School of Computer Science
Language Technologies Institute

Towards Support of Collaborative Reflection, Help Exchange and Group Learning in MOOCs

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Making MOOCs More Social

- Project and problem based learning
- Collaborative reflection and collaborative problem solving
- Community building and social support
  - Reducing attrition in MOOCs
  - Engaging under-represented students in online education
- Gateways to enduring communities of practice

Conversational Interactions in MOOCs

- MOOC data shows association between types of conversational interactions and
  - Retention/Attrition [Wen et al, 2014a, Wen et al. 2014b, Wen et al 2015]
  - Teamwork quality [Yang et al., 2015]
  - Learning [Xu et al., 2015]
- Foundation for the design of interventions that have an impact on real world MOOCs
- This talk: findings from three recent studies related to the broad vision of designing **discussion affordances for collaborative learning in MOOCs**

Discussion Affordances for Natural Collaborative Exchange

http://dance.cs.cmu.edu

MOOC Interventions

Bazaar

- Supported synchronous collaborative learning
- Opportunity for reflection and social connection

Quick Helper

- Support for effective help exchange

Data, Analytics and Learning

An introduction to the logic and methods of analysis of data to improve teaching and learning.

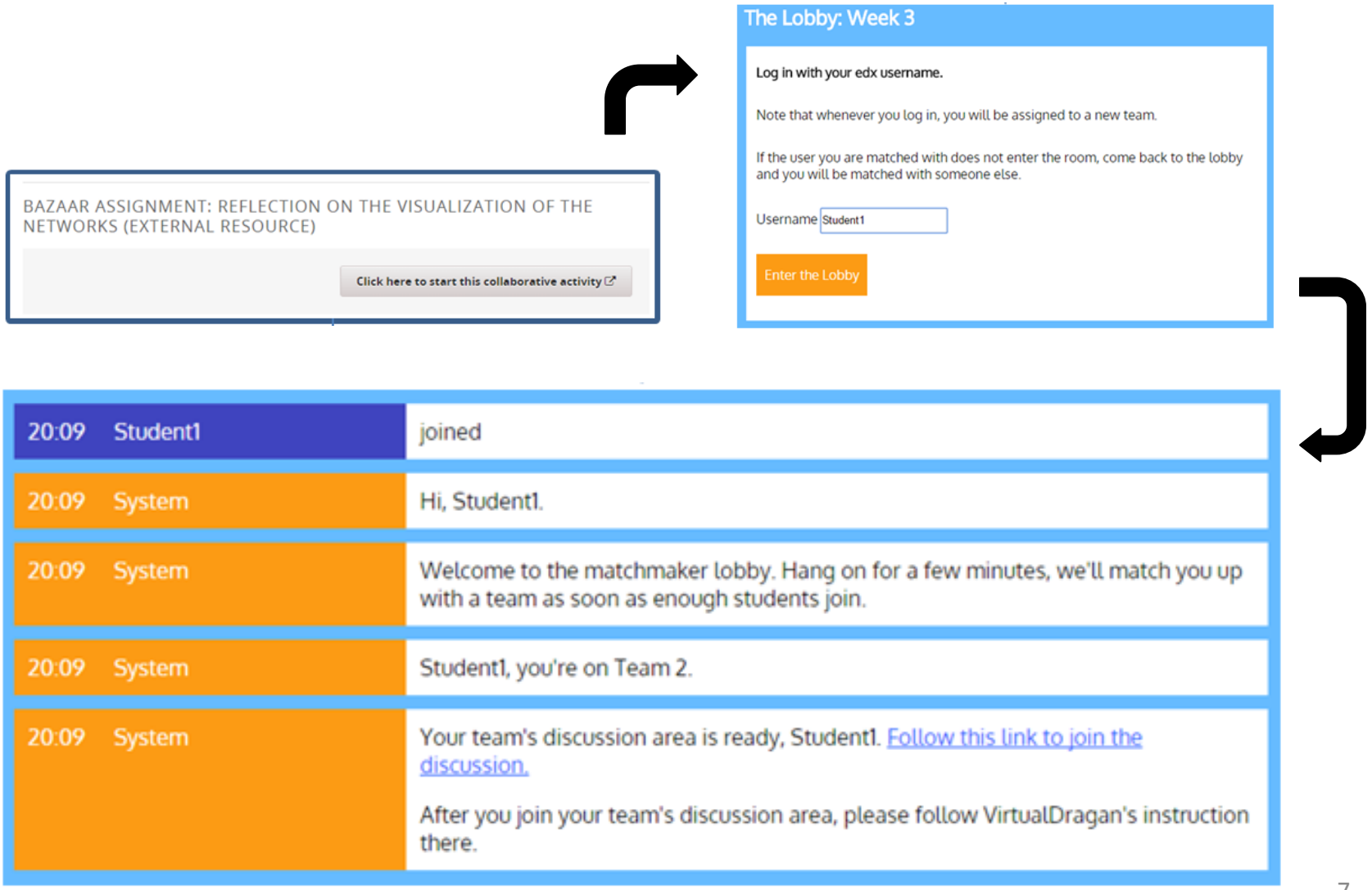
UNIVERSITY OF TEXAS ARLINGTON

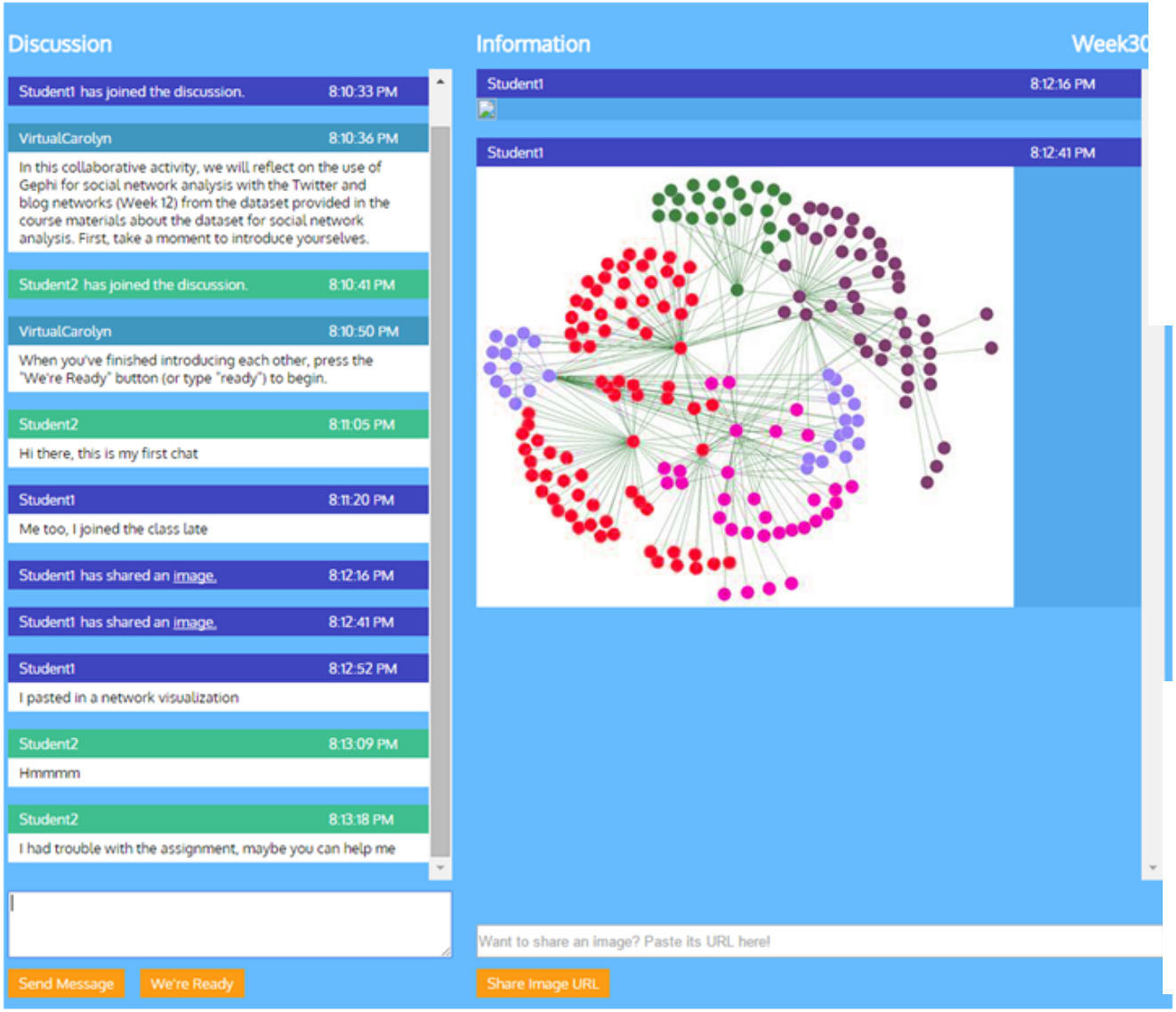
Athabasca University

COLUMBIA UNIVERSITY

Carnegie Mellon University

Ad-hoc Group Formation





Collaborative interaction supported by a virtual agent

Positive Impact of Chat Participation on Dropout

Survival analysis

- students who made at least one attempt to participate in a chat during the first 6 weeks
- unit of analysis: each 2 day period

Dependent variable:

- drop = 1 on the last 2 day time window when at least one click was recorded (0 otherwise)

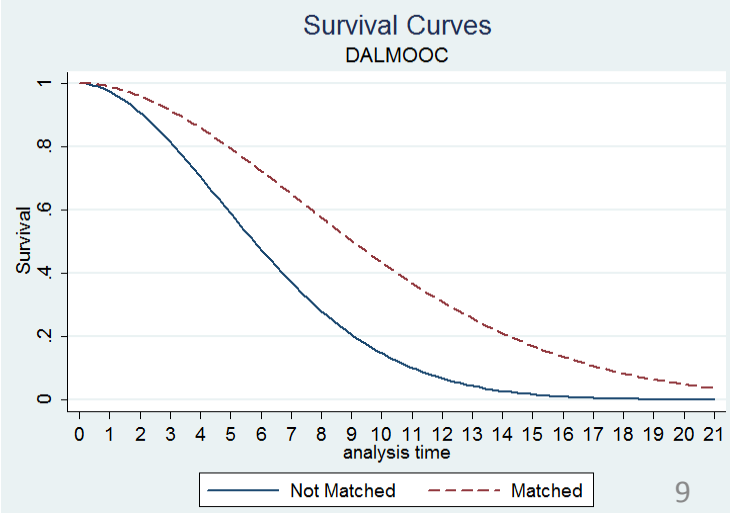
Control variables

- clicks on videos
- clicks on discussion forums

Independent variables:

- attempts to be matched for a chat
- successful match (binary)
- interaction between Attempts and Match

Independent Variable	Hazard Ratio	P Value
Video Clicks	2.38	P < .0001
Forum Clicks	.51	P < .0001
Match Attempts	2.33	P < .0001
Match Success	**.44**	**P < .01**
Interaction between Attempts and Match	.76	P < .05

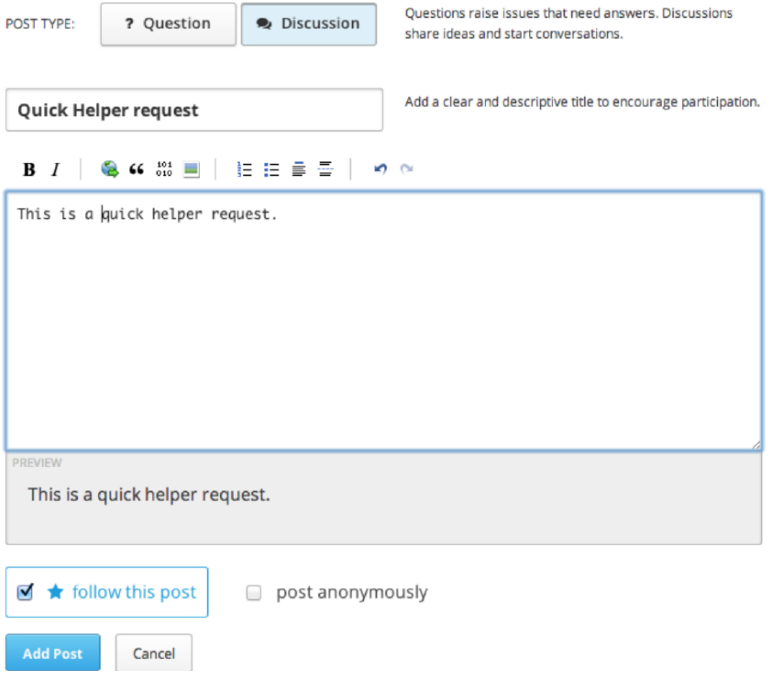


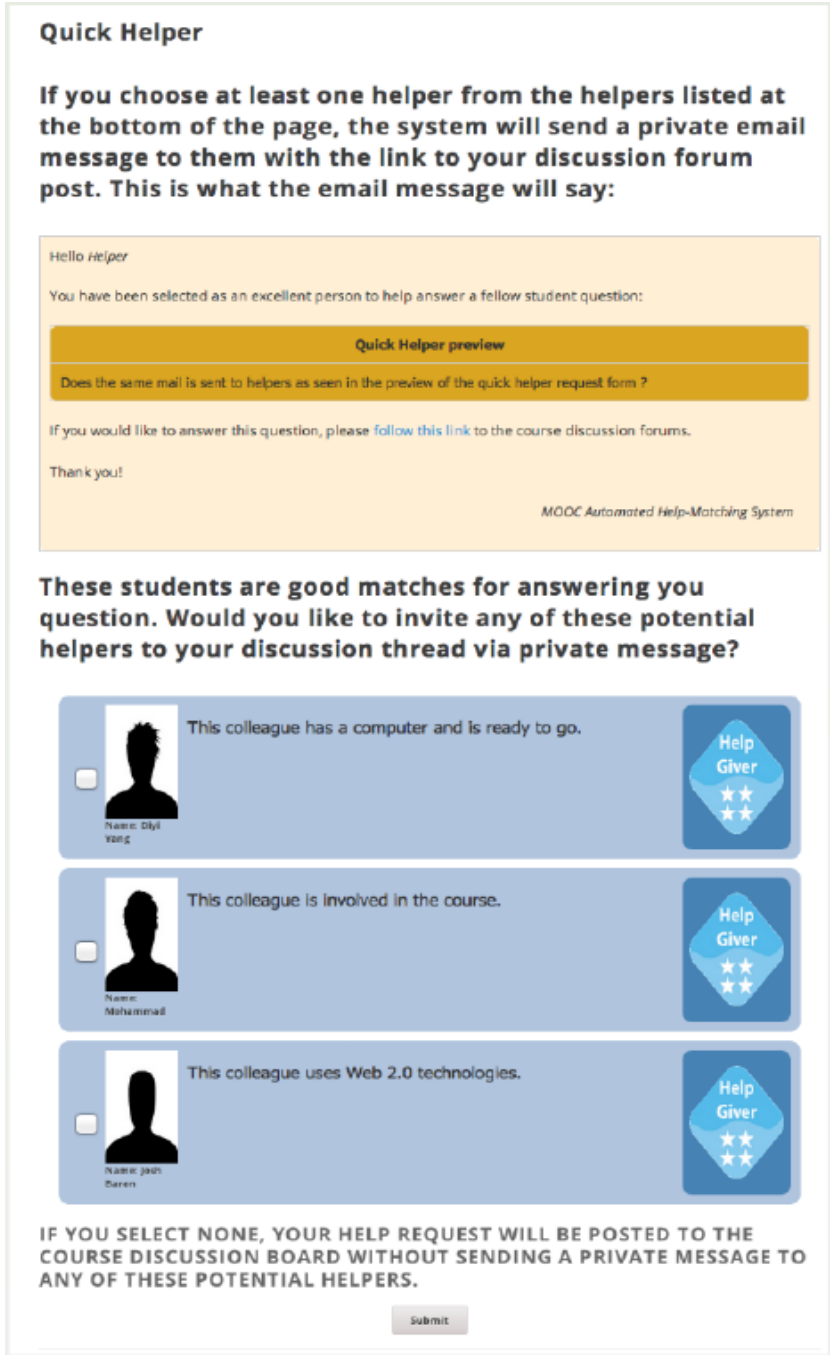
Comparative Analysis

	Social	Course Process	Course Content	Reasoning
Bazaar (week1)	18 (47.4%)	23 (60.5%)	14 (36.8%)	26 (68.4%)
Bazaar (week2)	22 (57.9%)	7 (18.9%)	21 (56.8%)	22 (59.5%)
Forums (week1)	39 (19.5%)	88 (44.0%)	53 (26.5%)	62 (31%)
Forums (week2)	32 (16.0%)	88 (44.0%)	80 (40.0%)	67 (33.5%)
Twitter (week1)	19 (19.0%)	31 (31.0%)	38 (38.0%)	28 (28.%)
Twitter (week2)	7 (7.0%)	38 (38.0%)	57 (57.0%)	35 (35%)

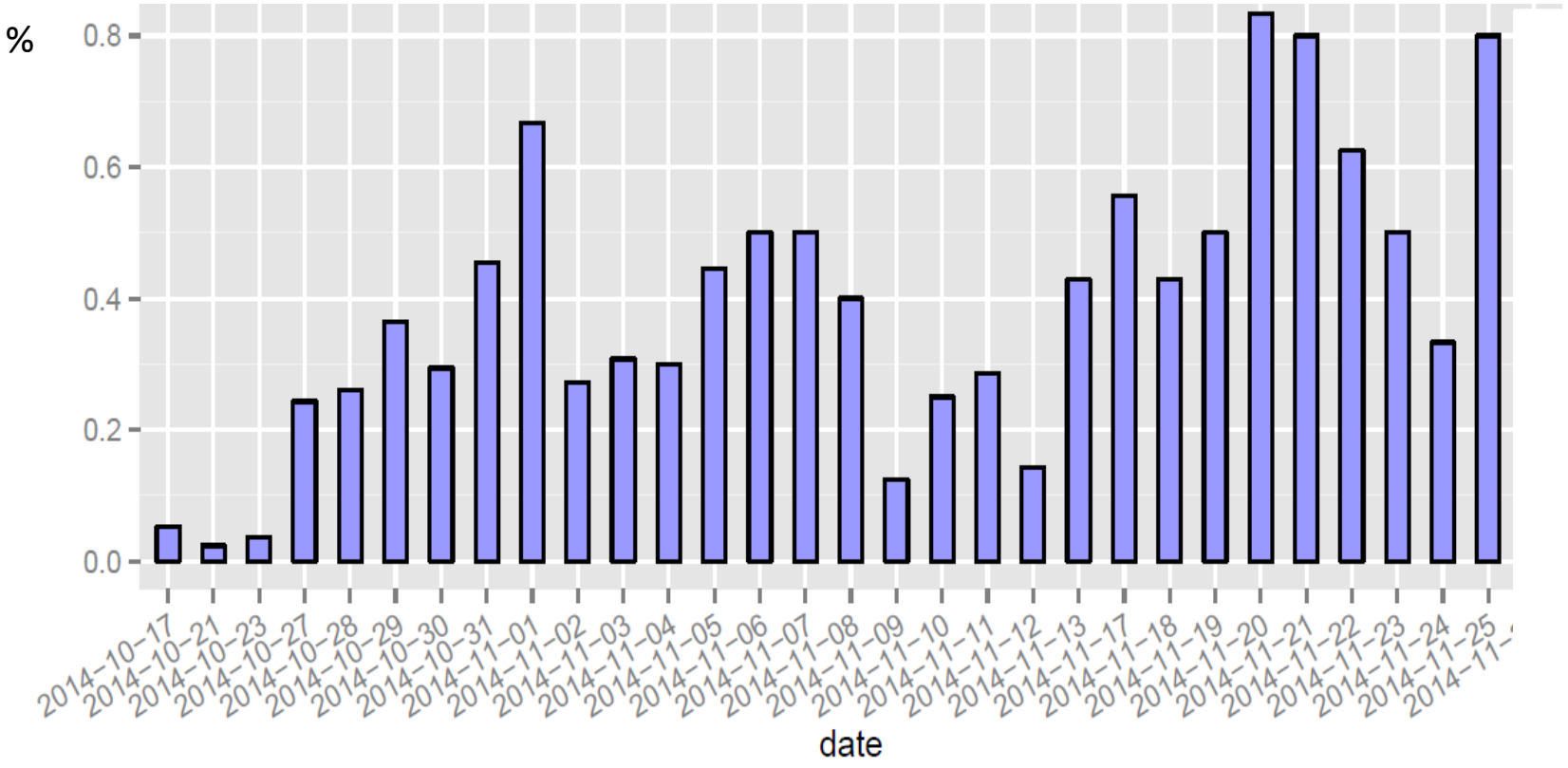
- Twitter and Bazaar have significantly higher concentration of **on task discussion**
- Bazaar has significantly higher concentration of **Reasoning**

Quick Helper





Quick Helper Usage in DALMOOC



- **Increasing ratio of quick helper threads to total threads over time** (R = .69, P < .0001)
- Overall probability of a thread getting a reply: 81%

Towards Longer Term Group Interventions

Team-based learning improves retention

- NovoEd reported overall lower dropout rate compared to traditional MOOCs [Deamicis 2013]
- Our analysis of two courses showed that more than 50% students in a team persisted until the end of the course

Current teams fail in their teamwork

- team score based on final team project submission

	Score = 0%	Score = 50%	Score = 100%
#teams	96	58	23

NovoED
Learn. Collaborate. Innovate.

Facilitating Team Formation

- Start with community-level task before forming teams
  - Counteracts homophiliy effect
  - Less social pressure
  - Wider range of opinions, resources, points of view

- Community engagement as evidence of who would work well together
  - transactive reasoning

Team Formation Experiments

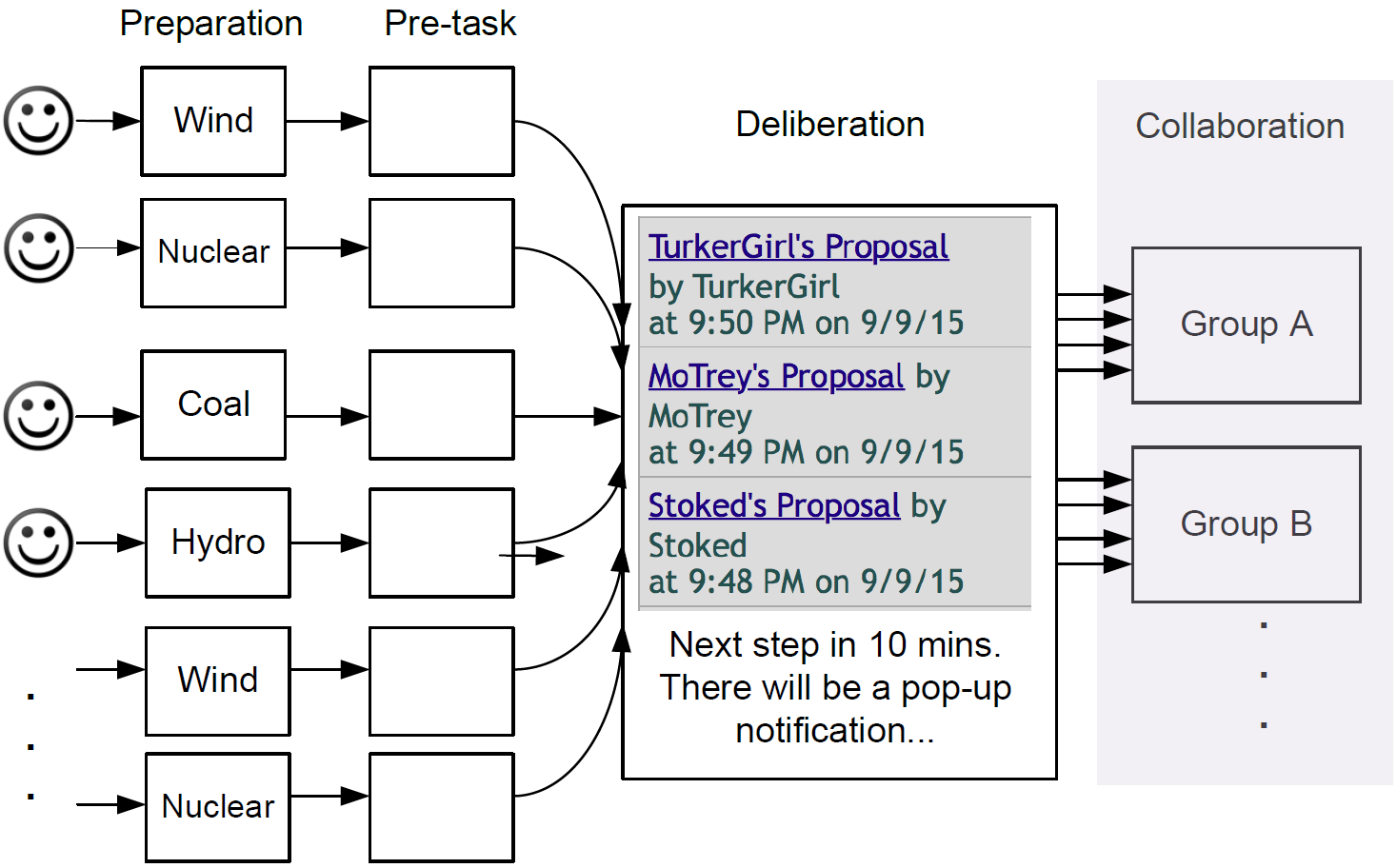
- In preparation for interventions in real MOOCs, we test our group formation hypothesis in Mechanical Turk [Coetzee et al. 2015]
- Rapid iteration on experimental design

RQ1. Will exposure to large community discussions lead to more successful small group collaborations?

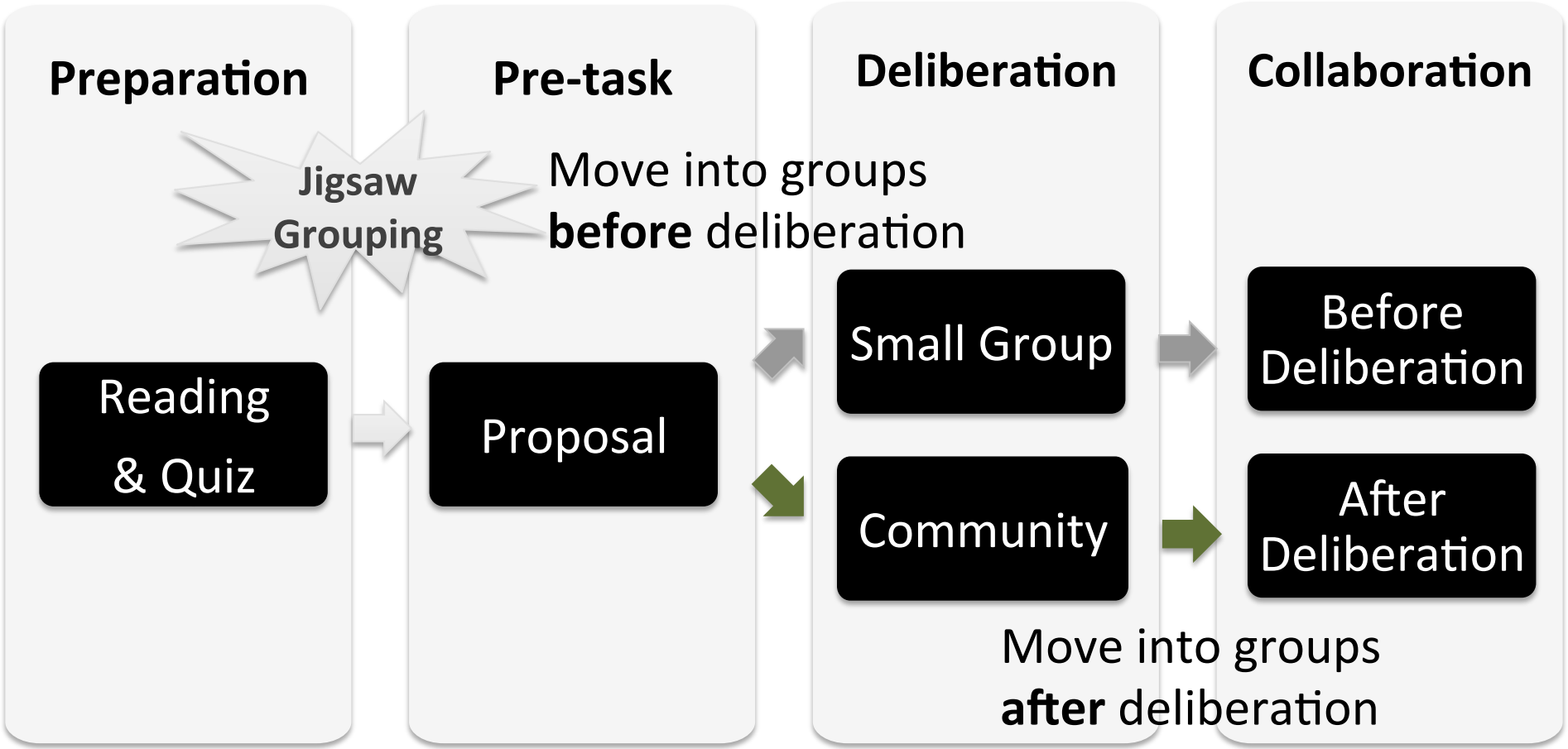
RQ2. Can evidence of transactive discussions during deliberation inform the formation of more successful teams?

amazon mechanical turk

Task Design


Preparation
Pre-task
Deliberation
Collaboration
Wind
Nuclear
Coal
Hydro
Wind
Nuclear
TurkerGirl's Proposal by TurkerGirl at 9:50 PM on 9/9/15
MoTrey's Proposal by MoTrey at 9:49 PM on 9/9/15
Stoked's Proposal by Stoked at 9:48 PM on 9/9/15
Next step in 10 mins. There will be a pop-up notification...
Group A
Group B

Experimental Manipulation #1



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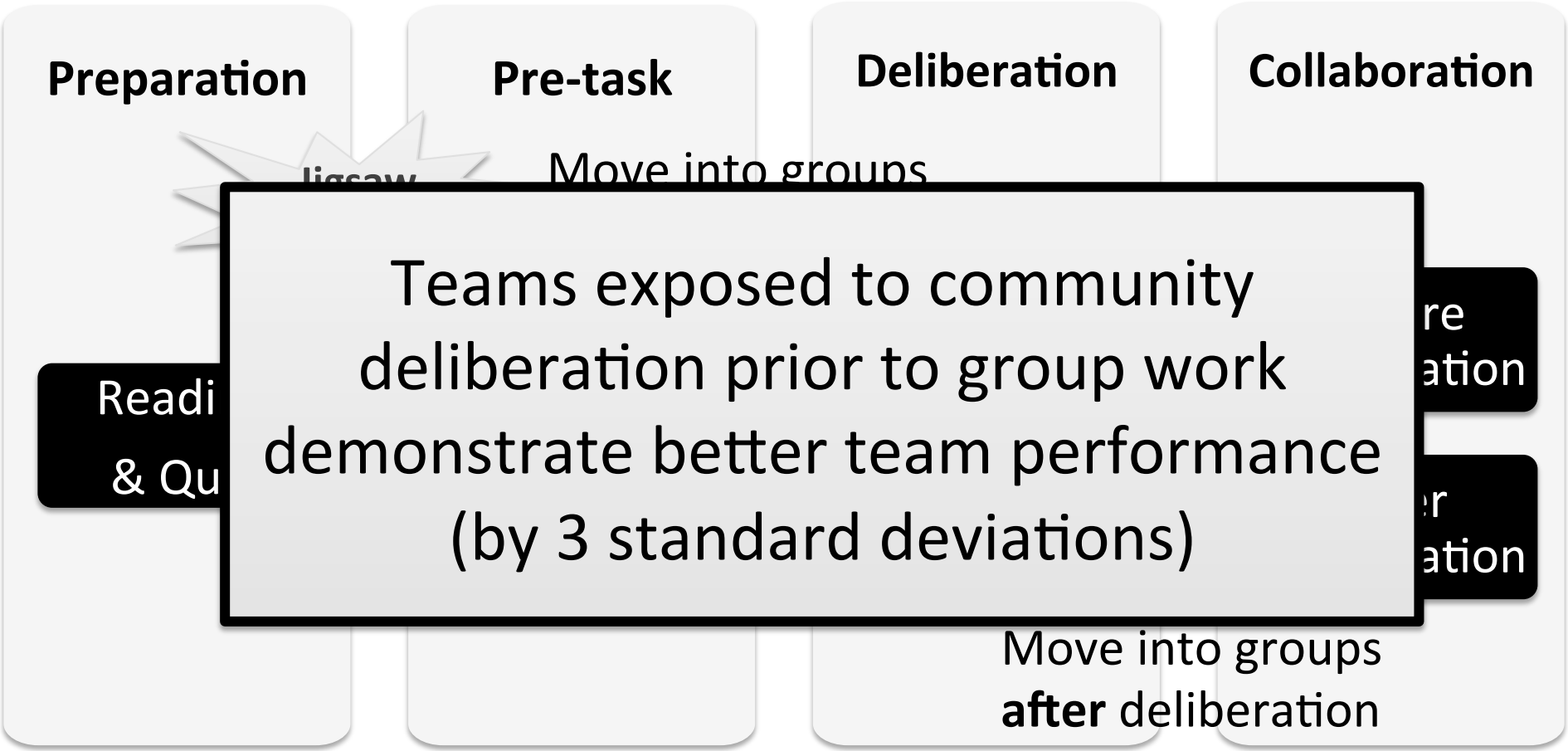
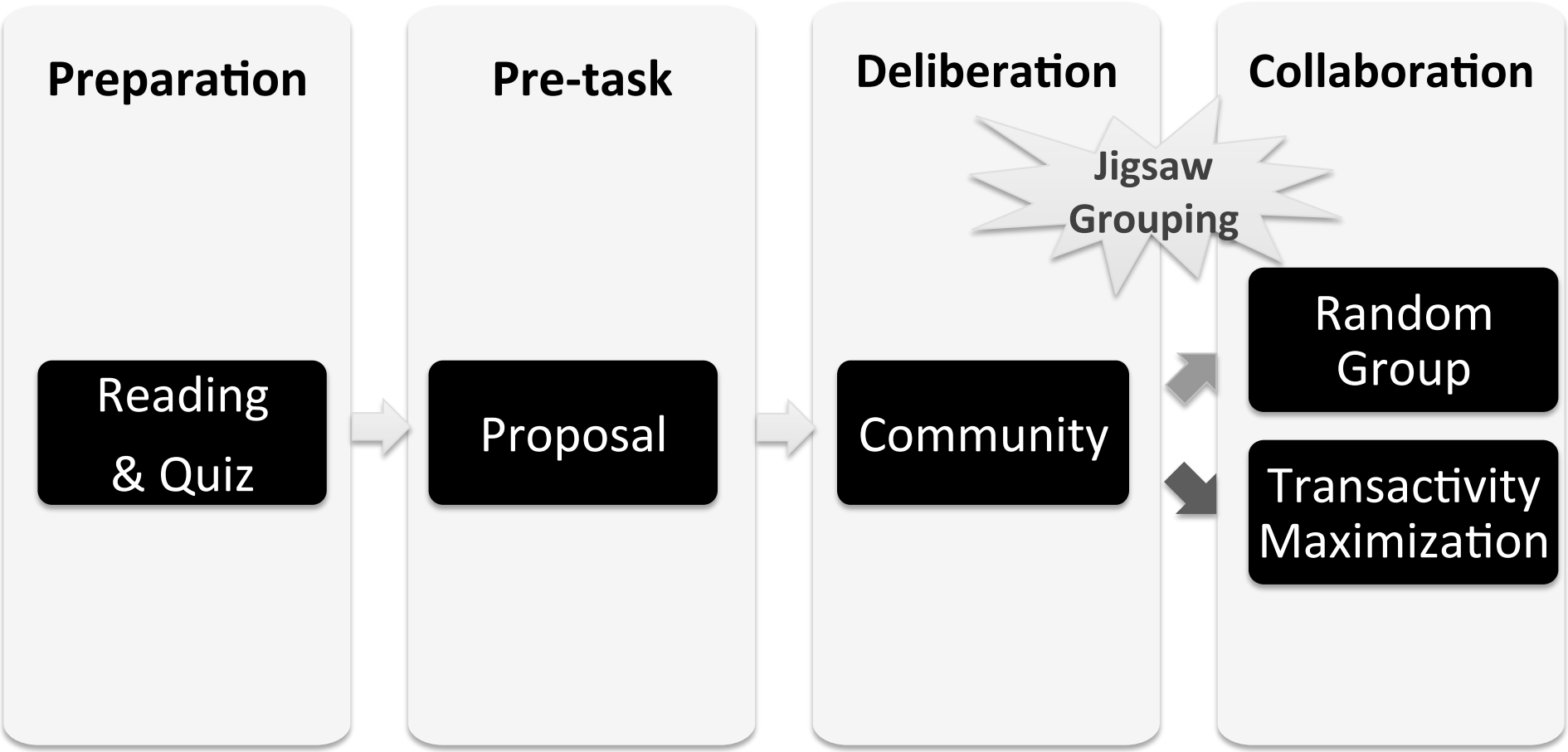


RQ1. Will exposure to large community discussions lead to more successful small group collaborations?

Experimental Manipulation #2



RQ2. Can evidence of transactive discussions during deliberation inform the formation of more successful teams?

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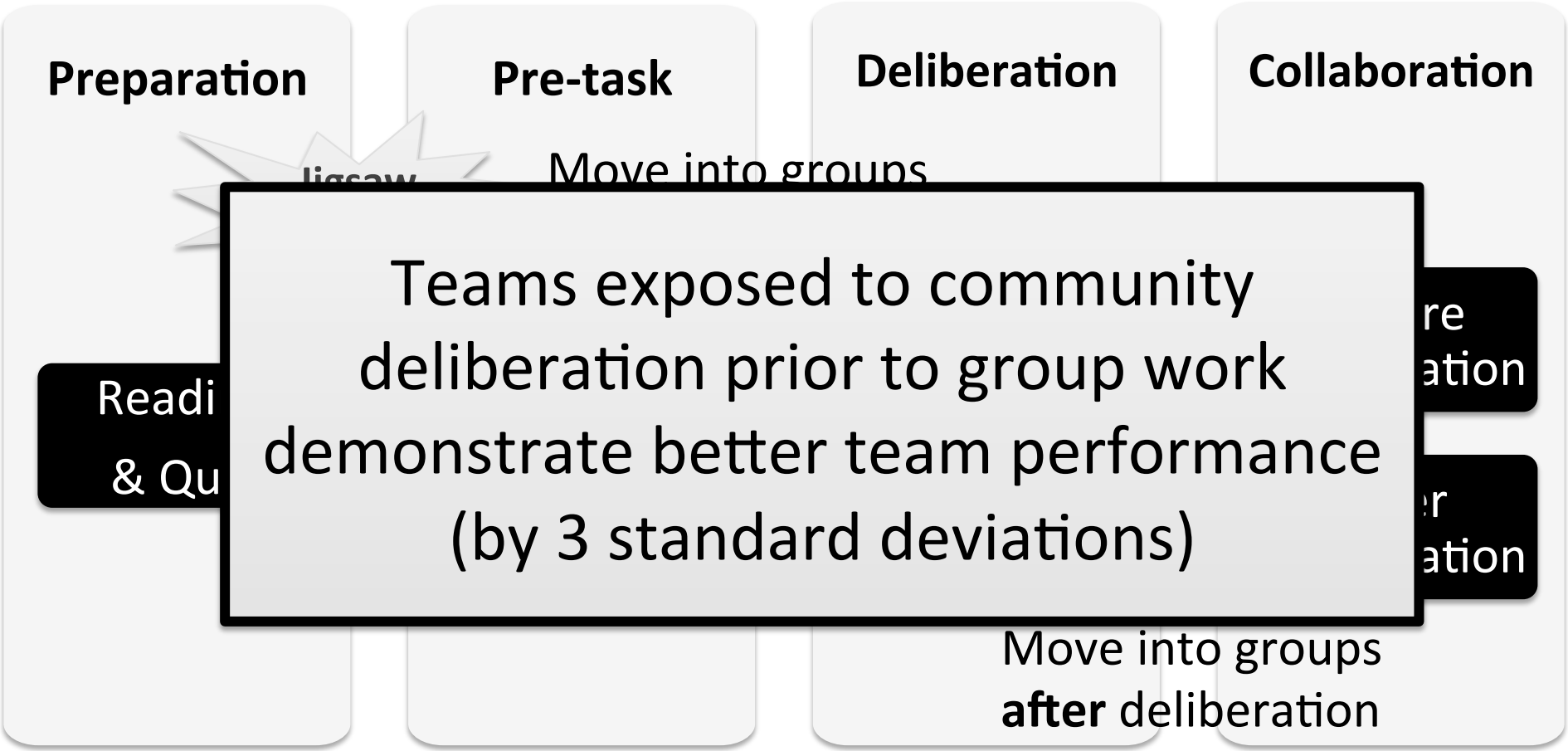

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Conclusions

- Collaborative reflection elicits higher degree of reasoning and lowers attrition.
- Social recommendation is well received by MOOC users. Effectiveness needs to be studied.
- Exposure to community-level deliberation provides more resources for group-level teamwork
- Increasing average process skills across teams improves the overall quality of produced work

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