

EFFECTS OF COMMUNITY SIZE AND CONTACT RATE ON SYNCHRONOUS SOCIAL Q&A

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Question Answering (Q&A)

- People have questions, want answers
- Automatic question answering not yet practical
 - Complex questions
 - Opinion questions
 - Knowledge that is not written down
- Solution: get others to help you out...

Social Question Answering

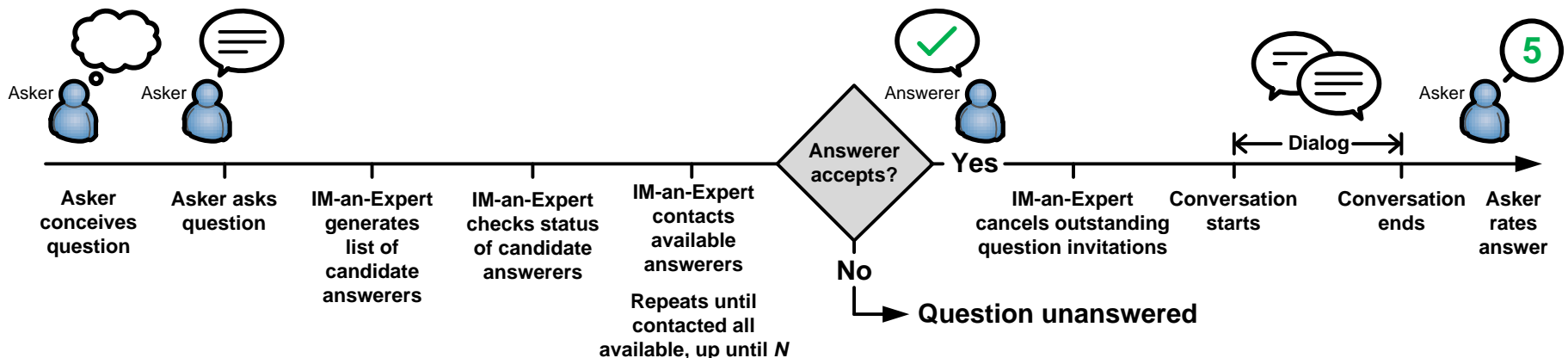
- Also known as “Community Question Answering”
- Ask people for help
 - Send email to mailing list
 - Use web forum
 - Answers service (Yahoo! Answers)
- Downsides:
 - Spams a lot of people (mailing lists)
 - Slow response (web forums)
- Solution: use instant messaging...

Synchronous Social Question Answering

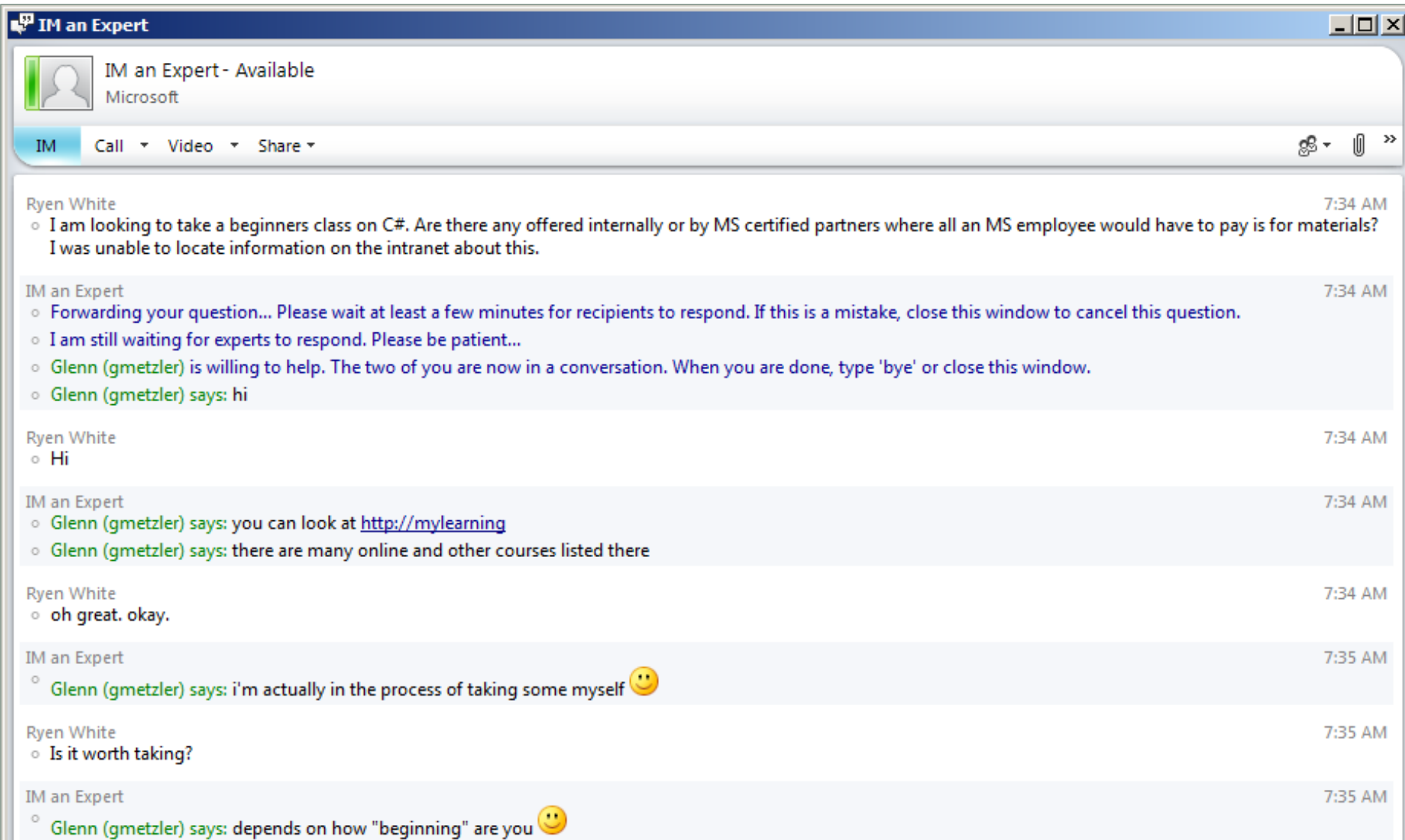
- Users ask a question using instant messaging (IM)
- System forwards question to users likely to know answer
 - Forwards to a few at a time
- Once a willing answerer is found, asker and answerer engage in dialog
- Example systems
 - Aardvark: Deployed on the Web (contacts friends, FoF, etc.)
 - IM-an-Expert: Built and deployed within Microsoft (contacts “experts”)
 - Others in CSCW and CHI community
- This paper uses IM-an-Expert for experiments
 - But similar results are expected for Aardvark or other systems

IM-an-Expert

- Facilitates question answering via real-time IM dialog
- All users are “experts” - can ask and answer questions
- IM-an-Expert finds answerers, connects askers to them, and mediates dialog:
 1. Asker poses question via IM or a Web page
 2. IM-an-Expert finds best available answerer
 3. Proxies IM conversation between asker and answerer



IMX Sample Conversation (1 of 2)



The screenshot shows a window titled "IM an Expert" with a status bar indicating "IM an Expert - Available" and "Microsoft". The window has a menu bar with "IM", "Call", "Video", and "Share". The conversation history is as follows:

- Ryen White** (7:34 AM):
 - I am looking to take a beginners class on C#. Are there any offered internally or by MS certified partners where all an MS employee would have to pay is for materials? I was unable to locate information on the intranet about this.
- IM an Expert** (7:34 AM):
 - Forwarding your question... Please wait at least a few minutes for recipients to respond. If this is a mistake, close this window to cancel this question.
 - I am still waiting for experts to respond. Please be patient...
 - Glenn (gmetzler) is willing to help. The two of you are now in a conversation. When you are done, type 'bye' or close this window.
 - Glenn (gmetzler) says: hi
- Ryen White** (7:34 AM):
 - Hi
- IM an Expert** (7:34 AM):
 - Glenn (gmetzler) says: you can look at <http://mylearning>
 - Glenn (gmetzler) says: there are many online and other courses listed there
- Ryen White** (7:34 AM):
 - oh great. okay.
- IM an Expert** (7:35 AM):
 - Glenn (gmetzler) says: i'm actually in the process of taking some myself 😊
- Ryen White** (7:35 AM):
 - Is it worth taking?
- IM an Expert** (7:35 AM):
 - Glenn (gmetzler) says: depends on how "beginning" are you 😊

IMX Sample Conversation (2 of 2)

IM an Expert	7:36 AM
◦ Glenn (gmetzler) says: I just a video classes from Dietel (sp??)	
◦ Glenn (gmetzler) says: two DVDs worth of sessions	
◦ Glenn (gmetzler) says: returned it a couple of weeks back	
Ryen White	7:36 AM
◦ what is dietel? Is that in the library?	
IM an Expert	7:36 AM
◦ Glenn (gmetzler) says: he's an author	
Ryen White	7:37 AM
◦ oh, I see. I'll take a look. I always forget to use the library :)	
IM an Expert	7:37 AM
◦ Glenn (gmetzler) says: writes many books on programming languages	
◦ Glenn (gmetzler) says: 😊	
Ryen White	7:37 AM
◦ cool, thanks.	
IM an Expert	7:37 AM
◦ Glenn (gmetzler) says: sure	
Ryen White	7:37 AM
◦ bye	
IM an Expert	7:37 AM
◦ You have finished the conversation. How helpful was the answer? Please provide a rating between 1(not helpful at all) - 5(very helpful):	
Ryen White	7:37 AM
◦ 5	
IM an Expert	7:37 AM
◦ You rated the answer as 5 and I've sent along the text if answerer's window is still open. Thank you. I hope I've been helpful. Bye!	

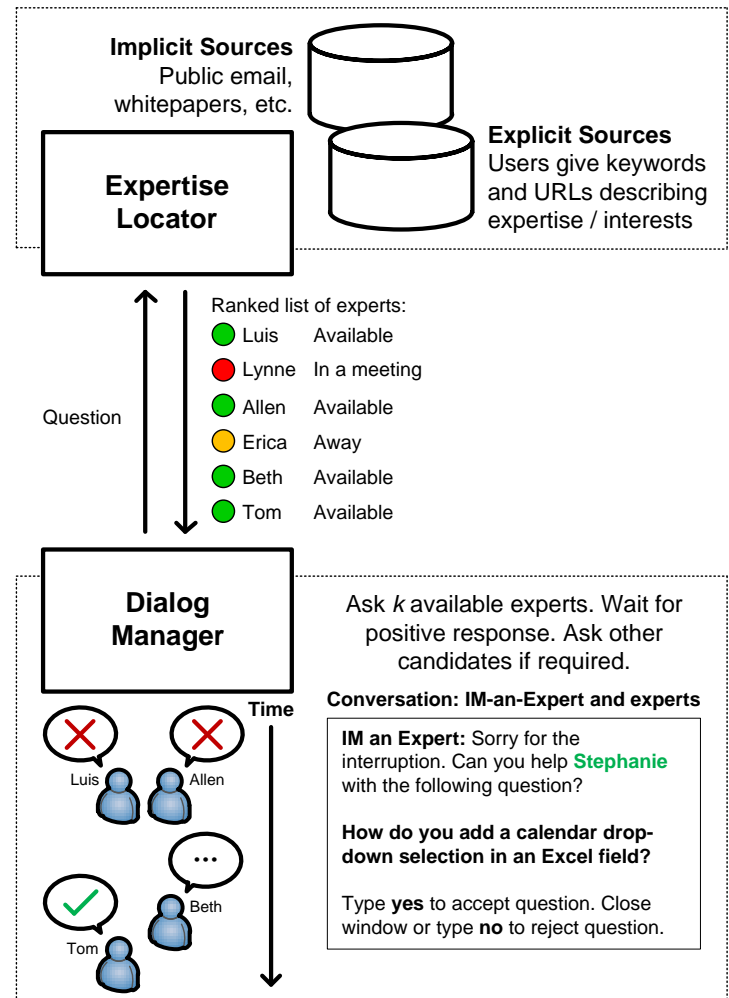
Last message received on 3/31/2011 at 7:37 AM.

Expert Finding

- Sources of user information
 - Implicit
 - Emails sent to internal distribution lists
 - Explicit
 - User-provided keywords and URLs about themselves or their interests
- TF.IDF ranking with temporal decay to balance questions
- Profile page where users can also:
 - Set question limits
 - Tune privacy settings
 - Suspend or disable the service

Dialog Management

- Coordinates flow of messages between askers/answerers
- Contacts top- k experts
 - k is “contact rate”
 - Only asks those who are **Available**
 - Availability set from calendars and users could set manually
- If answerer doesn't respond in 60 seconds or types “no”, then contact next user in list
- Once answerer accepts, other invitations are canceled
- All IM dialog logged



Asker and Answerer needs in IMX

- In IM-an-Expert, all users can ask and answer questions

Askers want	Answerers want
Low time-to-answer	Few interruptions
Quality answers	Relevant questions

- Needs are in tension
 - E.g., to get low time to answer may need to interrupt many users
- Investigate effect of community size and contact rate on the extent to which these needs can be satisfied
- This can help us:
 - Understand the impact of these factors in synchronous Q&A
 - Design better social Q&A systems

User Study: Participants

- Participants and Recruitment
 - Redmond-based MSFT employees w/ mailing-list based profiles $\geq 1\text{kb}$
 - Users required to be available for two-week study duration
 - 402 volunteers in total, users were highly familiar with IM (4.5/5)
- Experimental Groups:
 - 6 groups, varying both community size (n) and contact rate (k)
 - Group members didn't know about the other groups

k	Group	n
2	1	25
	2	50
	3	100
5	4	25
	5	50
	6	100

User Study: Methodology

- Study lasted two weeks
 1. Asked participants to take a pre-experiment survey
 2. Randomly-assigned participants to experimental group
 3. Asked participants to visit their profile page and provide keywords and URLs describing interests and expertise
 - Re-indexed daily to capture any profile updates
 4. Participants asked to consider using IM-an-Expert as resource for answering questions for study duration
 5. Two weeks from start date, study ended and participants completed post-experiment survey
 - 70% of all participants did so
 - Attrition was spread evenly across groups

Findings: General Usage

- Around 50% of participants asked and answered questions in the two-week study (35% of users did both)
- 25% of participants asked/answered half the questions
- Dialogs:
 - Lasted around six minutes
 - Comprised around 10 dialog turns
 - Turns evenly distributed between askers and answerers

Recall from earlier

Askers want	Answerers want
Low time-to-answer	Few interruptions
Quality answers	Relevant questions

- We're going to look at each of these needs in more detail

Findings: Asking – Time to Answer

Measures	Comm. size (<i>n</i>)	Contact rate (<i>k</i>)		
		2	5	All
Average time to answer	25	4m 31s	4m 2s	4m 8s
	50	3m 58s	3m 34s	3m 40s
	100	3m 12s	2m 57s	3m 5s
	All	3m 37s	3m 22s	

- Key takeaways:
 - Doubling group size leads to 30s reduction in time to answer
 - Higher contact rate leads to lower time to answer

Findings: Asking – Answer Ratings

- Askers rate answers on a scale from 1-5 at end of dialog

Comm. size (n)	Contact rate (k)		
	2	5	All
25	3.33	3.25	3.29
50	3.50	3.32	3.43
100	3.61	3.52	3.58
<i>All</i>	3.56	3.42	

- Key takeaways:
 - Larger group size leads to higher answer ratings (more expertise)
 - Higher contact rate leads to lower answer ratings
 - Less expert answerers may respond before more expert answerers

Findings: Answering – Interruptions

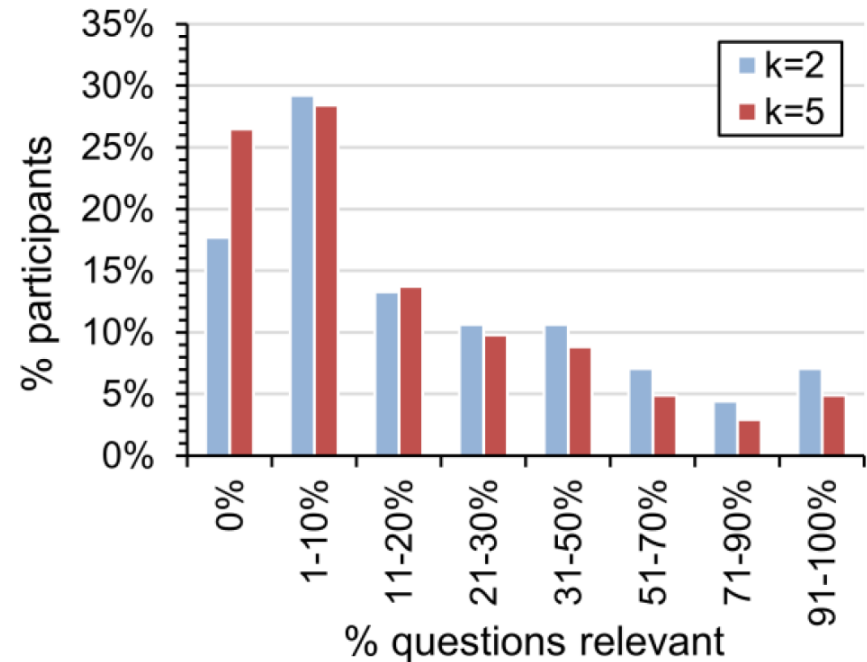
- Median number of users interrupted per question = 6

Measures	Comm. size (n)	Contact rate (k)		
		2	5	All
<i>% of group interrupted</i>	25	14.5%	25.2%	19.9%
	50	9.6%	17.4%	13.6%
	100	7.7%	14.2%	10.8%
	<i>All</i>	10.4%	17.7%	
<i>Felt unbothered by questions</i>	25	3.59	3.34	3.44
	50	3.92	3.78	3.87
	100	4.23	4.09	4.15
	<i>All</i>	4.20	4.00	

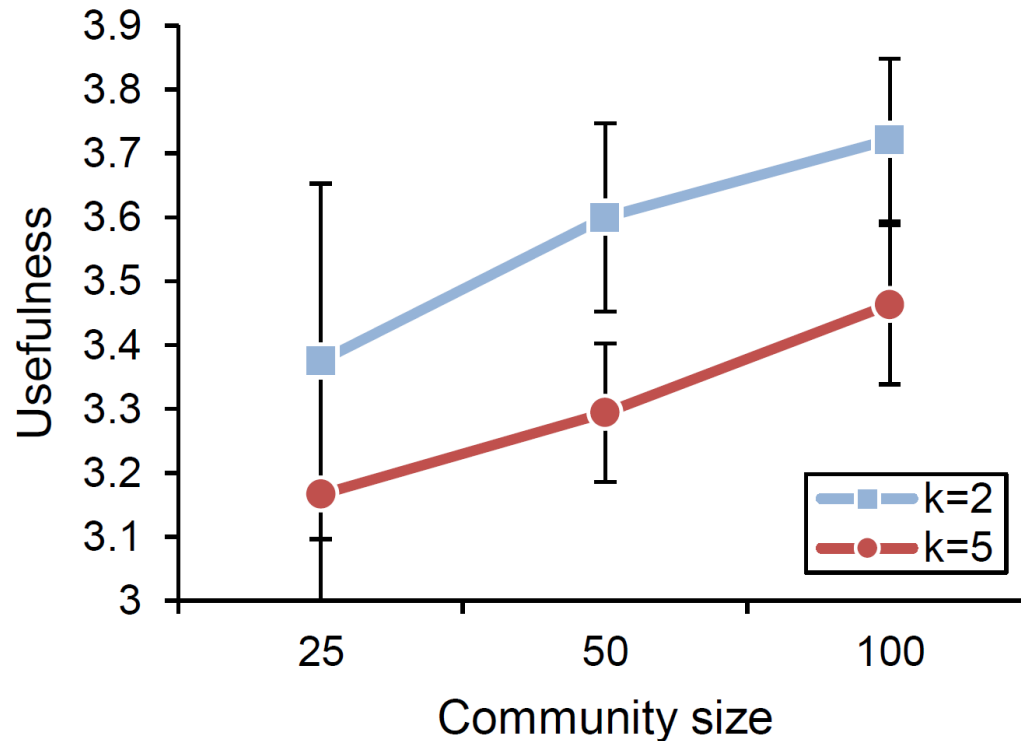
- **Key takeaways:**
 - Larger community size, less % interrupted + answerers less bothered
 - Higher contact rate, more % community interrupted + more bothered

Findings: Answering – Relevance

- Asked answerers:
 - Approximately what percentage of questions asked were relevant to you? (0, 1-10%, 11-20%, etc.)
- $k=2$ more relevant than $k=5$
- No differences from community size
- Reasons for not answering:
 - Question wasn't relevant to me (~25%)
 - I didn't know the answer (~50%)
- Expertise **level** is important in addition to having expertise



Findings: Overall Perceptions



- $k=5$ meant more answers and more timely answers, but ...
- $k=2$ was more useful
 - Users may wait longer for **better** answers, dislike interruptions

Conclusions

Download IM-an-Expert (<http://imanexpert.net>)

- Investigated impact of community size and contact rate on the effectiveness of synchronous social Q&A
- As community size grew, system performance increased
- Contact rate:
 - Askers prefer k with timely answers ($k=5$), high quality answers ($k=2$)
 - Answerers prefer k with relevant questions, few interruptions ($k=2$)
- To satisfy most users, synchronous social Q&A systems should use low contact rates and large communities
- More research is needed on the answer quality vs. timeliness tradeoff e.g., ceiling effects as community size grows