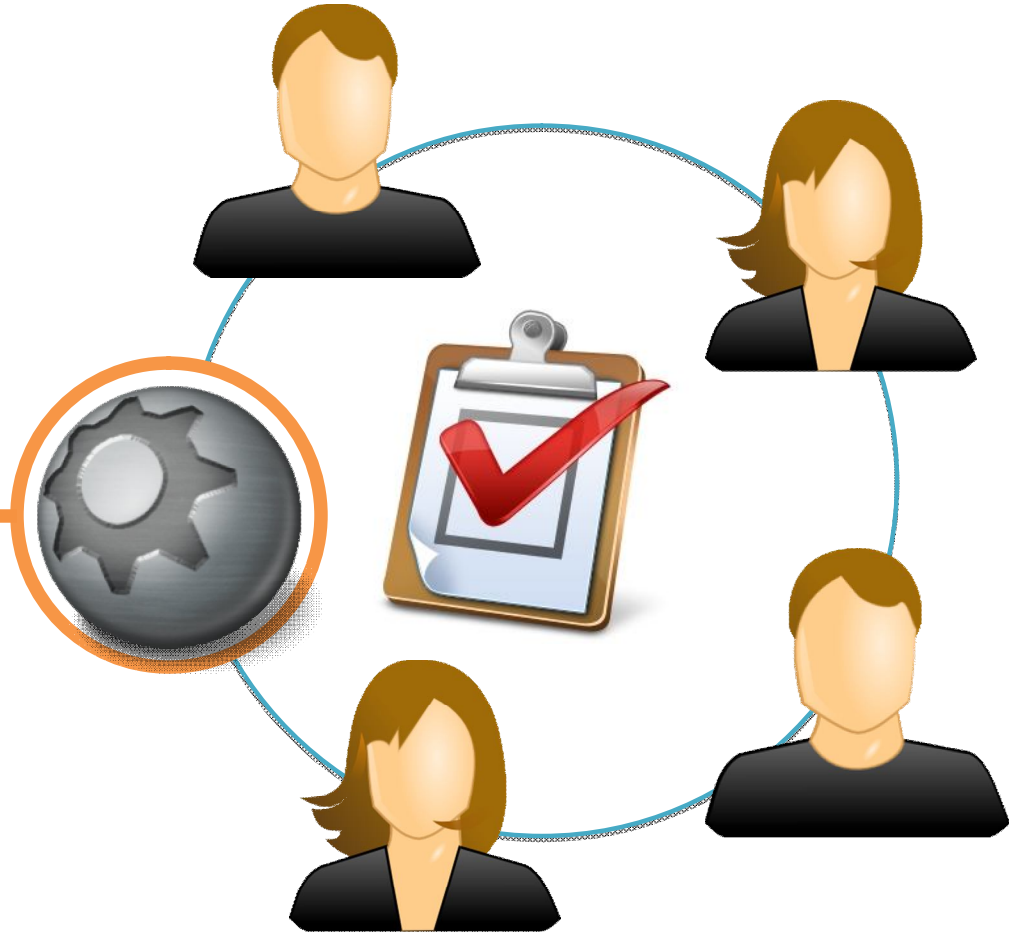
Conversational Tutors with Rich Interactive Behaviors that support Collaborative Learning

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

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

NANYANG TECHNOLOGICAL UNIVERSITY

NANYANG TECHNOLOGICAL UNIVERSITY

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?

LearnLab
Pittsburgh Science of Learning Center

HCII

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

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Pittsburgh Science of Learning Center

HCII

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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?

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