Mobile Q&A For Enhanced Communication

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ABSTRACT
We explore the potential of mobile Q&A systems by developing a web-based Q&A application. Its flexible set of features enables customization for different purposes. This paper describes the application and explains the motivation for developing two versions for different use cases, one specific and health-related, the other for general use. We describe the methods and results of an informal study that explores usage of the application among a small group of localized participants. Finally, we discuss the implications of this work and outline future areas of research and development.

Keywords
Mobile, Q&A, polling, asthma

INTRODUCTION
The popularity of Q&A applications is evident in their usage. Yahoo! Answers, on which anyone can ask or answer questions, generates as many new pages each month as are contained in the English version of Wikipedia [3]. These applications are useful for questions requiring subjective answers, specific expertise, or human processing. There is also a social and community aspect to the Q&A sites and social search (asking questions on social networks) that motivates use and influences community dynamics.

By moving these ideas to the mobile space, we create the possibility both for contextually dependent questions and for use on-the-go. For any application where timely question and response is desired, such as for health intervention, mobility is a must. People these days are doing everything on their smart phones, from email to games to Google searches, and they are doing them in every imaginable location. I am interested in how Q&A applications might be used on mobile phones, and how they can take advantage of the crowd as a unique and useful source of information.

Further, the mobile platform is conducive to Q&A applications because the interaction is relatively simple and probably less cumbersome than wading through websites which may not be formatted for the small form factor. It can also take advantage of some of the unique features of phones like location detection.

Simply defined, mobile Q&A (or polling) is situational question and answer communication. Though I use the word "polling", I do not mean it in the quantitative, large-scale, political polling sense that it is often thought. Rather I use it to mean multi-way communication in the form of questions. Questions can be sent by one person to another, or to multiple people. It is different from group SMS because the data is centrally stored, users can contact people they don't know, and there is possibility for much richer interaction. There is also some overlap with other applications like Facebook and email, but the focused capabilities (question and answer) are more conducive to creating a widely available archive of both personal and public information.

The goal of this work is to explore how mobile Q&A can be used for different applications, and whether it will be beneficial. Further, what kind of features and frameworks are necessary and desired in these applications? We also explore how people might use this type of application, and whether they find it useful or fun.

To approach these questions, I developed a web-based mobile polling platform. It has flexible features allowing customization for different applications. I created versions for two use cases: pediatric asthma management and general. I performed an exploratory, informal study consisting of a week-long trial period and online post-study survey.

RELATED WORK

Mobile Information Needs
There are a few areas which apply to my work on the Q&A application. The first is situated technology use, particularly using mobile phones to find information. Through a diary study, Sohn et al. examined mobile information needs [1]. They categorized the needs into sixteen categories, the most common of which were trivia, directions, point of interest, and friend info. Not all of the needs can be addressed using a question and answer application, but some, particularly point of interest and friend info, are conducive to it. Participants found mobile Internet access very useful for finding information, but thought it was cumbersome at times. A Q&A system might alleviate the need to search through web pages to find information. However, information needs requiring urgent attention and trusted sources might not fare as well. Another interesting observation from the study was that 72% of participants' information needs were triggered by context, which provides support for the mobile platform and for location-based capabilities such as showing a user questions that were asked in his/her vicinity.

Church and Smyth performed a similar diary study of mobile information needs [2]. They split needs into informational, geographical, and personal categories. Like

Sohn et al. they found that information needs are highly dependent on time and context.

Community Question and Answer Applications

Question and answer (Q&A) and polling applications are quite popular. Yahoo! Answers (Figure 1), is one of the most popular. Facebook has a questions feature which allows users to ask either open-ended or close-ended questions, with close-ended questions being referred to as "polls". Facebook's system is more inclined toward social use because users' friends, instead of strangers as with Yahoo! Answers, answer questions. Formspring is a Q&A-based social network which supports personal instead of factual questions (for example, "What is your favorite sport?"). It is intended for learning about friends.

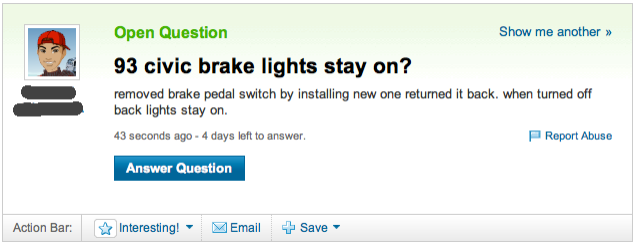


Figure 1. Yahoo! Answers

Several groups have studied the dynamics of community-based Q&A applications. Harper et al. did a study on answer quality in Q&A sites and found that the structure of the community contributes to the success [3]. Large communities fared better, and communities where questions are open to everyone produced better answers than those where questions depend on specific individuals. This makes sense because when there are more people, you are more likely to get more answers and a diversity of answers which you can then compare. Also, limiting questions to only certain groups or individuals removes the opportunity for quality answers from people that one may not expect to have certain knowledge. However, the researchers are not taking into account personal Q&A applications where questions could be targeted at individuals that a user knows. This could possibly increase response rate and quality because people feel obligations towards each other. The researchers suggest future research on incentive features in Q&A sites (such as points and ratings) and on understanding the whats, whys, and hows of question asking and answering, topics which this work begins to explore in mobile Q&A.

Morris et al. studied question and answer behavior in status messages of social networks [4]. They use the term "social search" to refer to finding information online using social resources. Through a survey of Facebook and Twitter users, they found that about half of the respondents had used their status messages to ask questions. They split up the questions into categories, finding that the top three types were recommendations, opinions, and factual knowledge, in that order. Of the eight types, only one (factual knowledge) contains questions that could potentially be answered using a search engine; the rest are heavily social. The researchers also asked respondents why they chose to use social networks instead of search engines to ask questions. The themes included trust, subjective questions, specific audience, and the desire to connect socially. The authors also comment that the main strength of social searching is subjectiveness of questions and answers. However, in contrast to anonymous Q&A sites, personal questions are not quite as appropriate (for example, asking about an embarrassing health issue). Response rate to questions was generally high, and answers were prompt and helpful. The motivations for answering questions included altruism, expertise, and social capital (like exchanging favors). It is interesting to note that Facebook added a question feature to status messages, most likely because they noticed that this was a common use of the tool. This research supports the beneficiality of and desire for Q&A sites with social support, and provides insight into social Q&A interactions. Since there are benefits to both social network integration and a more anonymous style, it would be interesting to compare them in a system that allows both or to investigate when one might be appropriate over the other.

Another study explored the cognitive benefits of social searching. Researchers found that asking questions to a network of people resulted in more content-light (conversational or off-target) responses, versus targeting an individual which resulted in content-rich answers [5]. They comment that the nature of relationships and cultural norms in private versus public venues are influential factors. Both methods have their own benefits and affordances so ideally a social search system should include both.

THE APPLICATION

The Q&A application is built on the GTmob platform (Figure 2). GTmob, created with the GT Research Network Operations Center, is a mobile widget portal for the Georgia Tech community. It is HTML5-based and uses Javascript, PHP, CSS, and SQL. Because it is a website rather than a native application, it can run on any device with an Internet browser. Though primarily intended for mobile devices, it can also be used on computer browsers.

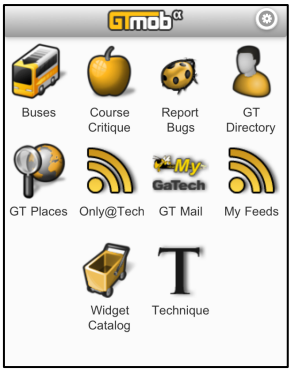


Figure 2. GTmob

My initial interest in polling stemmed from my work with GTmob and its emphasis on crowdsourcing. I chose to build the first iteration of the application in GTmob

because it provides login, API functions, and campus visibility.

The basic features of the polling widget are browsing polls, creating polls, responding to polls, and viewing responses. The application uses the jQuery Mobile library for UI elements. The user is presented with a list of polls (Figure 3, left) which can be filtered by those created by the user, those that have been answered by the user, and those that have no been answered. Pressing one of the items displays more details about the poll. If it has not been answered, the user is able to select and submit a response. If it has, the user sees the results. For multiple choice questions, results are displayed both as text and in bar graph format. To create a new poll the user presses a button in the header and types a question into the form. S/he can select the type of question: yes/no, agree/disagree, multiple choice (multiple answer or not), or open-ended (Figure 3, right). S/he types in response options in the case of a multiple choice question. Finally, s/he selects a question duration before submitting.

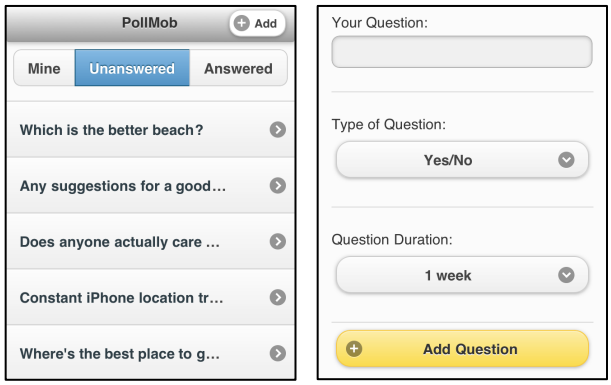


Figure 3. The polling widget

On the backend, polls and responses are stored in a database. User ID's are stored and associated with items.

Motivated by two use cases which will be described later, I added additional features to the platform:

- Groups: The ability to identify users by role, expertise, or any other grouping mechanism. Currently this is set directly in the database.
- Targeting: Allows users to target questions at other individuals or groups instead of to everyone.
- Associations: The ability to associate two users. For example, a professor could be associated to her students.
- Anonymity: Depending on the requirements of the use case, question askers and answerers can be made anonymous or not.
- Location detection: Uses the device's GPS or network information to pinpoint latitude and longitude. Currently this is stored in the database but not used in the interface.

These features can be added and removed with relative ease, and can be tailored to fit the needs of the particular application.

The groups feature is motivated by the need to sometimes target a limited number of individuals. The asker might only be interested in the opinions of certain people (e.g. students) or he might have a question that only some can answer (e.g. expertise in sailing). Targeting enables the use of groups in this way, and further creates the possibility for personal questions intended for only one or a few individuals.

Associations further personalize the system by allowing it to intelligently display targets based on pre-defined pieces of information. For example, a professor could choose to send a question to one or more of his students.

Location data can be used both as a means of analyzing usage and as a user-facing element which can be exploited to filter meaningful polls and responses. For example, the system could show a user only questions that have been asked in a small radius encompassing the baseball field in which the user is currently watching a game.

PEDIATRIC ASTHMA APPLICATION

I developed a version of the widget specifically intended for pediatric asthma patients and their healthcare providers. The capabilities and widespread use of mobile phones today are quickly improving mobile communications and health monitoring. In addition to having near constant Internet connections, smart phones have rich data entry possibilities and good processing power which can be leveraged for preventive health, interventions, and health management applications.

Related Work

Previous studies and applications have shown support for the use of technology in health (sometimes referred to as e-health or telehealth). A review of studies using SMS to affect behavior found that all but one out of fourteen demonstrated positive behavioral trends [6]. The Q&A application shares some key properties with these SMS studies (such as doctor to patient messaging), so these findings are promising for this work and can be used to inform design. Blake describes the use of mobile phones for health promotion (like dietary intervention) and health monitoring (like asthma management) [7]. He asserts that mobile technology enables more dynamic interaction between physicians, patients, and caregivers. Consolvo et al. designed a mobile phone application to encourage physical activity [8]. Their work supports the idea that connectedness and sharing between people with similar goals or conditions, such as pediatric asthma patients for our case, can be beneficial.

There has also been work specifically relating to the use of technology for asthma management. Through focus groups, Pinnock et al. found that physicians, patients, and caregivers were receptive to mobile phone-based asthma monitoring [9]. There was concern about patient dependence and constant supervision. The polling

application addresses these concerns by facilitating communication instead of solely quantitative data gathering for the purpose of intervention. It will not be used as the primary method of self-management, so dependence and technology failure are not as problematic. The study also found support for the use of mobile technology in helping doctors to establish diagnoses and helping patients understand their conditions. There are encouraging results for young asthma patients, because the technology might help them become more independent in their asthma management, while at the same time keeping the parents and physicians aware of their conditions.

Asthma management using mobile phones has been practically tested through Taiwan's Care for Asthma via Mobile Phone (CAMP) program, which allows asthma patients to monitor symptoms. The program resulted in a 60% healthcare cost reduction in one year [10]. While this application is similar to the ours, it does not allow for direct physician-patient contact or personalized questions. It is intended solely for improvement of asthma management, while ours is also for improved awareness.

Goals

The main goal of the application is to improve physicians', patients', and caregivers' awareness about and management of patients' conditions by facilitating information exchange and healing relationships. Ideally doctors will have more frequent updates about their patients, improving their understanding thus treatment. They will also be able to see an overview of the patient's condition without much overhead. This will save time in appointments by diagnosing problems before they become bad, and by reducing the need for patients to recall. The data gathered through polling will be richer, more accurate, and span a longer time period than data gathered from patients in traditional appointments.

The system enables multi-way communication between healthcare providers, patients, and caregivers. Doctors can ask questions to their patients (e.g. "How many times did you use Albuterol for quick relief today?"). Patients can ask questions to their doctors, all doctors, or all patients (e.g. "Does your asthma get worse when it's cold outside like mine?").

The Application

My work stems from work done by TJ Yun. His original application sends pediatric asthma patients pre-defined questions using SMS. The questions are related to a patient's condition and his/her knowledge about asthma. Summaries of responses are viewed by physicians in a web dashboard. Compared to SMS, the web-based application has more features such as dynamic question creation, enhanced interaction and displays, non-instant delivery, and the ability to collect location information. It also makes two-way communication more feasible. One downside is that web-based applications only function on smart phones. Also, since notifications are not supported from web apps, email or SMS will need to supplement for that part.

According to Fjeldsoe et al., tailored messages (personalized to each individual) seem to improve participant engagement and retention [6]. The polling application allows physicians and patients to initiate contact, and will support both tailored and untailored messages. In the current version, physicians don't have the option to choose preset questions, but this is important in a future version since physicians might not have the time or necessity to always compose tailored messages.

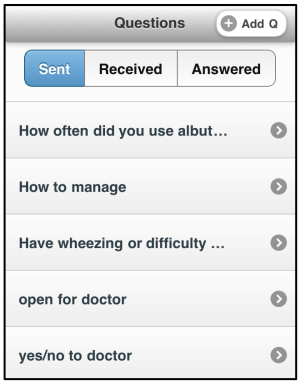


Figure 4. The asthma application

The application contains the following features:

- Groups: doctors, patients
- Targeting: patient can ask his doctor, all doctors, or all patients (Figure 5); doctor can ask any of his patients
- Associations: User A is doctor of User B and User C
- Anonymous group questions
- Non-anonymous individual questions

Figure 5. Choosing a target

Future Work

Future feature additions and research include:

- Notifications (SMS)
- Scheduled questions
- Pre-set questions (commonly asked)
- Web-based dashboard for data display
- Include caregivers & nurses
- Non-GT login or device-based identification
- Conversation threads

- Perform pilot study with asthma patients and physicians

GENERAL USE CASE

The second version I created is intended for general use. Dubbed PollMob, it is stripped of features such as groups and targeting in order to be used by a small group for an informal study. In this version, all users can see and respond to all polls. Poll creators are identified by their Georgia Tech usernames, but responses are anonymous. A user's location is recorded with each new poll and response. However, the user must give permission for the application to read the location through his/her device's dialog.

I advertised the study through email sent to several acquaintances and to a recreational mailing list for HCI students. Ten people volunteered at first. One person had to drop out because the application did not work on his Blackberry. The most likely reason for this is that his Blackberry is an older model and runs a version of the OS that GTmob does not support. Another student did not participate because of other obligations. Approximately at the middle of the study duration, one more person joined. The final total was nine participants, 8 being GT graduate students and 1 being GT staff. Most participants knew each other at least vaguely. 7 participants used their own devices and one borrowed a phone. The devices included iPod Touch, multiple models of iPhone, and multiple phones using the Android OS. Several additionally used their computer web browsers.

At the beginning of the study I sent all participants an email detailing the basic functionality of PollMob and the purpose of the study. Participants were asked to save the application as a bookmark and home screen icon. They were informed of the non-anonymous aspects of the application and were given the list of other participants. Participants were told to ask and answer questions whenever they felt like it. Since the goal of the study was to learn about potential usage, no constraints were placed and no reminders given.

For a little less than seven days, participants used PollMob. I found a few small bugs at the beginning and fixed them immediately. At the end of the week, participants were sent an email containing a link to an online survey. The survey consisted of 7 multiple choice and 8 open-ended questions.

RESULTS

Observations

There were 32 polls (an average of 3 per person) and 218 responses total during the study. These were made up of 6 yes/no, 0 agree/disagree, 16 multiple choice, 2 multiple choice multiple answer, and 8 open-ended questions. Some polls created by participants include:

- Does anyone actually care about the royal wedding?
- Constant iPhone tracking: big deal?
- What is the best hole-in-the-wall ATL restaurant?
- What's the deal with non-alcoholic beer?
- Which cat is cuter? [pictures included]
- Which of these social coupon sites do you use the most?

Interestingly, there were more multiple choice questions than anything else. The original intent for having the yes/no and agree/disagree options was to allow users to quickly create polls without having to type much on their mobile phones. However, the participants preferred choosing their own response options.

Of the polls, about a fourth can be classified as humorous (Figure 6, left). Another fourth are curiosities ("How much sleep do you get?") and another are point-of-interest (Figure 6, right). Others relate to suggestions ("What's the best birthday cake to celebrate 25 years?") and hot topics. Note that a poll can fall in multiple categories. None of the polls relate to immediate information needs ("I bought asparagus. How do I cook it?") or trivia ("How old is Angelina Jolie?"), likely because these types of answers are not subjective and can be easily found on Google. This could also be because, particularly with such a small group, response is delayed.

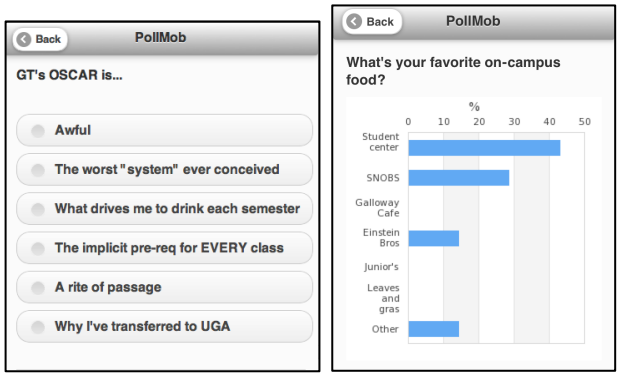


Figure 6. PollMob

There were several questions related to a common interest or shared experience. One user asked, "Any bets on who is wining tmrw?" in reference to an upcoming campus competition awards event. One user who did not know about the competition responded "who's playing?". The use of PollMob in this way implies that there is benefit to localized users.

Humor was found in both questions and responses. Multiple choice questions were an avenue through which poll creators could be funny, while open-ended questions enabled both the asker and answerer. For example, "What is your favorite slang word/phrase?" received responses like "pangsnarrt!". For this study responses were anonymous, but it would be interesting to explore whether users put more thought into their answers when responses are associated to usernames.

There was fairly consistent usage throughout the week and day, but it would be beneficial to do a longer-term study to find out if there is a drop-off over time. Location information was recorded for less than half the polls, either because the user's device was not properly retrieving

location or because the user chose not to share it. Because of the small amount of location data, no significant relationships can be determined between questions and location, but this would be an interesting area to explore in a longer study.

Survey

Participants were asked where they used PollMob most. There was a fairly even spread between home, campus, out, and in transit. One person additionally mentioned that she used it while waiting at the bus stop and waiting for meetings to start. This implies that it is beneficial for an application like this to be mobile-enabled.

Most participants chose "was bored or had spare time" as the most common reason for opening the application. Others had a specific question in mind or wanted to see what others had posted. 5 participants said that they checked for responses to polls less than 5 times a day but more than once a day, and 4 checked less than once a day. They chose to answer particular questions for several reasons (Figure 7).

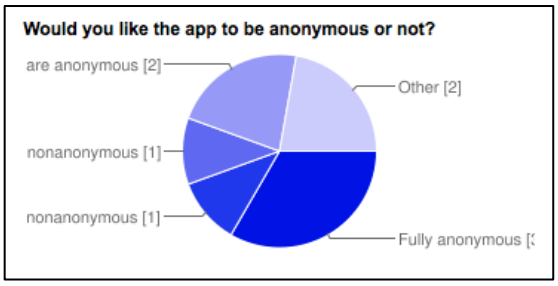
Why did you choose to answer the questions that you did?

Interested in responses	8	89%
Just because they were there	6	67%
Had the information that the asker was seeking and wanted to help out	5	56%
Thought the question was interesting or humorous	8	89%
Other	2	22%

People may select more than one checkbox, so percentages may add up to more than 100%.

Figure 7. Motivations for responding

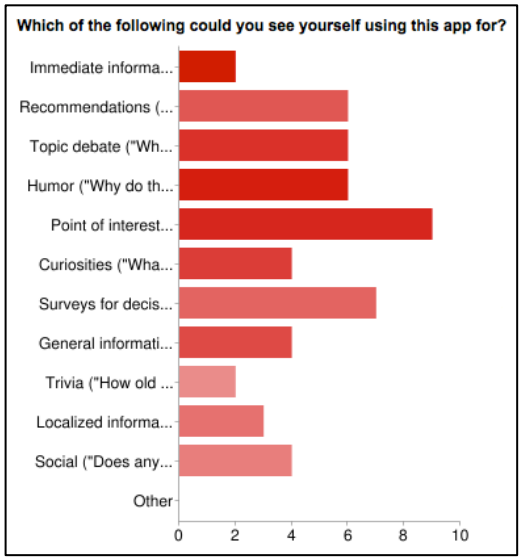
There was disagreement on the topic of anonymity (Figure 8). Responders were asked to elaborate on their preferences. Several said that full anonymity would encourage honesty and reduce possible embarrassment. Others would prefer to have a choice of anonymity for each poll and response.



Fully anonymous	3	33%
Fully nonanonymous	1	11%
Poll creator is anonymous but responders are nonanonymous	1	11%
Poll creator is nonanonymous but responders are anonymous	2	22%
Other	2	22%

Figure 8. Opinions on anonymity

Participants were also asked which types of questions they would potentially use PollMob for (Figure 9). Everyone cited point of interest. Recommendations, topic debate, humor, and decision-making had high numbers as well. As expected, only a couple people chose immediate information needs and trivia.



Immediate information needs ("I bought asparagus. How do I cook it?")	2	22%
Recommendations ("Should I buy a Dell or a MacBook?")	6	67%
Topic debate ("What do you think about Donald Trump running for president?")	6	67%
Humor ("Why do the Georgia Bulldogs suck so much?")	6	67%
Point of interest ("What's the best place to get a burger around here?")	9	100%
Curiosities ("What kind of car do you own?")	4	44%
Surveys for decision making ("Which musician would you most like to bring to Tech?")	7	78%
General information needs ("Anyone know when iPhone 5 is coming out?")	4	44%
Trivia ("How old is Angelina Jolie?")	2	22%
Localized information needs ("How is the traffic on I-75 North right now?")	3	33%
Social ("Does anyone want to go out to eat tonight?")	4	44%
Other	0	0%

People may select more than one checkbox, so percentages may add up to more than 100%.

Figure 9. Question categories

When asked how they came up with questions, participants said they were looking for funny or informative answers. They also mentioned decision-making and local recommendations. One person asked questions that "would directly aid in some work I'm doing". One particularly interesting comment was:

"When others asked humorous questions, I asked about [humorous topic], so I could meet the tone of the community of users by asking informal 'meaningless' questions, rather than questions that provided information."

The affect of users on one another is evident here. They were part of a community and some felt the need or desire to adapt to it.

I also asked which features would be useful. Groups & targeting and question threading were desired by almost all participants. Individual targeting and notifications were not as popular. Participants suggested other features like follow-up questioning, categorizing & sorting questions, hiding irrelevant questions, and inserting media files in questions.

Participants experienced a few usability issues. Some of the

questions were too long to fit the small screen, so they were cut off. One person suggested adding a marker to polls to indicate whether there as been new activity. A couple people wished for faster loading.

There were several suggestions for other applications of polling:

- Club or student group
- GT campus
- Groups of friends
- Tourists
- Patient-doctor interactions
- Workplace
- First responder or on-site task force
- Insurance companies
- Nurse hotlines

Finally, I asked for general thoughts about PollMob. Many said it was fun to use and they enjoyed seeing others' questions and responses. They found it potentially useful and some said narrowing down the focus could make it moreso. Participants agreed that the more people, the better. One person said that the application fits the mobile device well. One interesting remark was, "it was fun, but probably not a source of information I would yield very trustworthy". This leads to questions about the nature of the community. Could trustworthiness be improved in a less casual community? Is trustworthiness even desired?

DISCUSSION

The feedback from the informal study shows promise for mobile polling applications for general contexts. Further exploration could tease out some of the social factors that shape a question and answer community and encourage interaction among users.

The size of the group and short duration were limitations of the study. Participants were perhaps still feeling the novelty effect of using a new application, and maybe were not asking questions that they would on a regular day-to-day basis. Also, definitive results and statistics cannot be asserted. Nonetheless, some general lessons can be gleaned from the experience.

The categories of polls created inform further design of mobile polling applications. Humor, opinions, curiosities, and point of interest questions should be supported, through both the framework of the community and features. Also, social interaction and community forming is important. The questions related to shared experiences indicate that localized use of the application can be beneficial. In a larger study, the affect of users on one another could be analyzed by examining time trends in types of questions that are asked.

The addition of the groups feature is desired and could improve response time and accuracy by targeting only individuals to whom a question is relevant. An expertise-based system could be constraining, however, since it prevents others from stumbling upon questions. The groups feature could also be used for groups of friends and those who share real-world connections.

Conversation threading is another feature that would be beneficial. The danger, however, is in complicating the system to the point where it starts to resembles other applications too much.

Since there was disagreement about anonymity, giving users a choice might be the best option. While full anonymity has the advantage of encouraging honesty, it also dulls some of the interesting social experiences of the community. For example, if question creation was anonymous, users might feel less compelled to try to be humorous.

Polling is an innately crowdsourcing activity, because responses are created and curated by groups of people. An area of further exploration would be to create an archive of answers based on large amounts of responses.

Though there did not seem to be a clear tie between context and questions, we cannot discount the importance of context in mobile information needs. Users did not specifically say that questions were triggered by context, but they perhaps they were just not considering it in that way. Also, the study may have been too short to let interesting contextual questions emerge.

Even if context was not a leading factor in question creation, the fact that the application was used in multiple places and in transit supports the use of mobile phones for Q&A applications.

Because the study had few participants, it was not feasible to provide a feature for sorting polls by their creation location. Specifically, a user could choose to display only polls which were created within a certain mile radius of his/her current location. One can imagine contextually relevant questions such as "Which burger on this menu is the best?" or "Does anyone understand what the professor is talking about?" being asked. It could introduce shared experiences among users, both location-based and temporal. Though the study participants did not cite this as potential useful feature, it is worth exploring because of results from work on mobile information needs and the recent popularity of location-based applications.

There seems to be use for mobile polling in highly specific contexts such as the asthma application, but further research must be done. A future pilot study will help determine its usefulness. More work could be done exploring polling in other contexts

Future Work

The next steps involve adding more features such as:

- Keep improving interface & performance
- Location features
- Conversation threading
- Image & video embedding/attachment
- Sorting by categories
- Ability to integrate polls into other applications

I plan on deploying a version of the application for the Georgia Tech community in GTmob. It will include the grouping feature, which will first be populated by directory information classifying users as students, faculty, or staff. In addition to marketing PollMob to the community as a fun, general application as it was used in the informal study, I also plan to contact campus organizations and encourage them to use it for future surveys.

Additionally, I hope that other members of the Georgia Tech community can make use of the platform by customizing to their needs.

CONCLUSION

Overall, there seems to be support for mobile polling in the general context. It can be used by groups of people for various types of questions and with various intentions. Past research and opinions support the use of mobile Q&A in more specific contexts, but further research needs to be done in those areas. The customizable polling platform we created can be used to explore more facets of mobile Q&A.

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REFERENCES

1. Timothy Sohn, Kevin A. Li, William G. Griswold, and James D. Hollan. 2008. A diary study of mobile information needs. In *Proceeding of the twenty-sixth annual SIGCHI conference on Human factors in computing systems* (CHI '08). ACM, New York, NY, USA, 433-442.
2. Karen Church and Barry Smyth. 2008. Understanding mobile information needs. In *Proceedings of the 10th international conference on Human computer interaction with mobile devices and services* (MobileHCI '08). ACM, New York, NY, USA, 493-494.
3. F. Maxwell Harper, Daphne Raban, Sheizaf Rafaeli, and Joseph A. Konstan. 2008. Predictors of answer quality in online Q\&A sites. In *Proceeding of the twenty-sixth annual SIGCHI conference on Human factors in computing systems* (CHI '08). ACM, New York, NY, USA, 865-874.
4. Meredith Ringel Morris, Jaime Teevan, and Katrina Panovich. 2010. What do people ask their social networks, and why?: a survey study of status message q\&\#38;a behavior. In *Proceedings of the 28th international conference on Human factors in computing systems* (CHI '10). ACM, New York, NY, USA, 1739-1748.
5. Brynn M. Evans, Sanjay Kairam, Peter Pirolli, Do your friends make you smarter?: An analysis of social strategies in online information seeking, Information Processing & Management, Volume 46, Issue 6, Collaborative Information Seeking, November 2010, Pages 679-692, ISSN 0306-4573, DOI: 10.1016/j.ipm.2009.12.001.
6. Behavior Change Interventions Delivered by Mobile Telephone Short-Message Service. Brianna S. Fjeldsoe, Alison L. Marshall, Yvette D. Miller; American journal of preventive medicine 1 February 2009 (volume 36 issue 2 Pages 165-173 DOI: 10.1016/j.amepre.2008.09.040)
7. Blake H. Innovation in practice: mobile phone technology in patient care. British Journal of Community Nursing 2008;13(4):160-165.
8. Sunny Consolvo, Katherine Everitt, Ian Smith, and James A. Landay. 2006. Design requirements for technologies that encourage physical activity. In *Proceedings of the SIGCHI conference on Human Factors in computing systems* (CHI '06), Rebecca Grinter, Thomas Rodden, Paul Aoki, Ed Cutrell, Robin Jeffries, and Gary Olson (Eds.). ACM, New York, NY, USA, 457-466.
9. Pinnock, H., Slack, R., Pagliari, C., Price, D. and Sheikh, A. (2007), Understanding the potential role of mobile phone-based monitoring on asthma self-management: qualitative study. Clinical & Experimental Allergy, 37: 794–802.
10. Hung S, Tseng H, Tsai W, Lin H, Cheng J, Chang Y. Care for asthma via mobile phone (CAMP). Stud Health Technol Inform 2007;126:137– 43.
11. F. Maxwell Harper, Daniel Moy, and Joseph A. Konstan. 2009. Facts or friends?: distinguishing informational and conversational questions in social Q&A sites. In *Proceedings of the 27th international conference on Human factors in computing systems* (CHI '09). ACM, New York, NY, USA, 759-768.
12. Will Bamford, Paul Coulton, Marion Walker, Duncan Whyatt, Gemma Davies, and Colin Pooley. 2008. Using mobile phones to reveal the complexities of the school journey. In *Proceedings of the 10th international conference on Human computer interaction with mobile devices and services* (MobileHCI '08). ACM, New York, NY, USA, 283-292.