Design of a Social Interaction Environment for Electronic Marketplaces

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ABSTRACT

This paper presents the design of an interaction environment for fostering social interactions in electronic marketplaces. The environment incorporates a novel, spatially-organized, and interactive site map. The map provides visibility of people, activities, and social interactions and incorporates mechanisms for social interactions. Four design constraints abstracted from prior findings in CSCW guided the development of the map: sociality, scalability, spatiality, and imageability. The design evolved through a process consisting of several phases and iterations. We used HCI techniques, where appropriate, to analyze and study the design problem, to enumerate, explore, and reconcile a design space, and to informally evaluate a design solution.

Keywords

Activities, crowds, e-commerce, imageability, interaction design, map, people, online communities, scalability, social groups, social interaction, social navigation, social visualization, sociality, and spatiality.

1. INTRODUCTION

Online spaces like the Well, Usenet newsgroups, and MUDs (multi-user dungeons) have gained interest among researchers, educators and business people as objects of study, design, and commercial application [2, 5, 6, 18, 22]. The fields of Human-Computer Interaction (HCI) and Computer-Supported Cooperative Work (CSCW) have been particularly interested in the design and use of such systems to support groups of people collaborating. Much of their focus has been placed on understanding the interdependence of social and technical elements in a design space to successfully support online communities [19, 23]. More recently, the World Wide Web has been drawn to online communities as part of its evolution and growth. Much of this interest has been fueled by interests in capitalizing on online communities in new business paradigms [2].

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These developments are bringing the Web to an important and new stage in its development. While the first two stages can be characterized as valuing the importance of information and transactions, the third stage can be characterized as valuing the importance of people in playing a prominent role on the Web. Yet, much of the commercial efforts to enhance the participation and interactions of people have taken a tools focus (e.g., chat tools, bulletin boards, and instant messaging [1, 16]) rather than the broader socio-technical focus that has led to successes in earlier Internet communities and a handful of Web communities (e.g., Motley Fool).

Many Web efforts could benefit from the findings and emergent understanding about online communities from the HCI and CSCW fields. Specifically, they have found that online communities are supported by systems that provide settings for social interaction and where tools and social practice are closely intertwined and co-evolving (see [19] for examples). Such settings and the social interactions are supported by a mix of social design elements such as negotiation of turn-taking and technical design elements such as awareness, informal communication, and co-construction shared workspaces. Furthermore, the designs of such systems are complex and are very different from traditional single-user systems because these socio-technical systems are living and organic entities that are molded through use. Consequently, such systems need to provide environments that facilitate social interactions and link these social interactions to the settings in which they arise.

This paper describes the design of such an interaction environment for online marketplaces. Electronic marketplaces are online spaces where individuals gather to conduct transactions and may need to interact with other individuals (e.g., auction or home buying). The next section reviews and analyzes prior efforts to address the design problem. Then, we outline our design process and discuss how prior CSCW findings and HCI techniques were used to develop our design. This provides a window into the background, activities, approach and rationale for our design process. Finally, we present our design and illustrate its evolution. The aim of the paper is to shed light on the complexity of the problem, the organic nature of the solution, and the combination of resources, skill sets, and process used to solve the design problem.

2. RELATED WORK

Current commercial efforts like Gooey [10], Odigo[20], and Third Voice [24] provide an interaction environment using a tools approach. These third-party applications provide awareness of other users using the same application at a Web site. The presence information is shown at the granularity of the Web site; Odigo [20]

shows users co-located on the same page. They do not provide users with an awareness of other people in nearby locations (e.g., other similar pages).

Some tools enable users to be aware of activities of other users such as chat and all provide mechanisms that enable their users to chat with each other. Third Voice [24], in particular, allows users to annotate Web pages and to be aware of other information sources with information related to what the user is viewing. While these tools continue to support additional capabilities, many of them are limited in the social information they present. All of those tools do not display the information within a context that relates information, transactions and people.

Finally, a major drawback of these systems is that users are only aware of users who are using the same tool at the Web site rather than all of the users present at the Web site. The lack of inter-operability severely limits the awareness function and makes it difficult for users of different tools to communicate with each other.

In the research arena, there are a number of efforts to widen online spaces by visualizing the social context and cues of a social setting [7, 8, 14, 15, 25, 28]. These social visualization efforts introduce social cues to online systems to help create socially translucent systems where awareness and accountability are directly supported. Social translucency is suggested as a fundamental requirement for the support of communication and collaboration [8].

Many of these research efforts are focussing on supporting conversational settings such as chat, bulletin boards and newsgroups. We are unaware of any research efforts to address the electronic marketplace arena where other social interactions besides conversation are possible. The social interactions may be of a direct form such as providing recommendations or of an indirect form such as following in other people's footsteps.

3. RESEARCH AND DESIGN PROCESS

Our process involved setting explicit problem statement, design needs, and design constraints. It used empirical and analytic techniques to inform the researchers' understanding of the problem, its scope, its issues, and its solution. We made extensive use of prior CSCW findings in exploring the problem and built on these results as we examined the issues and created a solution. Finally, we used HCI techniques to structure and inform our investigations (e.g., a modified version of Questions, Options, and Criteria [13], scenarios [4], and mock-up prototypes). They were useful as tools to think about the issues and problems, as sounding boards for the solution, as communication vehicles and ultimately as means to evaluate the solution's validity and effectiveness. Figure 1 provides a schematic representation of our overall process. Each piece of the process is summarized below.

- Phase 1 — We defined the research problem — to create a socio-technical environment to foster social interactions in electronic marketplaces. This is a necessary first step to facilitate the development of online social groups because it provides an environment to support awareness, conversation and the co-construction of shared objects in a shared space. By enabling participants to interact in such an environment, a sense of shared purpose in a meaningful space can emerge and from which social groups can potentially emerge [11]. In addition, we were working under a three month time constraint to explore the problem as the first author was participating through a summer internship. We present a subset of the solution and the ideas that was developed.
- Phase 2 — We engaged in informal studies of Web sites with a community element to examine the aspects of the communities that were effective and elements that were lacking. At the same time, we incorporated related CSCW research on media spaces and communities [3, 9, 23]. Each activity mutually influenced and informed the other.
- Phase 3 — We combined the results from the previous phase to synthesize a set of design needs and a set of design constraints. The design needs characterize the crucial elements needed to create an online social interaction space where a sense of place and social groups may emerge. The design needs are: (1) visibility of people, activities and social interaction and (2) mechanisms for social interaction. The design constraints guided the formulation of a solution to the design needs. They include: sociality, scalability, spatiality, and imageability.
- Phase 4 — We developed a solution through a series of iteration and refinement of the design needs into a number of design ideas guided by the design constraints. The paper discusses a subset of these design ideas and a selection of iterations to provide a window into our solution development (see Table 1).
  - Loop 1 — Visibility of people.
  - Loop 2 — Support of e-commerce tasks.
  - Loop 3 — Visualizing an electronic catalog.
  - Loop 4 — Visual representation as map.

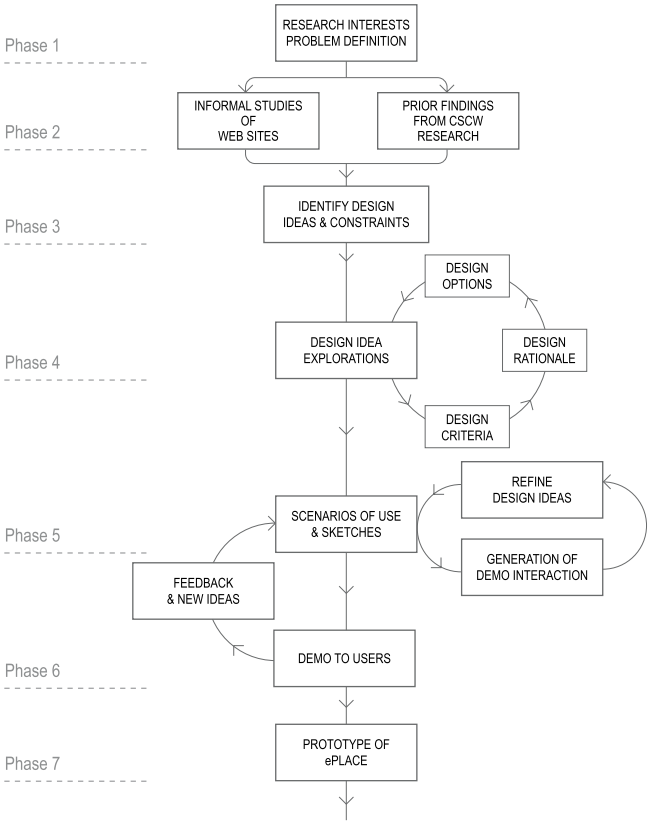

Figure 1: Process diagram.

- Loop 5 — Visual representation of social interactions like social navigation and chat.

- Phase 5 — We developed several scenarios of use to show the interactions with the solution. As well, these scenarios were useful during our user feedback sessions with potential users.

- Phase 6 — We showed a mock-up prototype of the solution along with an extensive scenario to several of our colleagues in one hour plus sessions over the course of a week. The mock-up prototype was implemented using Macromedia Director. Feedback sessions were conducted just prior to the end of the project.

Table 1: Design idea, criteria, options and rationale for the design of the social interaction environment.

Design Idea	Design Criteria	Design Options	Design Rationale
Visibility of people. For example, see Figure 2 and Figure 5.	This provides useful awareness information. It is an important catalyst for stimulating interactions	1. Embed representations on the page 2. Separate the representations from browser content into a separate application.	Avoid too much modifications of existing page. More control for user to see/not see visualization
Visual representation of e-commerce task, products and services. Compare Figure 4 with Figure 5.	Visual elements should accommodate marketplace domain such as electronic catalog and size of, traffic at, and number and variety of meaningful activities at the Web site.	1. Multiple rings to represent electronic catalog 2. Standardize to three rings for three levels of organization of catalog.	Location provides users with reference points. Movements in Web site should be visually represented. Interpretations of representation should translate across Web site.
Visual support of the e-commerce shopping task. See Figure 3	Frame awareness information with the shopping context and space. Place emerges when behaviors, actions, and interactions unfold in a space and develop shared meaning for its participants	1. Place awareness information alongside product categories and in the pages that the user is looking at. — or — Interleave awareness information with shopping task where users really move zones in the process of locating the target merchandise. 2. Hierarchical traversal of electronic catalog. — or — Ring traversal of electronic catalog (ring corresponds to zones).	The place where the most shared context of interaction is where products and services are located. People are guided, in part, by people, and by activities around them. A Web site needs to provide a coherent shared sense of space to facilitate a context of interaction Hierarchical traversal is not as intuitive as ring traversal for most people. Representation of the site does not need to mimic the physical world.
Visual representation as a map. See Figure 5 and Figure 6.	A visual representation that evokes a vivid identification of a powerfully structured and highly useful mental image of Web site space. The representation integrates, people, crowds, actions, and interactions.	1. Mimic physical world representation of store. 2. Use existing textual site map. 3. Develop an abstract spatial representation incorporating building blocks: landmarks, edges, districts, nodes, and paths.	Abstract site map can incorporate visual elements that allow a business to create a unique brand identity. Map provides a consistent metaphor for navigation, interpretation of behaviors, and social interactions at a Web site. Map incorporates common social rules that can enhance cognition and interactions at Web site.
Visual representation of social interactions. See Figure 7, Figure 8, and Figure 9.	Utilize map components to illustrate social interactions like social navigation and chatting. Awareness of other people's presence, activities, and interaction can catalyze interactions. Interactions are important mechanisms for fostering social groups.	1. Differentiate types of landmarks, districts and paths. 2. Visual elements provide information on mouse over. 3. Visual elements support a behavior (e.g., clicking on buddy moves user to buddy's location).	Map elements display information about people, activities and social interactions. Map elements define Web site structure — parseable landscape — that can be navigated. Map elements have interaction attributes that allow invocation of actions that are the basis of social interactions like chat and social navigation.

- Phase 7 — We are in the midst of developing a working prototype of our solution.

The remainder of the paper focuses on Phases 4, 5, and 6. As part of the discussion of Phase 4, we elaborate on the design needs and design constraints.

4. EVOLUTION OF DESIGN

This section examines the heart of the design process, the HCI techniques used, and the rationale for using them. We discuss a selection of the loops to show how design constraints guided the formation of design needs and evolved these needs into design ideas. We also show how a modified form of QOC (Questions, Options, and Criteria) was used to evolve the design ideas into their current forms, logical structures, and user interactions. QOC is a technique to explore an area of a design space, once a design question is identified (in our case a design idea) [13]. Each loop consists of four design considerations: design idea, design criteria, design options, and design rationale:

- Design *idea* encodes the core design concept. It also represents an idea that is inspired by external resources.
- Design *criteria* separates the visual forms from the interactions we want to develop. It is a description that balances between what the concept leads to and what the form constrains.
- Design *option* represents alternatives for the selected design idea. It includes questions raised in generating the alternatives.
- Design *rationale* provides the reasoning for the selected option.

Table 1 shows five examples of the design ideas we explored and their corresponding criteria, option, and rationale.

4.1 Loop 1: Visibility of People

In order to create the virtual bedrock for fostering social interactions, our first guiding constraint was to develop visualizations that catalyze *sociality.* This became a driver for the first design idea which was to make people visible. Without visibility of who is around, it is difficult for social interactions to occur (i.e., out of sight, out of mind). This need emerged as a focus of research and several efforts are underway to develop visual forms to explicitly make people and their activities visible (see [25, 28] as examples in chat spaces and newsgroups). Commercial efforts like Gooey [10] and Odigo [20] have also recognized this need and developed tools to visualize the presence of people.

However, these efforts do not directly consider the importance of our second guiding constraint, *scalability.* This constraint is concerned with having a visual representation that accommodates the size of (e.g., number of Web pages), the traffic at (e.g., number of site visitors), and the number and variety of meaningful activities at a Web site. As well, the visualization needs to scale effectively for different Web sites.

We began by creating a visual spatial representation that represents people within the information space of a Web page. The design displayed information by aggregating co-located people as a crowd rather than representing individual people at the site. The latter approach would display unneeded detail and would be difficult for users to obtain a gestalt for what was happening (see [15] of such an effort). The aggregate approach allows users to make use of the collective information of anonymous gatherings of people and of the salient activities to guide their behaviors, actions, decisions and interactions at the site [26]. This approach of representing salient information rather than all the detail addresses the scalability constraint. Figure 2 illustrates the "heartbeat" representation with flashing dots representing the density and dispersal of people within the site. This representation embeds the awareness information "in situ" with the product category that people are looking at.

We also developed a representation that moved the information outside the Web page (see Figure 4). In comparing the two representations, we decided that the latter representation was a better design choice. There were three design rationale that motivated this choice. First, by placing the information in its own viewer that was separate from the browser, users have more control over whether to see the visualization or not. Second, the separation would minimize the modifications that would need to be made to existing Web pages. Third, the awareness application could have greater consistency in terms of its functionality when separated from the browser.

4.2 Loop 2: Support of e-commerce Tasks

While awareness of the presence of people is an important functionality to help foster social interactions, it is not sufficient for vividly creating a sense of place for an e-commerce site. In particular, online spaces are very subjective spaces; where there are very few shared cognition or mental model among users. Harrison and Dourish point out that place emerges from a space when actions, appropriate behaviors and interactions unfold in a space and develop shared meaning for its participants [11]. We needed to understand and to relate the purpose and activities of site visitors with the products and services offered by the site. Visibility of people and their activities should be tied to the purpose and actions in order to provide useful information and enable meaningful behaviors, actions, and interactions. This helps provide meaning to a space and thus allows a sense of place to emerge through people's awareness and interactions with other people framed by the social cues within the site's context.

This issue led to our third guiding constraint, *spatiality,* which is to frame the awareness information within a space that reinforces a purposeful context. *Spatiality* is a notion drawn from CSCW analyses of space and actions which suggest that a space provides a set-

Figure 2: Heartbeat representation shows dispersal of people within product categories at a Web site as flashing dots.

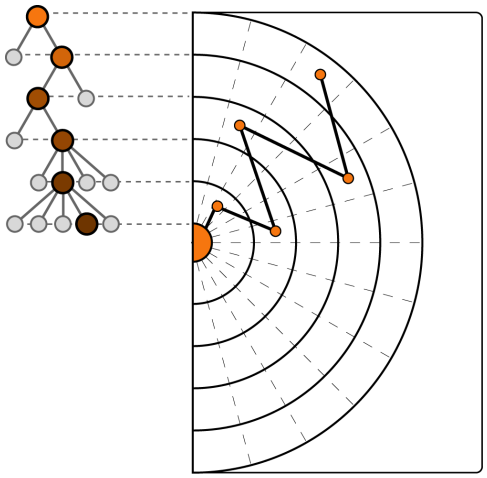

Figure 3: Shopping process for hierarchically traversing an electronic products catalog.

ting where actions unfold. More importantly, space acts as guides and constraints for collaborative activities [11].

We gained practical insights into this issue through observations of both real and virtual stores. We studied online retail stores in which shoppers need to interact directly or indirectly with other individuals to help them make decisions about their purchases (e.g., asking a sales person about an item). In brick-and-mortar stores, people typically engage in the shopping process within a store's space and their activities bring about changes in the store's landscape. For instance, if one stands in the lobby of a department store, one knows where one is located and where one's activities can be guided by where people are gathered, by other people's movement, and the kinds of merchandise being showcased. We are able to orient ourselves and navigate within the physical space, using it as a point of reference [21, 26]. On the Web, each page is a discrete space and lacks the continuity that a physical space has to help us formulate a coherent perception of the space. To achieve this coherence, we realized that the shopping process had to be weaved into a visual representation of the site so that the spatial characteristics of the Web site could be envisioned by visitors and allow the

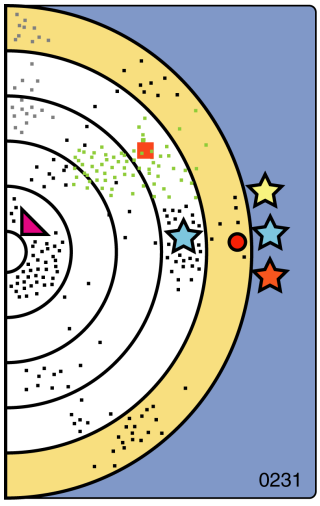

Figure 4: Preliminary design of the site map.

space to guide their actions. However, the spatial representation for the virtual world need not replicate the physical spatial metaphor; an abstract spatial metaphor based on the online browsing behavior of a store's electronic catalog is what should be developed to exploit the features of the online media.

Our prior work with an online bank [27] and our informal studies of electronic marketplaces such as Amazon and eBay informed the development of this abstract spatial representation. We found that the focus of people's attention centered around the e-commerce task and the elements of the electronic catalog (i.e., products and services). The task and the catalog provided the shared context for the interaction. Therefore, it would be useful for people to be aware of others looking at similar information at the Web site so as to facilitate interactions.

We also analyzed how shoppers navigate a site's catalog. The behaviors revealed a hierarchical traversal of the electronic catalog, culminating eventually at the target item. Since hierarchical traversal is not the most intuitive mental model in relation to our real-world experiences, we explored alternative representations. We settled on the idea of traversing through a series of rings beginning from an outside ring. This traversal is similar to the way people move through a physical store and converging ultimately to a place where their desired merchandise is located (see Figure 3).

4.3 Loop 3: Visualizing an Electronic Catalog

A deeper analysis of the structure of electronic catalogs revealed three levels of organization. The first level consists of broad product categories. It is similar to being at the crossroads to all the sections in a store. The second level consists of collections of related products. This is similar to being on a particular floor or section of a store. The third level consists of the individual product pages that a user can view. This is similar to being in front of a specific merchandise within the store. The refinement of the electronic catalog organization into these three levels helped simplify the number of rings that we had initially formulated in the preliminary design (see Figure 4). As a result, the visual representation standardized on three rings but the rings do not have to have proportional radii (see Figure 5).

Next, we decided to incorporate the presence of people in the ring representation. Drawing on the idea examined earlier, presence of people at the Web site, we placed information about crowds into the appropriate ring level corresponding to where they were located. This information appears as a backdrop in the representation and helps people make navigation-related decisions [26]. Users can meet other people who are in their vicinity. They may chose to move to or away from the crowd. Consequently, the resulting representation not only allows people to be aware of others' presence but it permits this information to guide their activities and possible follow-on interactions.

4.4 Loop 4: Visual Representation as a Map

While incorporating ideas identified in the previous loops, we began to think of the visual representation as a map. There were several benefits with using the map metaphor as a suitable match with people's mental models. First, the map accommodates the requirement that visual elements can be distinguished authentically for a business. Unlike the physical world, the meaning of a space at

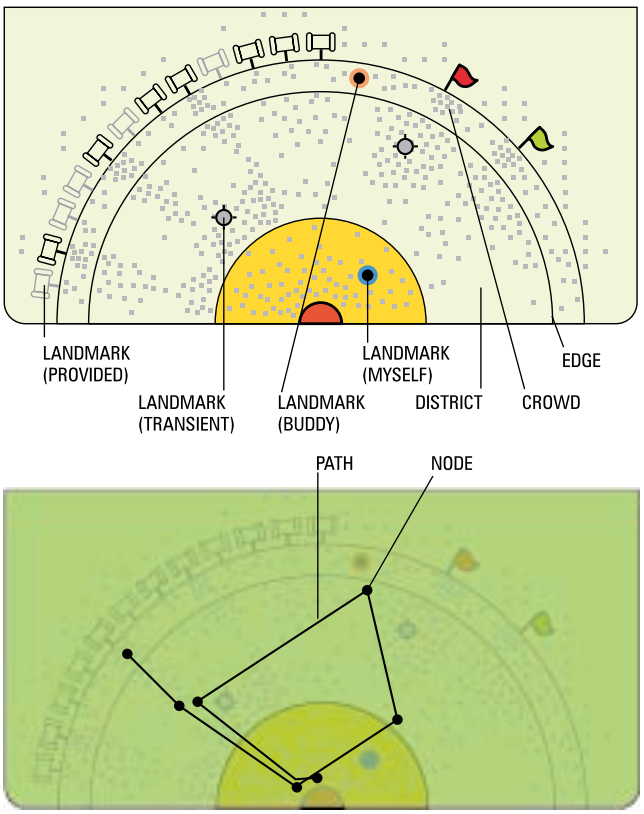

Figure 5: Basic site map and its constituents.

existing Web sites is far from having an identifiable structure, let alone a consistent one. A map provides such an identifiable structure and allows a business to create and express an unique identity which distinguishes one business' Web site from another (compare Figure 5 with Figure 6 showing two different e-commerce Web sites). Second, a visual map can enhance the notion of place for businesses by providing consistent metaphors for navigation, interpretation of behaviors, and social interactions at Web sites. It enables people to recognize social patterns at a site and to develop a sense of an integrated space. Third, maps incorporate common social rules that can enrich the cognition of the Web sites. By overlaying information about people, activities, and social interactions, it can facilitate and catalyze interactions among people. Consequently, we adopted the map notion.

As we began to develop the abstract site map, we found Kevin Lynch's notion of *imageability* to be important for weaving the

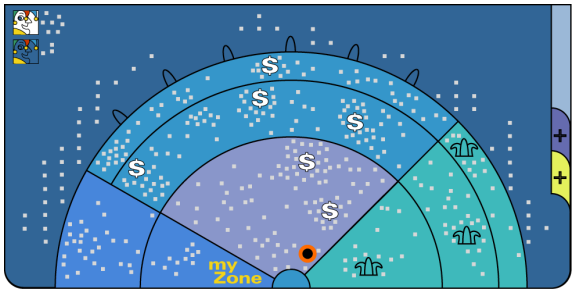

Figure 6: A site map design for another e-commerce Web site and shows its distinctiveness from other Web sites.

various design elements together (e.g., visibility of people, electronic catalog's level of organization, people's shopping and browsing activities). *Imageability* is defined as the quality in a physical object or representation which gives it a high probability of evoking a strong image in any given observer [12]. Shape, color, and/or arrangement are components that facilitate this vivid identification of powerfully structured and highly useful mental images of the environment. While this conclusion was driven by research of real-world cities, his argument is a compelling one to apply towards the design of a visual map of a whole Web site. As with real-world cities, certain components make the city legible, memorable, and distinctive compared to other cities. For example, the Empire State building in Manhattan, the Eiffel Tower in Paris, or the Charles River in Boston are notable elements that people identify with these cities.

In addition to adopting the imageability constraint, we adopted Lynch's building blocks of an environment: landmarks, districts, edges, nodes, and paths [12] (see Figure 5). These building blocks refined our earlier visual elements and enabled us to develop new visual elements. We were able to associate meanings to the visual elements we developed and to structure the visualization of the global site map. As a result, we were able to create a design of an abstract global site map for a real e-commerce Web site (see Figure 5). This design provides a coherence in the visualization of the sites' components.

4.5 Loop 5: Visual Representation of Social Navigation and Chat

At this loop, we started to generate ideas about the possible activities that people would be engaged in while using the map elements. Until this point, we were focused on the static visualization and had not considered what a series of activities and interactions would be like. This fueled our efforts to identify interaction attributes for the map components and how people would use them to navigate the site; both for personal and social purposes [17]. Figure 7 shows an example of an activity that precipitated social navigation (see Figure 8).

In thinking about social navigation and the situations that would lead to them, we started to generate questions about how people would interact with each other. For example, how would reciprocity be visualized with respect to the visibility of people, what are the articulated objects that can be customized by the users, and what are the basic mechanisms for communication among people? These questions led us to think about other forms of social interaction. Figure 9 follows from the earlier social navigation example to show the user discovering that her buddy's iconic representation has changed. Being curious, she rolls her mouse over her buddy's landmark to reveal that she is engaged in a chat with someone else (i.e., indicated by the dashed line connecting the two dots). She also sees that her dot appears here because she is at the same location as her buddy. This example and several others became the basis of a collection of ideas of other forms of social interaction.

4.6 Phase 5: Usage Scenarios & Sketches

To create a coherent design of the interaction environment, we brought the ideas together into a number of scenarios. Snapshots of each visualization would not successfully communicate the overall ideas we had in mind because they did not provide explanations.

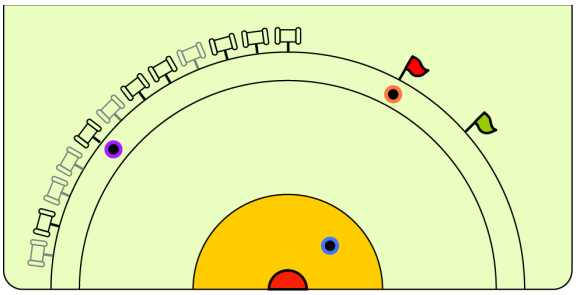

Figure 7: A buddy (red dot) appears in user's map.

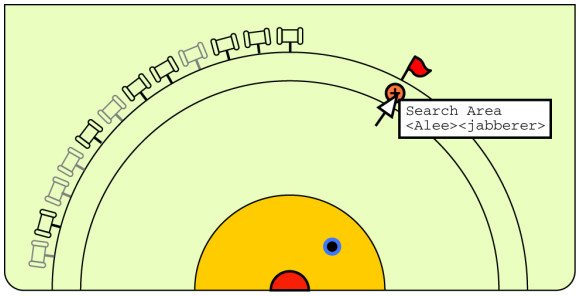

Figure 8: Precipitated by buddy's appearance (red dot), the user decides to move to the location where the buddy is located.

We decided to create mock-up prototypes of a number of coherent scenarios using an e-commerce site as the principal example in the scenarios. The scenarios included:

- The launch of the visual map in relation to the browser when the user arrives at the business' Web site.
- The transformation of the global map as the user navigates through different parts of an e-commerce Web site.
- The changes to the global map elements based on activities of other people at the Web site.
- The support provided by the global map as the user moves about a Web site under various situations.
- Two different kinds of social interactions among people to illustrate the exact actions taken by the users.
- The use of each map components during navigation.

4.7 Phase 6: User Feedback

We conducted individual sessions with ten different colleagues to obtain their comments and feedback. Our colleagues were valid users because increasingly, we all are becoming users of e-commerce applications. Therefore, we are all potential users of electronic marketplaces and we are potential participants in online social interactions in electronic marketplaces. The ten colleagues were a mix of researchers, developers, designers and managers. All had transacted with at least one e-commerce site prior to our sessions with them.

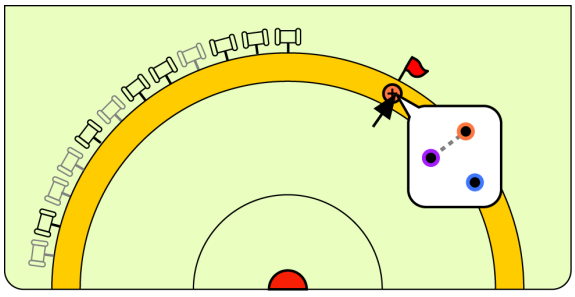

Figure 9: Having navigated to where the user's buddy is located, she can mouse over the landmark and see herself in the same space as well as seeing her buddy chatting with someone else.

Their comments and feedback were used to refine our design, to highlight open issues with our solution, and to provide material for additional scenarios. In fact, we developed sketches of some of these during this phase. These additional sketches were shown to people who came later in the feedback sessions. They consisted of one or two interconnected images that showed the essence of the idea. Compared to the mock-up prototypes, the scenarios were less developed but still relatively effective as communication vehicles.

One particularly controversial feedback from these sessions had to do with ring traversal. We had opted earlier for the outside-in design because it carried over well from the physical world where one moves into a store as they shop and not inside-out. However, during our feedback sessions, several people commented that the inside-out metaphor was more natural. As a result, we are rethinking that our analogy of navigation in a physical store may be too literal to apply to the online world. We also feel that further user testing and real observation of use will be needed to resolve this issue of whether one or the other or both representation would be appropriate.

We continue to show the mock-up prototypes to others. As with the participants in the formal part of this phase, the feedback has been positive. In fact, people continue to offer suggestions and ideas, and others have engaged us in a critique of the design solution. Thus, before even moving to a stage where a running prototype could be placed in the hands of potential users, the mock-up prototype has engendered good discussions.

5. CONCLUSION

Our design of a social interaction environment for electronic marketplaces focussed on two needs. The first is a visual representation based on an abstract, spatially-organized, site map that displays information about people, activities and social interaction occurring at a Web site. The second supports mechanisms for facilitating social interactions like social navigation and chat.

Our design has been guided by four constraints abstracted from prior findings on media spaces and online communities. They include sociality, scalability, spatiality, and imageability. The *sociality* constraint focuses on encoding social information, activities, and interactions which can foster interactions among participants and lead potentially to the formation of social groups. The *scalability* constraint is concerned with the development of a visual representation that can support the size of, the traffic at, and the size and variety of activities occurring at different Web sites. This constraint led us to represent the salient information rather than all the detail. The *spatiality* constraint makes explicit use of a spatial metaphor to frame the information and activities that reinforces a purposeful context. Finally, the *imageability* constraint is concerned with developing a representation that facilitates a vivid identification of powerfully structured and highly useful mental

images of the social interaction environment (i.e., parseable landscape).

We used an iterative design process that was guided by problem statement, design needs, and design constraints. It used HCI techniques to analyze and study the design problem, to enumerate, explore, and reconcile a design space and to evaluate a design solution. It is appropriate to characterize our process as having a strong iterative problem-solving element due to the complex and organic nature of the interaction design problem. We developed our ideas of the social interaction environment through extensive use of scenarios and mock-up prototypes. Aside from being effective tools for thinking about the issues and sounding out our solution, we found these tools to be effective vehicles for communicating our design, simulating possible interactions, and obtaining user feedback.

We continue to receive ideas for enhancing our design and to pursue new issues to address. A working prototype of the conceptual design is being developed. We plan to also test some of the issues raised during the design and during the user feedback sessions (e.g., intuitive cognitive match of the site map in relation to the navigation on the Web site).

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