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The Use of Mobile Devices as Group Wisdom Support Systems to Support Dynamic Crowdsourcing Efforts

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ABSTRACT

Early group decision support systems (GDSS) literature discussed how group size and member proximity impacted the design of the room and technology necessary to facilitate group decision-making. A Legislative Session is the early term for a large group that holds face to face meetings. With advances in mobile technology, we can turn any large group meeting into an opportunity to capture the wisdom of the crowd. This paper will describe how both crowdsourcing initiatives and group wisdom support systems (GWSS) initiatives can be supported by mobile devices. An example of a keynote address at an academic conference and the use of JoinSpeaker technology will be presented as a way to hold a dynamic crowdsourcing efforts.

Keywords: Crowdsourcing, GWSS, GDSS, Mobile Devices, JoinSpeaker

INTRODUCTION

A group decision support system (GDSS) "is an integrated computer-based system to facilitate the solution of an unstructured or semi-structured task by a group that has the joint responsibility for performing it" (DeSanctis and Gallupe, 1985). Early GDSS were electronic boardrooms where each user had a CRT in front of them, which could perform some basic functions used to create solutions to the problem presented to the group. These solutions could be presented individually or aggregated to form a group decision by a moderator who posted the solution to a large screen that all participants could view. Some issues that early studies in this area considered were the design of the electronic meeting room and the GDSS itself (Huber, 1984; DeSanctis and Gallupe, 1987), whether the system was being used to enhance communication or support task oriented problem solving (Dennis, et. al, 1988), the fit between the task assigned to the group and the technology used to support group decision-making (Zigurs and Buckland, 1998), group size, group cohesiveness, and group proximity (DeSanctis and Gallupe, 1987; Dennis, et. al, 1988). Typically these systems supported small instead of large groups, and often times the participants in the group were face-to-face in the decision-making process.

With technology improvements and changes in the way the Web is being used today, the idea of generating ideas from large groups of geographically dispersed groups was born. Crowdsourcing benefits from Web 2.0, user driven technologies and mindsets and is defined as "the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call" (Howe, 2006). While crowdsourcing efforts are typically conducted over the Internet and draws its large number of participants from a potentially Internet-wide group of users, crowdsourcing is not limited to the Internet. This study discusses how the wisdom of the crowd can be tapped with mobile devices in a special type of crowd that is called a legislative session in the GDSS literature. A legislative session is a meeting in which the audience is large, the group meets synchronously, and there is face-to-face communication (DeSanctis and Gallupe, 1987).

CROWDSOURCING

While Howell coined the term crowdsourcing, the idea came from Surowiecki's *Wisdom of Crowds* in 2004. Surowiecki surmised that "if you put together a big enough and diverse enough group of people, the group's decisions will, over time, be intellectually superior to the isolated individual, no matter how smart or well-informed he is." This is true only if four conditions of a wise crowd are met (Surowiecki, 2004). First, crowds should be heterogenous and have a diversity of opinions, the opinions of the crowd should not influence each other – hence a level of independence from each other, the crowd must have the information they need to properly make the decision termed decentralization, and there must be some mechanism to aggregate the results of crowd input. If these four conditions are met, the decisions produced by the crowd should be superior to those of any individual.

Rosen (2011) outlined some corporate crowdsourcing initiatives, including Starbucks MyStarbucks idea suggestion website, where participants can suggest product, experience and involvement ideas for the company, the Netflix Prize where teams of participants vied for $1 million in prize money if they could improve the company's movie recommendation system, and Threadless which is a t-shirt company that sources its ideas entirely from the crowd who both creates designs and votes on the designs.

GROUP WISDOM SUPPORT SYSTEMS

A pair of researchers (Wagner and Back, 2008) drew on the basic premise of Surowiecki's wise crowd concept (2004) and created the idea of a group wisdom support systems (GWSS). The major premise is that if a crowd is wise, the decisions made those using a GWSS should be superior to those of decisions generate by GDSS. The differences between a traditional GDSS and a GWSS as outlined by Wagner and Back (2008) are as follows:

Group size – the GWSS needs to draw from a much larger group of participants than a GDSS.

Group composition – to truly create wisdom, the GWSS participants must be diverse in their opinions, while with GWSS it is not a requirement to have this diversity.

System support – in GDSS the system is there to support the process of decision-making while in GWSS, the system supports not only the process, but stores the meta-data for how that decision was arrived upon.

Group process – in GDSS the system supports brainstorming, categorizing of ideas, and voting. The GWSS is similar but puts a more heavy emphasis on aggregation of responses since the number of ideas generated is much larger.

Information volume provided by individual participants - For GDSS each participant must participate more because the group is typically much smaller than in GWSS where the group is very large. Each individual in the GWSS initiative has to contribute less to achieve the final decision.

Collective memory – to create wisdom both the decision itself and the process used to reach that decision is important, so a design aspect of any GWSS is the ability to generate metadata about the decision-making process. This is not important in GDSS design.

In addition to the many differences outlined between GWSS and GDSS, Wagner and Back (2008) outline three design features that are critical for a GWSS. The first is that the GWSS must be able to draw from a diverse group of beliefs, the second is that the system must be able to aggregate the results of the crowd, and finally the system must be able to create metadata about the group process.

With advances in mobile technology, such a system exists that meets the design requirements of a GWSS, and allows for large groups of diverse opinions to be captured. A discussion of the JoinSpeaker technology follows, which supports dynamic crowdsourcing events and meets the design requirements of a GWSS.

JOINSPEAKER TECHNOLOGY / ACADMEMIC CONFERENCE EXAMPLE

A dynamic crowdsourcing effort could occur anywhere where that the technology is present and a crowd is available. Imagine a keynote address at an academic conference where a vast majority of the conference participants are present. In our example, the keynote speaker at an academic conference like AMCIS has just asked the audience to identify the most important research issues for the field of MIS to focus on in the next five years. We are suggesting that the technology exists to capture the knowledge of such a crowd that has dynamically formed, is comprised of experts, and that may never come together again.

At a typical keynote address, the speaker has a computer hooked up to a projector where a Power Point presentation is being shown on a public screen to the audience. The JoinSpeaker technology is a web-based program that a speaker could use to solicit feedback from the crowd. The requirements to use this technology are as follows: a computer with Internet access that is hooked up to a projector, an iPad or tablet PC connected to the Internet to moderate crowd responses, and audience members that have mobile devices connected to the Internet.

Prior to the academic conference or presentation the speaker needs to create an account, and then must log into the account when the crowdsourcing effort is to occur. The speaker logs into the JoinSpeaker website with both the computer that is hooked to the projector and his/her tablet PC or iPad. The computer is used to broadcast the audience feedback to the public screen, while the tablet is used to control both the comments that will be made available for voting and the comments that will appear on the public screen. The reason for the use of tablet PC is that the speaker can walk around on stage during the whole process and can moderate the event while not being anchored to a chair behind a computer. While the speaker does

not necessarily need to act as the moderator, the moderator should be someone that is knowledgeable enough about the topic being discussed to eliminate duplicate and/or low quality ideas. In prior tests of the JoinSpeaker technology, moderators have noted that only about 10-15% of the audience members generate ideas, while a far higher percentage participate in voting. So if an academic conference has a keynote address with 500 participants, the speaker/moderator could expect to sort through 50-75 ideas from the crowd.

Audience members are given a unique URL for that particular speaker and are asked to visit that website with their mobile device. The audience members do not need a username or password to access the website and can vote without providing any contact information. The audience members can voluntarily provide their email address if they want to keep future communication channels open with the speaker, but are not required to do so. All comments made by audience members are anonymous so that the speaker and crowd judge the comments based on their merits and not based on the merit of the participant that made the comment.

After the idea generation stage concludes, the moderator views the ideas on his/her tablet PC in real-time and can select which ideas get pushed back to the mobile devices of the crowd for voting purposes. Duplicate ideas and/or ideas that the moderator feels are not worthy of voting can be deleted so that the audience can vote on unique, high quality ideas. The audience members can then read through the ideas and vote in one of three ways on each idea: thumbs up – suggesting that the idea is worthy of future discussion, thumbs down – suggesting that the idea is less worthy of future discussion, or no vote, which means the audience member is neutral towards the idea. The votes are then aggregated so that each idea is given a final score which is obtained by subtracting the number of negative votes from the number of positive votes each idea received. The ideas with the highest scores can then be presented on the public screen for further discussion during the session.

We envision that this technology will help with the idea generation and idea evaluation stages of the crowdsourcing and can do so in a very short period of time. In the example of the academic conference keynote speaker, who may have an hour to present, the idea generation and evaluation process might take only 10-15 minutes, leaving the remainder of the time to discuss the ideas that are most important to the crowd in greater detail.

DYNAMIC CROWDSOURCING

Surowiecki (2004) identified four elements to form a wise crowd, which were echoed by Wagner and Back (2008) in their discussion of creating GWSS. The JoinSpeaker technology is able to create an environment where all four of these criteria are met. The first is a diversity of opinions, in which the crowd contains multiple differing viewpoints. An academic conference would provide a fertile location for this diversity of opinions. The second criteria is independence, and this is the idea that the opinions of the members of the crowd are not influenced by the viewpoints of others in the crowd. By allowing anonymous voting, and by presenting ideas on the public screen only after they have been voted on, the viewpoints of the participants are not clouded by the viewpoints of others. The academic conference setting also meets the criteria of decentralization, where participants draw on their own expertise to answer questions / provide feedback, and are not reliant on the viewpoints of the speaker or others in the crowd to make decisions during the idea generation and idea evaluation process. Finally the voting mechanism acts as an aggregator, the final criteria of a wise crowd or GWSS. The vote aggregator allows for the best ideas to rise to the top for further discussion while other ideas not deemed as promising will be eliminated.

DISCUSSION AND CONCLUSION

The goal of this paper was to discuss how mobile technology can be used to create group wisdom support systems that support dynamic crowdsourcing efforts wherever large groups of people who are connected to the Internet congregate. An example was provided of using JoinSpeaker technology at an academic conference to capture the wisdom of the audience that comes together for a short period of time, and whose makeup may never be replicated again. The technology supports and the moderator would facilitate the session in such a way where there is independence of thought, a diversity of opinions, decentralization of information whereby everyone has the knowledge and ability to participate, and an aggregation method to capture the wisdom of the crowd.

While the Internet is typically the forum for large-scale crowdsourcing events, in situations as described in the GDSS literature as legislative sessions, those with large face-to-face audiences (DeSanctis and Gallupe, 1987) that meet synchronously, dynamic crowdsourcing efforts are possible. The JoinSpeaker system allows for anyone with a mobile device

to participate, reaching diverse opinions, the technology facilitates voting and the aggregation of these results, and also captures the decision making and voting process for later review.

We plan on conducting future research with the technology in the near future to explore the benefits to organizations of such endeavors, and we encourage others to use this technology to explore their own research studies.

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