

# SUPPORTING SYNCHRONOUS SOCIAL Q&A THROUGHOUT THE QUESTION LIFECYCLE

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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
  
- Systems
  - IM-an-Expert: Built and deployed within Microsoft
  - Aardvark: Deployed on the Web
- This paper uses IM-an-Expert for experiments
  - But similar results are expected for Aardvark or other systems


# IM-an-Expert: Real Time Social Q&A

- Built and deployed within Microsoft, thousands of users
- Free and available for any organization to install
  - Shipped by  Microsoft Lync™
  - Download at [www.imanexpert.net](http://www.imanexpert.net)

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- Low Interruption cost (10 users *median num interrupted*)
- Excellent answer quality (4.5 *average rating on 1-5 scale*)


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- **What can we do to support askers and answerers?**

# IMX System

**Asker: Stephanie**  
Initiates chat with IM-an Expert and asks a question

## Contact List

 IM an Expert Available

## Conversation: Stephanie and Tom

**Stephanie:** How do you add a calendar drop-selection in an Excel field?

**IM an Expert:** I am searching for answerers. Please be patient.

**IM an Expert:** Tom is willing to help. The two of you are now in a conversation.

**Stephanie:** Hi Tom!

**IM an Expert:** Hi Stephanie

IM-an-Expert mediates dialog between asker and answerer

**Stephanie:** Thanks Tom!


**IM an Expert:** No problem

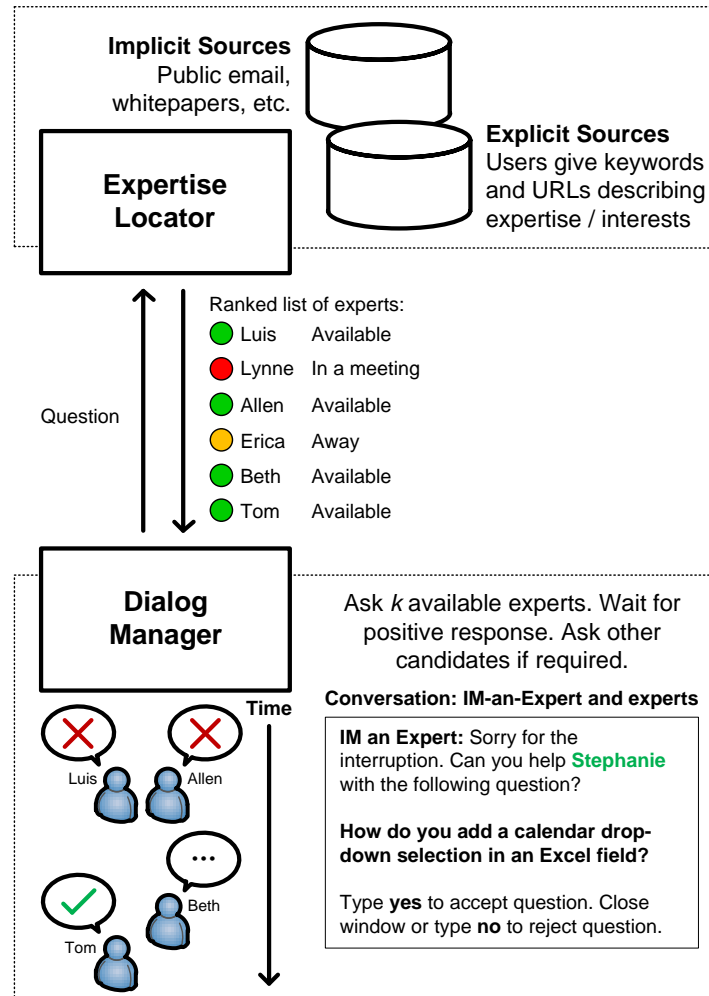
**Stephanie:** bye

**IM an Expert:** Please rate the answer you received on a scale from one (not helpful) to five (very helpful)

**Stephanie:** 5

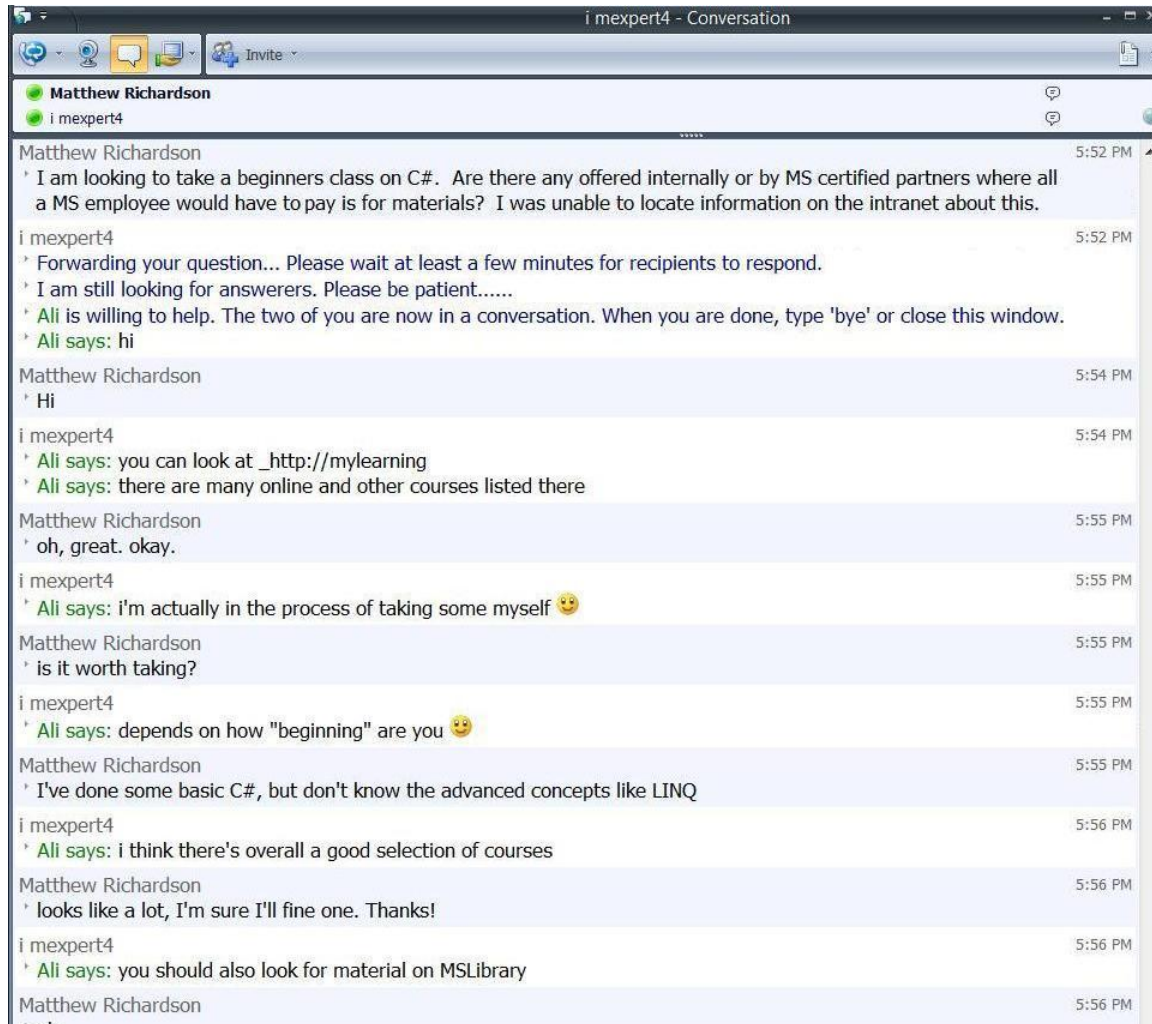
**IM an Expert:** You have rated this answer as very helpful. I have passed along the rating to the answer. Please close this window.

**Answerer: Tom**  
Volunteers and helps to answer 





# IMX Sample Conversation 1/2



The screenshot shows a chat window titled "i mexpert4 - Conversation". The participants are Matthew Richardson and i mexpert4. The conversation is as follows:

Matthew Richardson 5:52 PM  
I am looking to take a beginners class on C#. Are there any offered internally or by MS certified partners where all a MS employee would have to pay is for materials? I was unable to locate information on the intranet about this.

i mexpert4 5:52 PM  
Forwarding your question... Please wait at least a few minutes for recipients to respond.  
I am still looking for answerers. Please be patient.....  
Ali is willing to help. The two of you are now in a conversation. When you are done, type 'bye' or close this window.  
Ali says: hi

Matthew Richardson 5:54 PM  
Hi

i mexpert4 5:54 PM  
Ali says: you can look at [\\_http://mylearning](http://mylearning)  
Ali says: there are many online and other courses listed there

Matthew Richardson 5:55 PM  
oh, great. okay.

i mexpert4 5:55 PM  
Ali says: i'm actually in the process of taking some myself 😊

Matthew Richardson 5:55 PM  
is it worth taking?

i mexpert4 5:55 PM  
Ali says: depends on how "beginning" are you 😊

Matthew Richardson 5:55 PM  
I've done some basic C#, but don't know the advanced concepts like LINQ

i mexpert4 5:56 PM  
Ali says: i think there's overall a good selection of courses

Matthew Richardson 5:56 PM  
looks like a lot, I'm sure I'll find one. Thanks!

i mexpert4 5:56 PM  
Ali says: you should also look for material on MSLibrary

Matthew Richardson 5:56 PM  
-b

# IMX Sample Conversation 2/2

Matthew Richardson 5:56 PM  
' oh

i mexpert4 5:56 PM  
' Ali says: i just a video classes from Dietel (sp??)  
' Ali says: two DVDs worth of sessions  
' Ali says: returned it a couple of weeks back

Matthew Richardson 5:57 PM  
' what is dietel? Is that at the library?

i mexpert4 5:57 PM  
' Ali says: he's an author

Matthew Richardson 5:57 PM  
' oh, I see. I'll take a look. I always forget to use the library 😊

i mexpert4 5:57 PM  
' Ali says: writes many books on programming languages  
' Ali says: 😊

Matthew Richardson 5:57 PM  
' cool. thanks.

i mexpert4 5:58 PM  
' Ali says: sure

Matthew Richardson 5:58 PM  
' bye

i mexpert4 5:58 PM  
' You have finished the conversation. How helpful was the answer? Please provide a rating between 1 - 5

Matthew Richardson 5:58 PM  
' 5

i mexpert4 5:58 PM  
' You rated the answer as 5 and I've sent along the text if answerer's window is still open. Thank you.

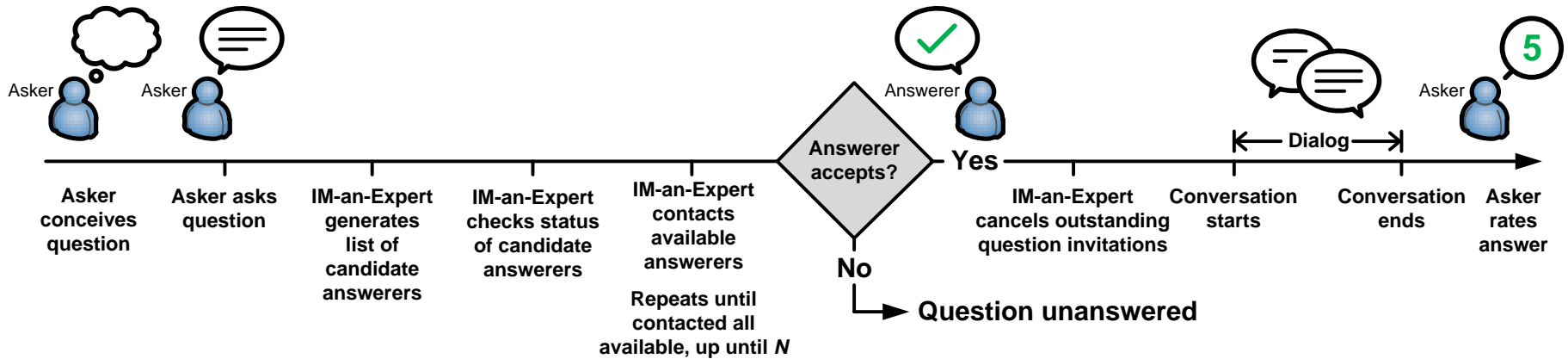
Last message received on 8/20/2009 at 5:58 PM.

A  
😊

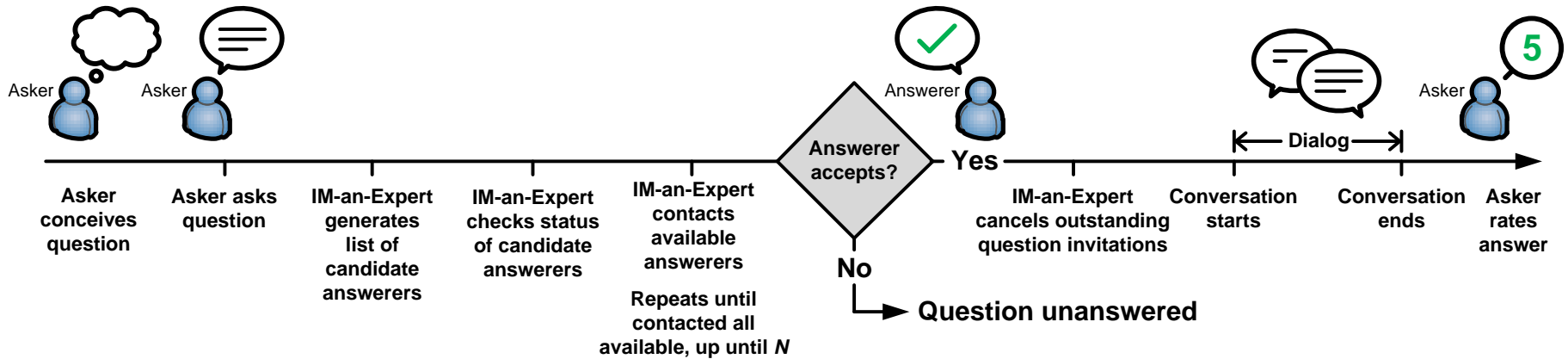
# Some Example Questions

Question	Rating
1. What is Unified Communications?	5
2. Is Veterans Day a Microsoft holiday?	5
3. Excel: how do I set default pivot table to "Classic"?	5
4. OCS TCP UDP question	5
5. Can DPM backup based on VSS writer services?	1
6. Excel related: is there a way to have the "Classic PivotTable" as default in Excel 2007? When I create new pivots I have to go to "PivotTable Options" and then "Display" to change it to classic... I just don't like the "new" pivot format, so I use the classic all the time. Thanks.	1
7. What is the capital city of Afghanistan	1
8. I have a problem	1

# Supporting the Question Lifecycle



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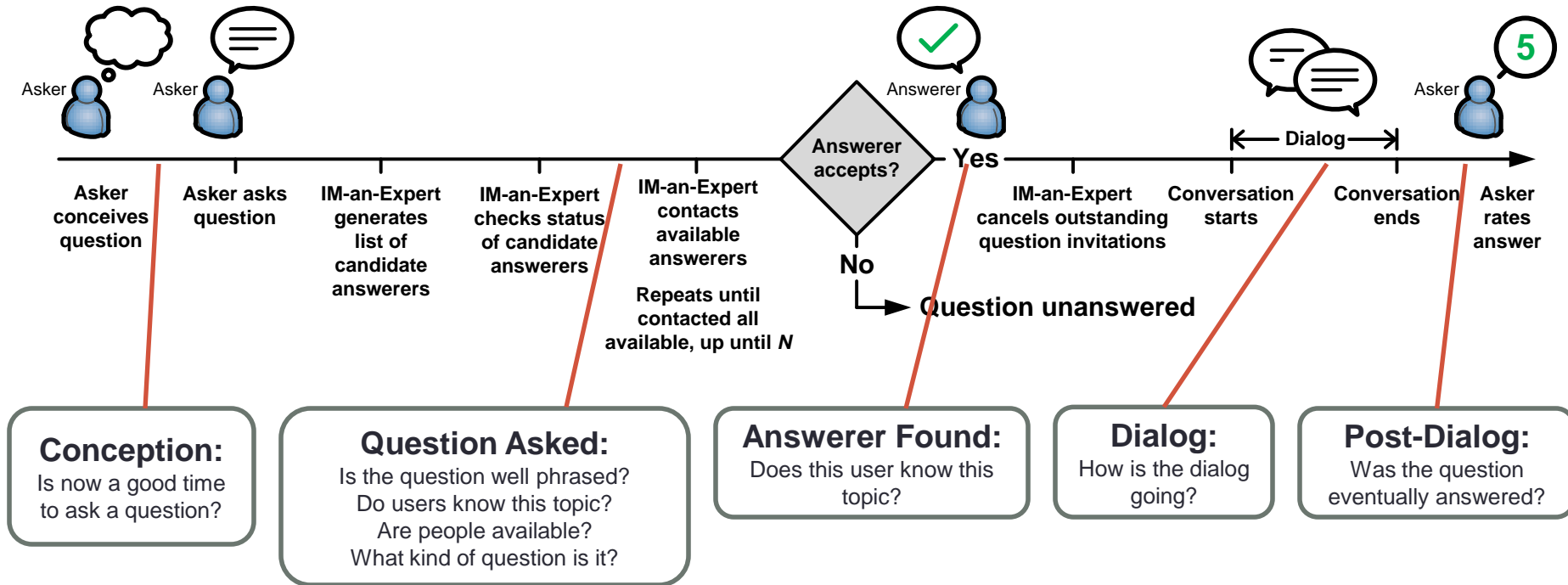


**Will someone try to answer this question?**

**Predicting: How many users will be interrupted?**

**Will the asker be satisfied with the answer?**

# Supporting the Question Lifecycle



**Will someone try to answer this question?**

**Predicting:** How many users will be interrupted?

Will the asker be satisfied with the answer?

# Method

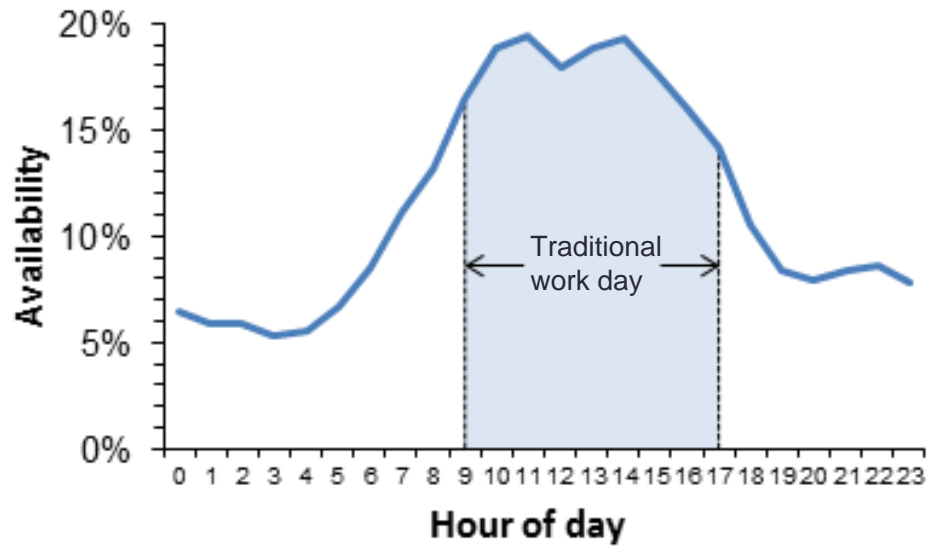
- Goal
  - Predict *satisfied*, *answered*, and *num interruptions*
- Data
  - 1725 questions from IM-an-Expert use
  - 1009 questions were answered
  - 794 were rated
- Technique
  - Classification: Logistic regression with L1 and L2 regularization
  - Regression: Linear model, stochastic grad. descent, squared loss
  - 10-fold cross-validation
  - Relatively small data set: Boosted decision trees and averaged perceptron gave no better results.

# Prediction Task: Features

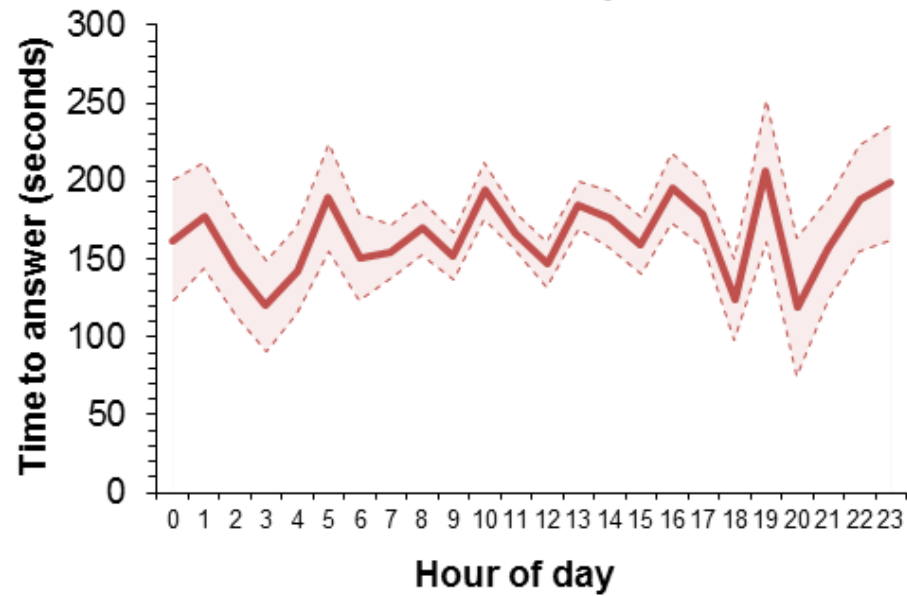
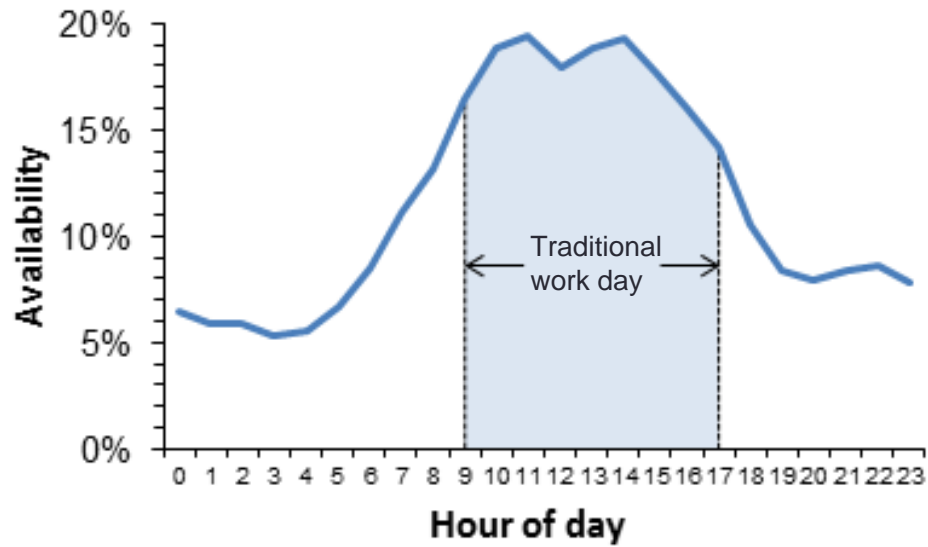
- **Conception** (49 features)
  - Asker: Profile size, anonymity, max per day, ...
  - Time: hour, day, avg. availability
- **Asked** (22)
  - Question: type, 'help', 'please', newlines, length, ...
  - Potential Answerers: expertise scores, availability
- **Answerer Found** (29)
  - Answerer: Profile size, anonymity, max per day, ...
  - Answerer profile match with question, time elapsed
- **Dialog** (26)
  - Time elapsed, turns by each user, chars typed
  - "sorry", "don't know", "I don't", "thank you"
  - URLs, question marks, emoticons



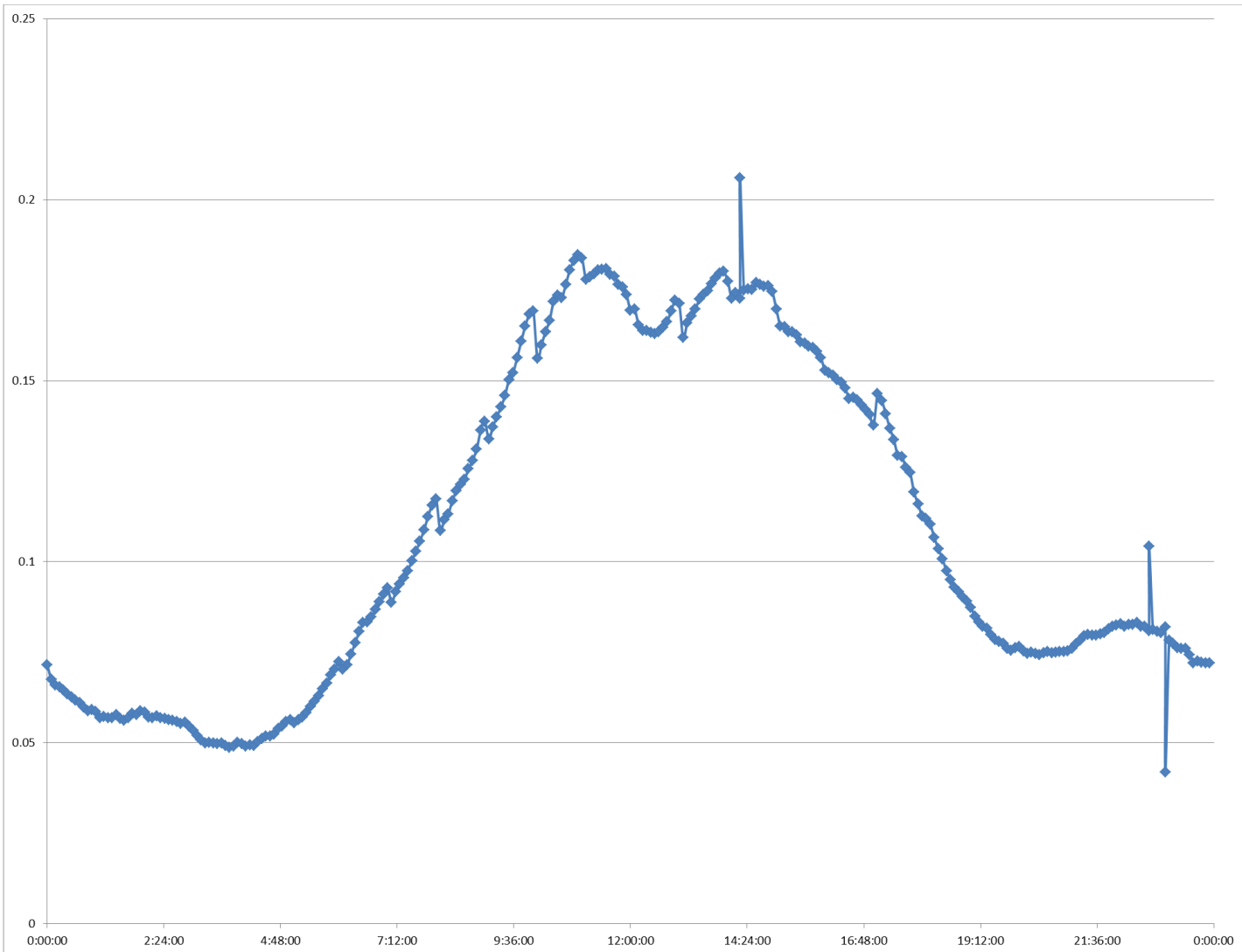
# Availability



# Availability

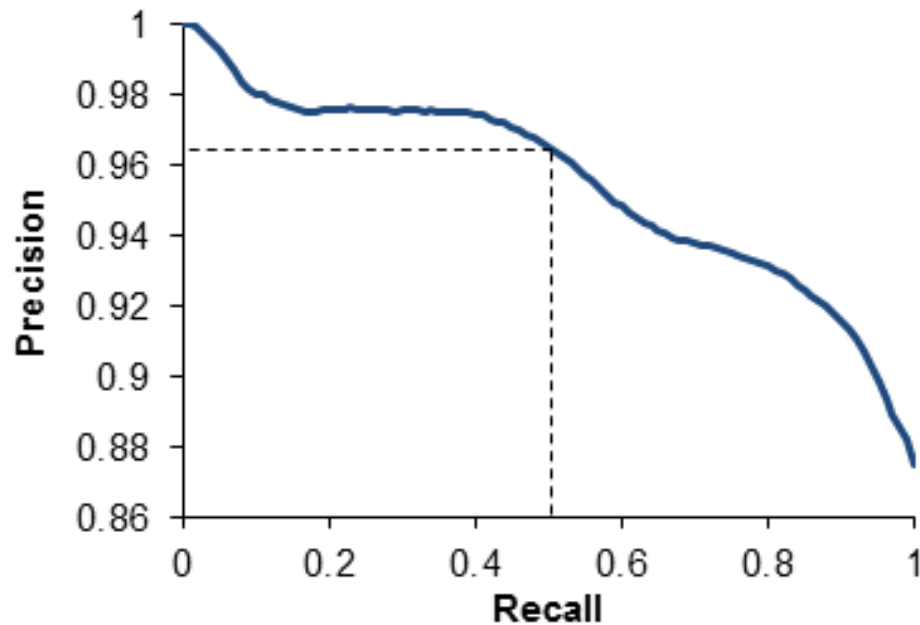


# Just for Fun: Fine-grained Availability



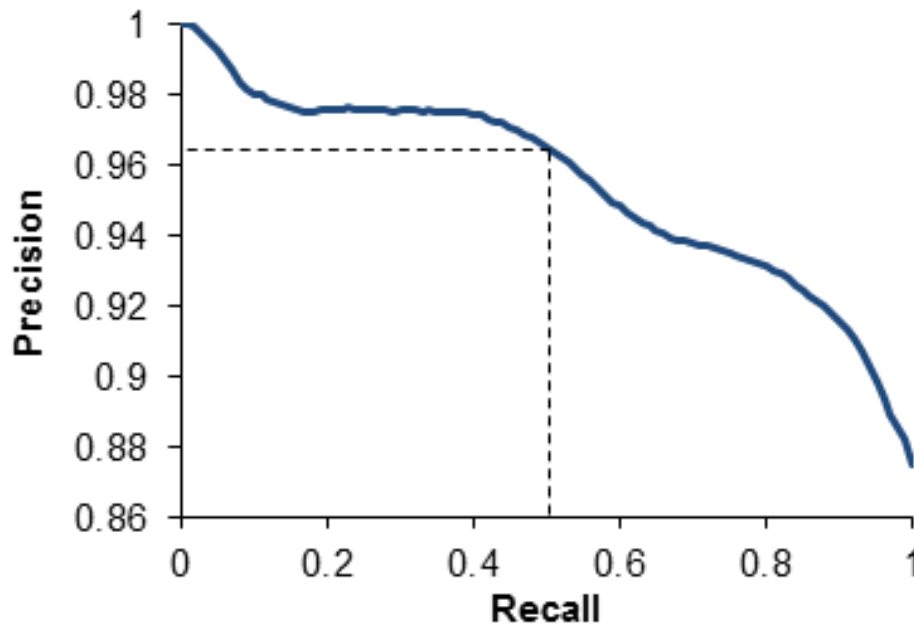
# Results for *Satisfied*, Post-Dialog

- Predict rating of 3 or more



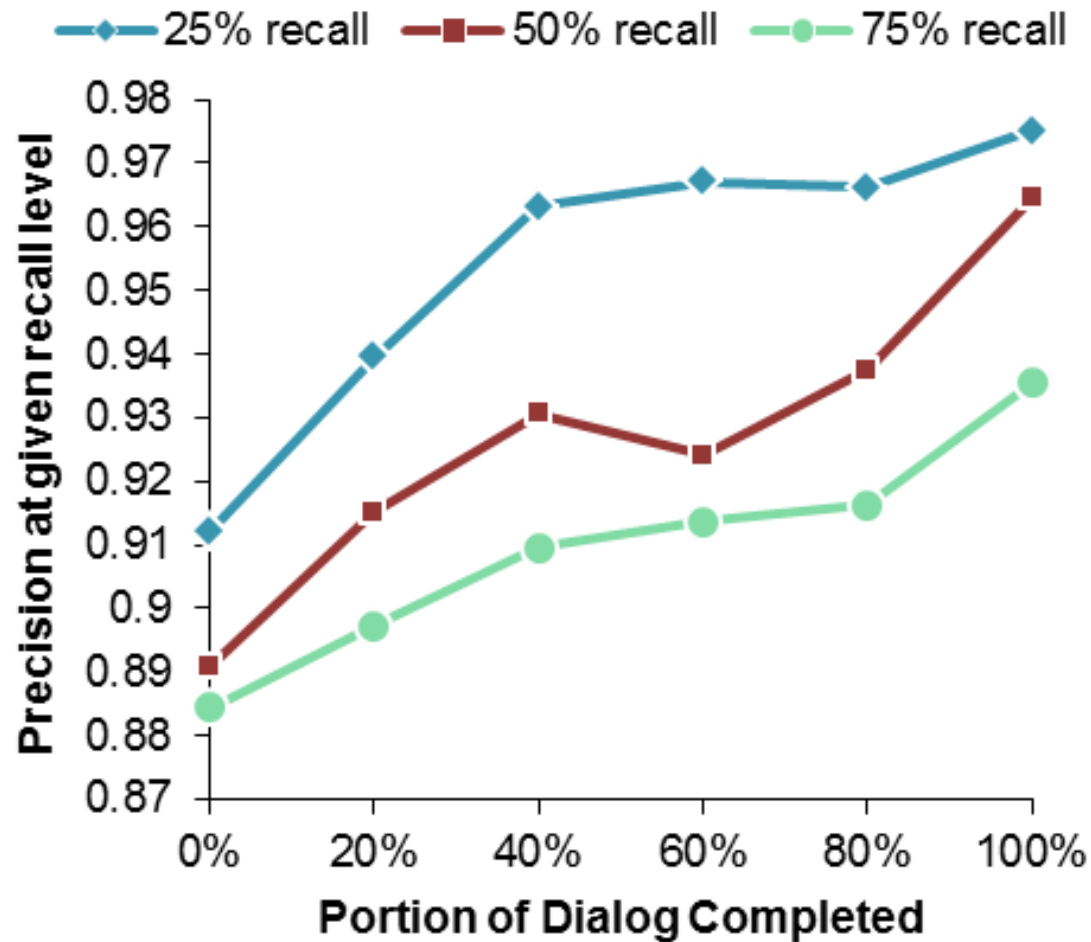
# Results for *Satisfied*

- Predict rating of 3 or more



<b>Question Stage</b>	<b>P@25%</b>	<b>P@50%</b>	<b>P@75%</b>
<i>Prior</i>	87.2	87.2	87.2
<i>Conception</i>	89.2	<b>89.8<sup>+</sup></b>	88.3
<i>Question asked</i>	88.4	<b>89.7</b>	<b>88.6</b>
<i>Answerer found</i>	<b>90.9</b>	<b>89.1</b>	<b>88.3</b>
<i>50% dialog</i>	<b>96.7<sup>+</sup></b>	<b>93.2<sup>+</sup></b>	<b>91.5<sup>+</sup></b>
<i>Post-dialog</i>	<b>97.6</b>	<b>96.4<sup>+</sup></b>	<b>93.6</b>

# Predicting *Satisfied* During the Dialog



# Dissatisfied (rating < 3)

<b>Question Stage</b>	<b>P@25%</b>	<b>P@50%</b>	<b>P@75%</b>
<i>Prior</i>	12.8	12.8	12.8
<i>Conception</i>	15.0	<b>16.9<sup>+</sup></b>	<b>13.8<sup>+</sup></b>
<i>Question asked</i>	17.2	<b>16.1</b>	<b>13.4</b>
<i>Answerer found</i>	16.1	<b>15.1</b>	<b>14.1</b>
<i>50% dialog</i>	<b>32.7</b>	<b>24.6<sup>+</sup></b>	<b>18.2<sup>+</sup></b>
<i>Post-dialog</i>	<b>45.0<sup>+</sup></b>	<b>35.7</b>	<b>23.1</b>

# Feature Selection for *Satisfied*

## **(a) Features selected for the *post-dialog* phase**

Characters typed by answerer during the dialog  
Answerer says sorry during the dialog  
Last thing said during the dialog is a question  
Time to answer  
Asker wants to be anonymous in transcript of dialog  
The last thing said by the asker is thank you  
The question begins with “How”  
The retrieval score of the top available answerer candidate  
The number of dialog turns taken by the asker  
The number of characters typed by the asker  
Number of characters in the question  
The question contains the word “help”

## **(b) Features selected for the *question asked* phase**

Asker wants to be anonymous in transcript of dialog  
The retrieval score of the top answerer candidate  
The question begins with “How”  
The question begins with “Why”



# Other Tasks

- Answered

<b>Question Stage</b>	<b>P@25%</b>	<b>P@50%</b>	<b>P@75%</b>
<i>Prior</i>	58.5	58.5	58.5
<i>Conception</i>	61.4	<b>60.1<sup>+</sup></b>	59.4
<i>Question asked</i>	<b>71.2<sup>+</sup></b>	<b>66.1<sup>+</sup></b>	<b>62.6<sup>+</sup></b>

- Interruptions

<b>Question Stage</b>	<b>MAE</b>	<b>MSE</b>
<i>Prior</i>	10.77	152.5
<i>Conception</i>	<b>10.69<sup>+</sup></b>	<b>151.2<sup>+</sup></b>
<i>Question asked</i>	<b>10.13<sup>+</sup></b>	<b>141.7<sup>+</sup></b>

# Supporting Askers and Answerers

- How can this support askers?
  - Inform asker of satisfaction or answer probability
    - Asker can rephrase or go elsewhere if too low
- How can this support answerers?
  - Abort questions that are unlikely to be answered
    - Saves 45 answerers from receiving an interruption
  - Abort questions that are unlikely to be satisfied
  - Force asker to rephrase questions that will cause many interruptions
  - Build knowledge base of satisfied questions even if there was no rating, which takes load off of answerers.

# Conclusions

- Synchronous social Q&A a valuable technique
  - Faster response times, less answerers interrupted, high satisfaction
- Answerers are volunteers: Want to reduce their load
- Askers expect quick, quality answers: Inform when otherwise
- Explored prediction tasks for *satisfied*, *answered*, *num interrupted* to support askers and answerers.
  
- Used data from real system (IM-an-Expert)
  - System is available at [imanexpert.net](http://imanexpert.net)
- Able to achieve our tasks with reasonable accuracy
  - Particularly at lower levels of recall
- Results should extend to any synchronous social Q&A system