

Community-based Conference Navigator

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Abstract. As the sheer volume of information continues to grow, information overload challenges users in many ways. Large conferences are one of the venues suffering from this overload. Faced with several parallel sessions and large volumes of papers covering diverse areas of interest, conference participants often struggle to identify the most relevant sessions to attend. We have designed a community-based conference navigator system that uses social navigation support to help conference attendees schedule the most appropriate sessions and make sure that the most important papers are not overlooked.

Keywords: Information overload, community-based personalization, adaptive navigation support

1 Introduction

As the sheer volume of information continues to grow, information overload challenges users in many ways. Large conferences are one of the venues suffering from this overload. Faced with several parallel sessions and large volumes of papers covering diverse areas of interest, conference participants often struggle to identify the most relevant sessions to attend. Conferences organized by the Association for the Advancement of Computing in Education (AACE) such as E-Learn[6], and ED-Media[7] are a clear example of large conferences with diverse collections of papers. To tackle the planning problem, AACE makes the schedule of the conference available on the web several weeks before the conference and also offers a personal scheduler system to help conference attendees plan their conference beforehand. The schedule and the planner provide the title and abstract of each paper. However, given the large number of papers (more than 500 articles in 15 parallel sessions in the latest ELearn conference) without any navigation support, it is a challenge for the conference attendees to find what interests them and not miss any interesting presentations. Informally, conference attendees are accustomed to seeking each other's advice in order to find relevant papers. However, at a large conference with hundreds of attendees, it is very difficult to find people with similar interests. To address this problem we have designed a community-based conference navigator system that formalizes the process of advice-seeking from people with similar interests. The system uses community-based adaptive navigation support to help conference attendees schedule the most appropriate sessions and make sure that the most important papers are not overlooked. The system is designed as an adaptive service layer covering the AACE conference program and schedule. It adds the wisdom of the community to the system in order to help individuals make decisions.

The remainder of this paper is structured as follows. In section 2 we review related work on community-based personalization. In Section 3 we describe our community-based conference navigator system. Section 4 describes our preliminary evaluation of the system. Section 5 concludes with a discussion of future directions for research in this area.

2 Community-Based Personalization

Over the last decade, a range of information systems have looked at how community-based personalization can help users find their way in a rapidly expanding information space. Community-based personalization is mainly offered through social information access

technologies. These technologies capitalize on the natural tendency of people to follow direct and indirect cues about the activities of others; for example, we often prefer restaurants that appear to attract lots of customers and our movie preferences are often informed by the opinions of others.

Pioneering work on social information access from the early 90's attempted to formalize this social tradition in two ways: collaborative filtering and history-enriched environments. Collaborative filtering attempted to propagate information items between users with similar interests. This technology enabled a social form of information filtering and recommendation. For example, the innovative collaborative filtering system GroupLens [4] allowed the cross-recommendation of NetNews articles. In contrast, history-enriched environments attempted to make the aggregated or individual actions of community users visible to others, mainly to facilitate social navigation through a given information space. For example, the 'Read Wear and Edit Wear' system [2] visualized the interaction history a document developed between its authors and readers, enabling third parties to quickly locate the most-viewed or -edited parts of a document. More recently, the set of social information access technologies has been extended by the advent of social search and social bookmarking systems. Social search systems such as I-SPY [5], attempt to help new searchers by harnessing past successful searches by similar users, promoting results that have proved successful during these sessions. Social bookmarking systems such as WebTagger [3] applied tagging to help new users locate useful information that has already been discovered and classified by others. Information access using social tagging systems was recently popularized by such systems as del.icio.us and Flickr. Knowledge Sea II [1] is an elaborated example of social browsing. It was developed to help students within one course discover the most useful pages in multiple open corpus textbooks. It supports information access through search, visualization, and browsing and guides the users with extended footprint-based and annotation-based social navigation support.

3 Community-based Conference Navigator

To explore the problem of conference planning, we have developed a community-based conference navigator system for the E-Learn conference organized by AACE. This system uses community-based adaptive navigation support to help conference attendees schedule the most appropriate sessions and to make sure that the most important papers are not overlooked. The system is built as an adaptive layer of service over the AACE conference planning system, which allows the conference attendees to browse the entire program and plan their own schedule. The service tracks different activities of the community, including the scheduling of papers and allows users to add comments to papers. The activities are used to update the community profile accumulating over time—the "wisdom" of the community. This "wisdom" in turn is made available to all community members through adaptive icon annotations that attract attention to papers that are popular within a certain community.

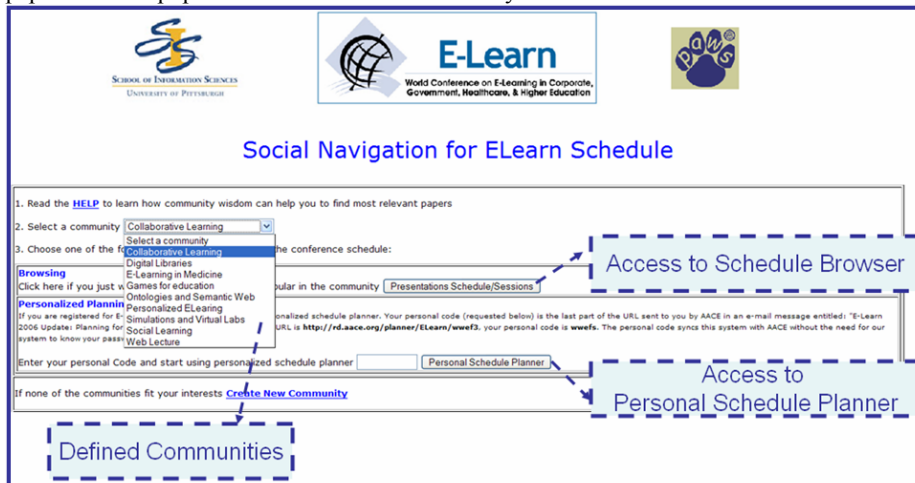


Fig. 1. Conference Navigator Login Page

To use the service, a user needs to first choose a community. If the desired community does not already exist, they can create their own community. Figure 1 presents the login page to the system. As can be seen in the figure, the system provides two access options: “Schedule Browser”, and “Personal Schedule Planner.” Both methods are augmented with community-based support as described in the following section.

3.1 The Schedule Browser

The schedule browser helps users to locate papers that are popular within the community. The AACE schedule browser allows users to search the schedule by topic, date, and keyword in within the author, title, organization, country, or abstract. Our schedule browser “hijacks” the results returned from the AACE search and provides community-based navigation support by augmenting the search results with visual cues (icons). The visual cues represent different community activities such as annotation, reading or adding a paper to one’s personal schedule.

Figure 2 presents the overall view of schedule browser with community-based navigation support. The results shown in the figure are the list of the papers presented on the first day of the conference, which includes 77 papers. The current user is looking at this result as a member of the “Social Learning” community. Community information is shown at the top right of the window. Papers that are scheduled by members of the community are augmented with footprints icons. While navigating and checking the papers, the user can add annotations to visited papers and mark them as relevant or irrelevant to the interests of the community. Users’ annotations are represented by a sticky note icon. The overall attitude of the community about the relevance of the paper is represented by a thumb-up or thumb-down icon.

The first, third, and fifth papers in the list shown in figure 2 are augmented with community information. The footprints icon added to the first and third results signifies that those papers are scheduled by members of the “Social Learning” community. The thumbs-up icon added to these two results recommends these two papers to the community. However, the fifth item is not annotated by any footprints icon, which means that no one from the “Social Learning” community has added the paper to their schedule and the thumbs-down icon is another indication that the paper is not relevant to the “Social Learning” community.

E-Learn 2006 Presentation Schedule/Search

Search Author Search

Date: All Days Saturday, Oct. 14, 2006 Monday, Oct. 16, 2006
 Sunday, Oct. 15, 2006 Tuesday, Oct. 17, 2006

Topic: Search

Next Page
Presentations Matching Search: 77
Sat, Oct. 14

Time	Room	Title	Type	Topic	Proceedings Starting Page #
10:00 AM	3	AnnotatEd: A Social Navigation and Annotation Service for Web-based Educational Resources Rosta Farzan, University of Pittsburgh, USA; Peter Brusilovsky, University of Pittsburgh, USA View Details	Full Paper	Tools & Systems	2794
10:30 AM	9	Using iPods to Support Content Area Learning in a Japanese College Lecture Course Douglass Scott, Waseda University, Japan; Shoji Nishimura, Waseda University, Japan; Shogo Kato, Waseda University, Japan View Details	Full Paper	Tools & Systems	3014
11:15 AM	3	Enabling the collective to assist the individual: CoREAD, a self-organising reading environment Andrew Chianina, McGill, Canada; Susanne Lajoie, McGill University, Canada View Details	Brief Paper	Tools & Systems	2753
11:35 AM	3	Drag and Drop Streaming: an Inexpensive Method for Recording and Delivering Lectures is Becoming the Next Revolution in E-Learning Salvador Baez-Franceschi, University of Houston, USA; Athad Dinshaw, University of Houston, USA; Ian Evans, University of Houston, USA; Donald Nieuwenhuis, University of Houston, USA View Details	Brief Paper	Tools & Systems	2715
11:55 AM	3	Supporting Diagnostic Problem Solving in Medical Education Using an Integrated Classroom - E-Learning Model Sonia Faremo, McGill University, Canada; Susanne Lajoie, McGill University, Canada; Genevieve Gauthier, McGill University, Canada; Jeffrey Wiseman, McGill University, Canada View Details	Brief Paper	Tools & Systems	2788

Fig. 2. Schedule Browser

Anyone who is interested in viewing papers from the viewpoint of several communities is able to switch to a different community at anytime. A link at the top left allows the user to change the community at anytime. In this way, the user will view the same set of results, but they will be augmented for a different community.

3.2 Personal Schedule Planner

AACE provides a personal code to all registered attendees so that they can use the personalized schedule planner. The schedule planner provides the user the ability to search the conference schedule, similar to the schedule browser. Users can search by topic, date, or keyword. Next to the link to each paper returned in the search results, there is an option to add the paper to one's personal schedule, as shown in figure 3. All the scheduled papers can be viewed in the "My Schedule" section of the interface. Once the paper is added to the schedule, the "Add" option will be replaced by the "Remove" option—allowing the user to edit his/her personal schedule.

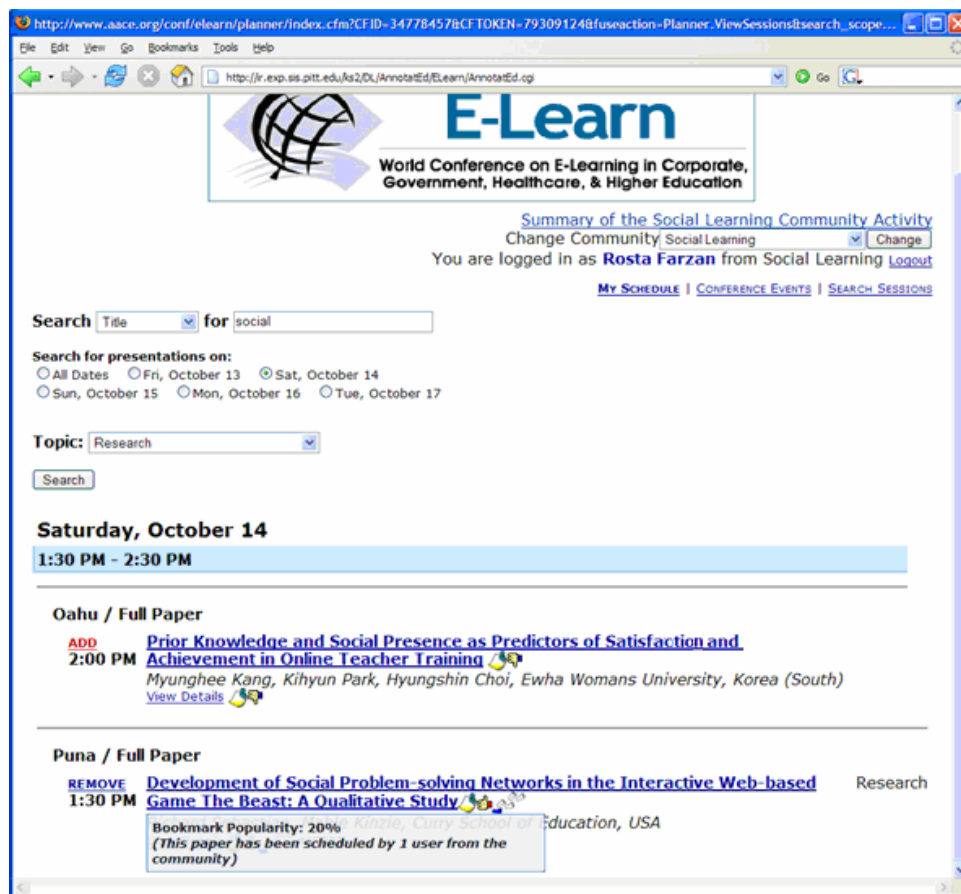


Fig. 3. Personal Schedule Planner

Our system synchronizes authentication with the AACE without the need to know any personal data. When a paper is added to or removed from the personal schedule it is tracked by our system as well. As a result, we have information about all papers scheduled by each member of the community and we can use this information to provide navigation support. While checking and planning the schedule, users are also able to annotate the paper and mark it as relevant or irrelevant to the interests of the community. The same community-based navigation support as the "Schedule Browser" has is provided for the schedule planner, as shown in figure 3. Previously scheduled papers are annotated with a footprints icon and papers with users'

annotations are emphasized by adding a sticky note icon. Papers found relevant by the community are annotated with a thumbs-up icon while ones found not relevant by the community are annotated with a thumbs-down icon. The navigation support in the planner view allows the user to plan their session attendance with the help of a community with similar interests. The users are able to locate relevant papers and make sure to attend important presentations. Therefore, community-based navigation support improves the personal planner while the planning actions of each member of the community feed into the collection of community wisdom at the same time.

3.3 Annotation Feature

As mentioned in the previous section, our system incorporates an annotation feature which allows the users to annotate papers while browsing, or planning the schedule and let the user mark the paper as relevant or irrelevant to the interests of the community. When the user clicks on a search result returned by the AACE search, a detailed page about the paper is presented which includes the title of the paper, information about the authors, and the abstract of the paper. Our system adds the annotation feature to these paper information pages as a frame on the right side of the window. Figure 4 presents an information page along with the annotation feature. As shown in the figure, previously written community annotations are shown at top of this frame and information is also given about how many members have scheduled to attend the paper.

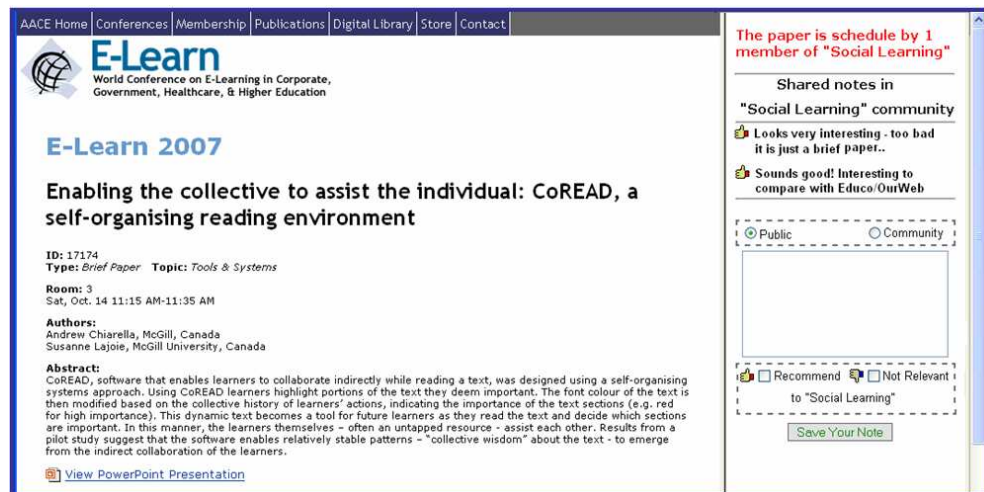





Fig. 4. The annotation feature

An annotation is a free-format note that will be associated with the related paper. The user has the option to share the note with everyone who uses the system (*Public* option) or to limit it to one community (*Community* option). Along with the free-format note, the user can recommend the paper to the community if she finds it relevant or otherwise mark it as not relevant. As described in previous sections, this information is used to provide navigation support and guide other members of the community.

3.4 Community-Based Navigation Support

The main personalization functionality of our system is its social navigation support. This support is provided by augmenting links to papers presented to the user during search and browsing, with visual cues reflecting the activities of the community. Appropriate visual cues represent different activities of the community and the level of color within each icon represents the magnitude. Filling an action with a higher level of color represents a higher magnitude for that action. Icons with various levels of color are shown in Table 1.

Table 1. Visual cues providing community-based navigation support




Activity	Icon
Planning	
Annotation	
Overall attitude	

For example, the height of the color in the footprints icon represents the magnitude of scheduling; i.e., the number of community members who have scheduled to attend the paper. Higher levels represent that a higher number of members of the community scheduled that paper. To give more weight to early scheduling events, the levels increase logarithmically. The maximum level depends on the number of members in the community. We would assign the maximum level to a paper which is scheduled by half of the members of the community. The range of each level is specified using the following formula

$$range(i) = \left(\left[Max^{\frac{i-1}{5}} \right], \left[Max^{\frac{i}{5}} \right] \right) \quad \text{where } Max = \frac{\# \text{ of community members}}{2}$$

Similar to footprints icons, different filling levels are used for sticky note icons, representing the different densities of community annotations, with higher levels representing larger numbers of annotations. Since the number of annotations is limited, we assigned levels directly based on the number of values as shown in table 2.

Table 2. Assignment of annotation icon

Number of Users' Notes	Icon
One	
Two to five	
More than five	

When the user mouses over an icon, detailed information about the annotations including the total number of annotations, the number of members recommending it, and the number of members finding the paper not relevant are presented to the user. If the paper is generally found to be relevant by a larger proportion of community members, the paper is augmented with a thumbs-up icon and if it is not found relevant by a larger proportion of community members, it is augmented with a thumbs-down icon.

3.2 Activity Summary

Another important feature of the system is the ability to view the summary of activities for each community. At the top right corner of all pages there is a link to check the summary of community activities. The summary page shows all pages annotated by the community, the top 5 pages scheduled by the community, and the top 5 papers accessed. There is an option to view all scheduled and all accessed papers as well. Each paper is linked back to its description page which includes the abstract of the paper. Similar to previous views, the links in the view are also annotated with visual cues. The annotated papers are augmented with annotation icons, as described above, which shows the density of annotation and the overall attitude of the community towards the paper. Scheduled papers are also augmented with the footprints icon which represents the number of members scheduled to attend the paper. Figure 5 presents a sample view of the summary of activities completed by the “Social Learning” community.

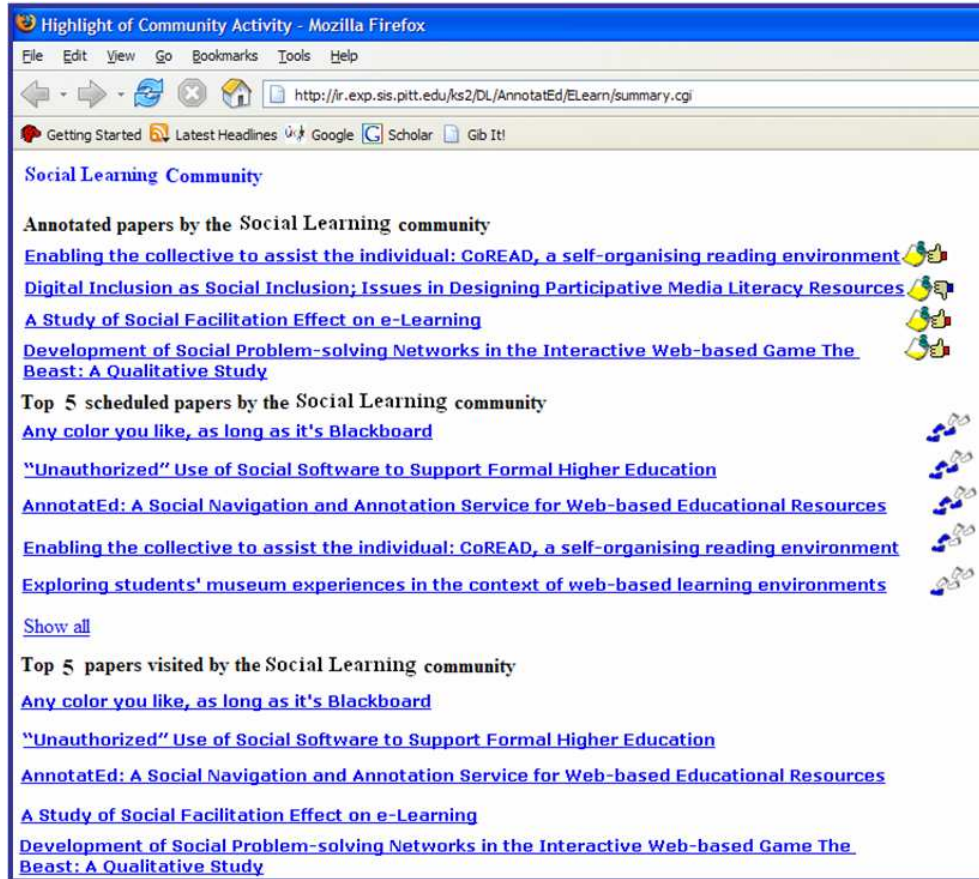


Fig. 5. Summary of activities by the "Social Learning" community

4 Preliminary Evaluation

To evaluate our community-based conference navigator system, we ran a user study at the latest E-Learn conference. As mentioned before, E-Learn is one of the conferences organized by AACE, which provides an online schedule and planner to attendees, several weeks before the conference. Each year, E-Learn features about 500 articles, which are organized in about 15 parallel sessions. We created several communities related to the conference and advertised the system one week before the conference, through email to the members of these communities who were attending the conference. We also prepared a flyer and advertised the system throughout the conference. We asked participants to plan the conference using the system. The participants were also asked to respond to a questionnaire which was designed to evaluate the community-based support features of the system. We collected the questionnaire at the end of the conference. The questionnaire included 7 short questions. The sample questions are shown in figure 6.

Unfortunately, our study was damaged by a technical problem. We expected the main use of system to happen during the second day (after the first day was spent advertising the system). However, due a local earthquake, there was a power outage during the whole second day of the conference. While the conference was able to continue, the attendees were not able to use computers. As a result, we collected only seven attendee responses to our questionnaire. Out of these seven responses, six used the system extensively and one did not use the system (so we discarded the responses from that user). As a result, the collected data presented below should be tempered with an understanding of the sample size. A more elaborated study needs to be carried out for a better understanding of the system.

2. While browsing or planning the schedule the social annotation cues are very noticeable.
 a. Strongly agree b. Agree c. Neutral d. Disagree e. Strongly disagree

3. How useful did you find the following navigational cues? Put letters into table.
 a. Very useful b. Useful c. Neutral d. Useless e. Very useless

	While planning your schedule	While locating interesting papers
Presence of any type of community annotations 🗨️		
Presence of positive type community annotations 👍		
Presence of negative type community annotations 🗨️		
Presence of footprints (sign of scheduling by members of the community) 👣		

4. The ability to provide comments for the community is very useful.
 a. Strongly agree b. Agree c. Neutral d. Disagree e. Strongly disagree

5. The ability to read comments from the community is very useful.
 a. Strongly agree b. Agree c. Neutral d. Disagree e. Strongly disagree

Fig. 6. Sample questions

A set of questions was asked about the usefulness and attractiveness of social annotations. The result is shown in Fig. 7. As shown in the figure, all users noticed the social annotations and 80% of them found the social annotation very useful in planning the conference and locating the most interesting papers. Generally, the users also found the ability to provide comments and read others' comments to be very useful.

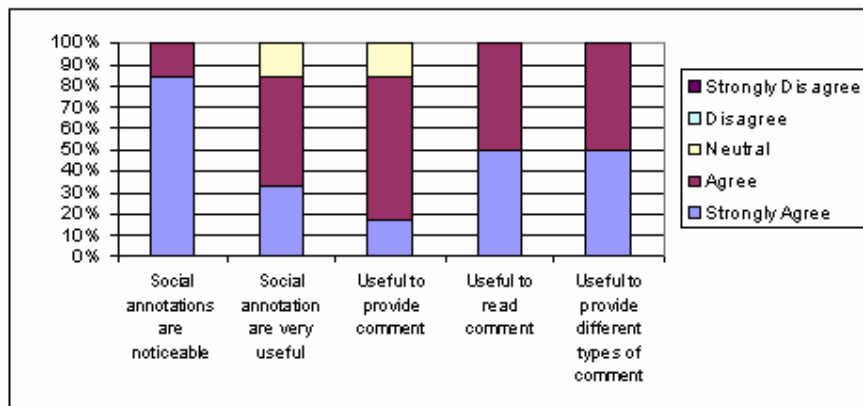


Fig. 7. Users' attitude toward the usefulness and attractiveness of social annotations.

Another set of questions asked the users about the usefulness of each visual cue while planning and browsing. The results are shown in figure 8. It is interesting to observe that the general presence of users' annotation is not as useful as other social cues, which is an expected result. Users are more interested in knowing whether the paper is found relevant or not-relevant by other members. Consistent with this result, the importance of negative comments is the same as the importance of positive comments. This means that knowing a paper is relevant or not relevant influenced the users' decisions about the paper. The results also show that the footprints icon, representing scheduling information, is the most useful icon. This is a rather expected result since there is a stronger level of interest in scheduling.

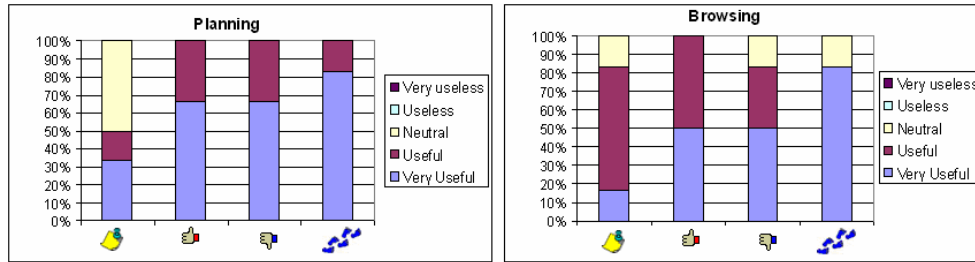


Fig. 8. Usefulness of visual cues while planning and browsing the schedule

5 Conclusion & Future Work

The current work presents our design for a community-based conference navigator system that collects the wisdom of the community in order to guide individuals making decisions about attendance at papers presented at a large conference. We have presented the design and a preliminary evaluation of the system. As mentioned before, a more elaborate study is required to validate whether the system is useful in guiding conference attendees. We plan conducting future studies in upcoming AACE conferences. Moreover, we are looking into integration of our system with the AACE system instead of as an add-on system. True integration of the systems would improve the visibility of our system and also enable us to add more functionality to the system. For example, it is currently not possible to plan to attend a paper from the activity summary page since our system does not have any access to AACE planning. This would be an important additional functionality for the users. Another limitation of the current implementation is scheduling a paper for more than one community. Since our system uses AACE planning and AACE only allows scheduling a paper once, it is not possible to schedule the same paper for different communities. A true integration of these two systems will help to address these limitations.

References

1. Brusilovsky, P., Chavan, G., and Farzan, R. (2004) Social adaptive navigation support for open corpus electronic textbooks. In: P. De Bra and W. Nejdl (eds.) Proceedings of Third International Conference on Adaptive Hypermedia and Adaptive Web-Based Systems (AH'2004), Eindhoven, the Netherlands, August 23-26, 2004, pp. 24-33
2. Hill, W. C., Hollan, J. D., Wroblewski, D., and McCandless, T., (1992) Edit Wear and Read Wear. In: Proceedings of ACM Conference on Human Factors in Computing Systems, CHI'92. ACM Press, New York City, New York. 3-9
3. Keller, R. M., Wolfe, S. R., Chen, J. R., Rabinowitz, J. L., and Mathe, N. (1997) A bookmarking service for organizing and sharing URLs. In: Proceedings of Sixth International World Wide Web Conference, Santa Clara, CA, April, 1997, pp. 1103 - 1114.
4. Resnick, P., Iacovou, N., Suchak, M., Bergstrom, P., and Riedl, J. (1994) GroupLens: An open architecture for collaborative filtering of netnews. In: Proceedings of ACM conference on Computer supported cooperative work, Chapel Hill, North Carolina, ACM Press, pp. 175-186.
5. Smyth, B., Balfé, E., Freyne, J., Briggs, P., Coyle, M., and Boydell, O. (2004). Exploiting Query Repetition and Regularity in an Adaptive Community-Based Web Search Engine. *User Modeling and User-Adapted Interaction*, 14(5). 383-423, 2004
6. World conference on E-Learning in corporate, government, healthcare, and business. <http://www.aace.org/conf/elearn/>
7. World conference on educational multimedia, hypermedia, and telecommunications. <http://www.aace.org/conf/edmedia/>