

Resident Recommendations

Team Linden Lab-Capstone Project

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Executive Summary

We, a team of five Human Computer Interaction masters students at Carnegie Mellon University, applied our combined backgrounds in Computer Science, Design, and Cognitive Science to alleviate the difficulties faced by the Residents of Second Life with the strengths identified in its most experienced users. Our design specifically addresses the concerns of new users by sharing community experiences through an object-centric social network.

We began our research with a literature review to understand the current trends of social networks and virtual worlds. We then analyzed services that are related to Second Life to understand the industry environment. We then applied proven Human Computer Interaction methods to identify the following trends in Second Life:

- New users are initially confused by the Search feature interface
- New users do not comprehend the nature and variety of the content available in Second Life
- New users have trouble finding groups and events
- New users want to meet new people
- Experienced Residents distrust the Search feature
- Experienced Residents rely on group notices and word of mouth to find new places and events
- Experienced Residents miss being able to leave feedback about their Second Lives
- Experienced users are willing to embrace change if it benefits them

Second Life currently has a gap between the knowledge and practices of its experienced users and those whom are just beginning. The same reasons for which experienced users distrust the Search feature cause new users confusion and sometimes disappointment. This solution considers the positive practices of experienced users and makes their benefits available to the entire Second Life community by focusing on:

- matching the content in Second Life to the individual's preferences
- valuing the individual's opinion
- allowing Residents to express themselves through personalization
- utilizing the combined knowledge of the community
- ensuring the sincerity of the system at every opportunity

Resident Recommendations provides listings tailored to the individual by taking into account his or her interests, the opinion of friends and group members, and the opinion of the community as a whole. This system accepts user feedback and utilizes that feedback to aid Residents in navigating the vast content of the virtual environment. The integrity of the system rests with its users, encouraging community policing of the presented content.

In the following pages, we will describe our approach, summarize our perceived problem space, illustrate our design, and layout our rationale based in user testing. We close with future design directions.

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1. Introduction

1.1 Introduction

We were presented with the challenge of both improving the new user experience in Second Life and increasing social networking within this virtual world. Our project provides the unique opportunity to apply Human Computer Interaction (HCI) methods to a large and dynamic society and the world they have created. Second Life is, at its core, entertainment software and therefore it is not a matter of keystrokes between the users and their goals, but an analysis of regular behavior, the desires of Residents and the obstacles standing between them and their desires. The measure of success is not efficiency but happiness. We strive to bring the practices of successful Residents to those who struggle within the virtual environment. By complimenting orientation, inspiring exploration, fostering trust, and supporting community connections, we aim to enrich the Second Life experience for all its Residents. This document will cover our methods, the problem space, and our design. We will address the design of each feature and the logic behind them, highlighting their testing and the response. We close with future design directions and the rationale behind them.

1.2 Methods

1.2.1 Exploratory Phase

During the first four months of this project, we employed various HCI methods to explore the current user experience of Second Life. We began our research with an initial briefing from our contacts at Linden Lab. During the meeting, our group and our clients collaborated to create an affinity diagram, highlighting areas of shared interest. We read numerous articles covering social networking practices, virtual worlds, and computer mediated communication. We identified the industry players and employed three methods of industry analysis: SWOT analysis, industry matrix, and industry graph, to ground our perspective in the current condition of the market. After identifying the types of users whom were of interest, we then conducted several Contextual Inquiries, two with social networking experts, four with Second Life experts, and one with a Second Life novice. In addition, we interviewed four former Residents who had left Second Life to find reasons why they left. We also conducted an extensive survey asking about Second Life, other virtual worlds, and social networking experiences where we used data from approximately 270 responders. To compliment our research into Second Life novices, we concluded our exploratory research with three Think Aloud studies on users with no previous experience in Second Life.

1.2.2 Generative Phase

Upon conclusion of our exploratory research, we created another affinity diagram composed of import points within our research and organized into themes. We illustrated these conclusions and used them validate our perceived needs with users. From these themes, we brainstormed possible solutions to address the issues raised in our affinity diagram. We then storyboarded these concepts and validated them with Residents within Second Life. From this feedback, we distilled the most promising concepts and produced several storyboards illustrating multiple use scenarios. These were submitted for a further round of validation with users in Second Life before proceeding to the wireframing phase. We produced the initial wireframes based on the feedback from our concept validation, refining some features and

eliminating others. We conducted Think Aloud studies on our wireframes, creating four iterations of wireframes before moving to the high fidelity prototype. While implementing our high fidelity prototype, we conducted further Think Aloud studies on screen shots of the design, making several design changes before full implementation. Finally, we tested the interactive prototype with Second Life users.

1.3 Current Practices

Even with its own economy, Second Life is entertainment software and therefore is open-ended for users to create their own experiences. It does not have the structure of MMORPGs, which have missions to fulfill or levels to acquire. Instead of system created content, almost all content is user generated. Second Life's unique approach produces an environment where each Resident of Second Life determines its purpose for themselves.

Every Resident enters Second Life via Orientation Island. Here they learn the basics of Second Life: communication, navigation, interacting with objects, and editing their appearance. Upon completing orientation, they are offered two options: enter the vast environment of Second Life or proceed to Help Island. On Help Island, Residents are given free items as well as the opportunity to learn the basics of building, see featured artwork, and view demo objects such as a home. During these experiences, new users come in contact with many other Residents, either new themselves or mentors supported by Linden Lab. When they are ready to exit, users are presented with the same portal to the rest of the virtual world as on Orientation Island: a billboard that gives the user a random location to which to teleport.

Once within the vast virtual environment, Residents are on their own to determine where to go and what to do. Only a few options exist In-World to begin exploring, the main two being the Search feature or consulting another Resident. New users heavily rely upon the Search feature, whereas experienced Residents prefer to consult their contacts and groups.

After establishing themselves within the community, users go on to pursue diverse interests. All content in Second Life, with the exception of Orientation Island, Help Island and those Islands owned and operated by Linden Lab, are generated and maintained by its users. If something does not exist in Second Life, a user can make it themselves. As a result, just about anything a user could be looking for is available in some form in Second Life.

Friendships are often forged when Residents collaborate together. We have seen examples of friendships made over business projects, building endeavors, and scripting work. Many friendships occur when two Residents share something in common, and this commonality is often discovered when participating in an activity both Residents enjoy.

2. Setting up the Problem Space

Over the course of our research, four themes emerged from the data. In this section, we will review the pressing issues revealed by our research. What follows is a discussion of our themes of Orientation, Exploration, Trust, and Community in detail.

2.1 Orientation

For new users, Second Life is a rich and immersive experience but also a confusing one. Provisions are in place to try to acclimate new users, such as the Orientation and Help Islands, but it is possible for a new Resident to skip part or all of the exercises on these islands. Even if a user completes all of the instruction on both islands, our research showed that they still experience an extended acclimation phase. Many new Residents have difficulty learning how to control their avatar, acquiring marketable skills within Second Life, or simply navigating through the vast virtual environment (Appendix C-D p. 95, E p.159, N-P p. 196).

Expert users of Second Life have produced various groups, lectures, and forums both In-World and outside of Second Life to address just these issues. However, many new users struggle to find groups that interest them and very few spend time attending events (Appendix C-D p. 95, E p.159). Every expert we observed during our Contextual Inquiries was eager to give back to the community and always paused what they were doing to help a new Resident when asked (Appendix I-L, p. 176). New users often miss this support because they have issues speaking to strangers (Appendix C-D p. 95), as discussed in section 2.3.

2.2 Exploration

New Residents actively seek out places to explore within Second Life. To accomplish this, the majority turns to the Search feature (Appendix C-D p. 95). Yet many are confused by the Search interface, as revealed in our Think Alouds, interviews, and Concept Validations. During their first encounter, new users are unsure what the tabs mean and receive no explanation when they investigate because the tabs are initially blank (Appendix N-P p. 196). The mixed results, consisting of places, events, groups, people, and classifieds are confusing to new users (Appendix N-P p. 196). In addition, many have no idea what to search for, failing to make any connection between their real life interests and the activities available in Second Life (Appendix N-P p. 196, U p. 266).

The connection between real life and Second Life is embraced, at some level, in expert users. While they may not reveal their real life information, such as their names or email addresses, seasoned Residents do pursue their real life interests, such as music and programming (Appendix C-D p. 95). Yet even experts dislike the Search feature, albeit for different reasons. They feel that the Search feature is unreliable, due to the weighting of traffic and its paired corruption by campers as well as a feeling that Search is a poor tool for navigating the greatly multiplied content now available in Second Life (Appendix C-D p. 95, E p. 157). Our survey, interviews, and Contextual Inquiries showed that experts rely heavily on groups and word-of-mouth to find new events and locations (Appendix E p. 157).

2.3 Trust

Seventy percent of new users come into Second Life without knowing a single fellow Resident (Appendix C-D p. 95). They often are distrustful of other avatars, and experience a condition we refer to as 'Stranger Danger' (Appendix I p. 176, C-D p. 95, E p.157, U p. 266). Users and especially new users are more likely to trust other Residents if they share mutual friends (Appendix E p. 157), but Second Life does not have a publicly displayed friends list to support this independent check. Residents also base their estimation of trust on subtle cues such as demeanor. The current profile has an About section, which gives the Resident's joining date, their group memberships, with other sections for selected favorite locations other information, such as a website, but it does not provide any information about a user's interests aside from what can be selected from predetermined check boxes.

Expert users expressed that when a more experienced user helped them in some way this interaction not only deepened their trust in that Resident but increased their enjoyment of Second Life and a new user, who did not receive such help, stated that it would have enhanced his or her experience (Appendix E p.157). However, sometimes when a new user is willing to ask for help from strangers, they are put off of doing so again because the Residents do not respond (Appendix N-P p. 195).

2.4 Community

Hanging out with friends is the most popular activity in Second Life (Appendix C-D p. 95). One of the main reasons new users log onto Second Life is to make new friends (Appendix C-D p. 95). When expert Residents are looking for new locations and events, they rely on word-of-mouth (Appendix C-D p. 95, E p. 157, I-L p.175). One of the main ways Residents build trust with other Residents is through collaboration (Appendix ## interview). Yet as important as community is to the Second Life experience, many users leave because they do not make friends and therefore do not form any social ties. Although new users list meeting new people as a top priority, they spend very little time actually trying to do so (Appendix C-D p. 95). Without directly speaking to the Residents around you, a problem for many new users as mentioned in the previous section, it is almost impossible to determine if you share any interests with that Resident.

This in no way means that Residents are unwilling to share, quite the opposite. The problem lies in that users are not sure whom to ask. While the Resident next to a user may be quite willing to share his favorite locations, he could be into heavy metal while the user may be looking for harp music in a garden. The current tools available to the user do not help Residents to share information, resulting in many missed connections.

2.5 Summary

Exploration is a key element of the Second Life experience. Residents explore by either using the Search feature, getting group notices, or asking other Residents. Each of these methods has its difficulties. The search feature is problematic for both new users and expert users, one having difficulty understanding the interface and the results, the other feeling that the content is too vast to navigate easily. New users often do not join groups and many new users have difficulty talking to strangers. There are many opportunities for new users to find closer ties to the Second Life community, however the current tools in place do not facilitate this, resulting in missed connections and frustrating experiences.

In order to aid users in their wanderings through Second Life, a system needs to be in place that collects all of the available information in one location. Such a system should be easy to use and incorporate important markers of Resident feedback. This system should also increase a user's community connection to aid in orientation, exploration, and trust as well as giving them a more tangible reason to remain in Second Life.

3. Resident Recommendations

Resident Recommendations is the culmination of months of research and validation. Resident Recommendations is an augmentation of the current Second Life interface that fosters in novice users the positive practices of current experts. Resident Recommendations generates three types of listings: places, events, and groups. These listings are generated by matching personal interests to listing categories, employing community generated ratings, and taking into special account friends' and group members' ratings. Resident Recommendations allows the user to then share this knowledge with the community.

Recommend has five main components:

- Recommendations
- Resident Feedback
- Tagging
- Community Connection
- System Integrity

3.1 Recommendations

Our research revealed a severe lack of informed direction in new users and a distrust of the Search feature in expert users. Our Think Aloud studies showed that most of our new users had a poor grasp of the possible activities available within Second Life, with only one making the connection between his or her real life and what to search for in Second Life (Appendix N-P p. 196). In addition, our survey and interviews showed that expert users no longer trusted the Search feature to bring up results of interest, instead relying more heavily on groups and word of mouth (Appendix C-D p. 95, E p.157).

Through Concept Validation, conducted by sharing storyboards with users (Appendix U p. 266), we found that Residents were most excited about a better way to search in Second Life. We found that Residents enjoyed the idea of being shown listings generated by their interests, as oppose to search results generated mainly by traffic.

The Recommendation window generates recommendations, aka listings, more closely attuned to each individual Resident's tastes by taking into account a user's interests, ratings, and community connections. Each listing, previewed as cards on the List View, has an associated Details page, allowing the user to investigate further before deciding to take action on the listing, such as teleporting to the location.

3.1.1 Recommendations



Figure 1 Recommendations Button in Context

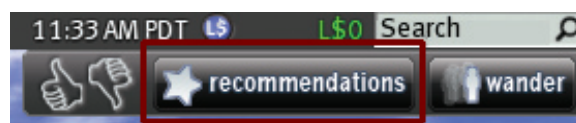


Figure 2 Recommendations Button

Goal: The Recommendations feature is designed to:

- aid a user in locating new and interesting activities in Second Life.
- orient the new user in the range of possibilities manifested in this virtual world.
- help experienced users locate new listings they may not have found otherwise.

Design & Rationale: Recommendations is a social bookmarking system where people can share their ratings of listings and a collection of places that they have liked with the community. We are suggesting

this information be gathered from the user's friends, groups and their general interest, and the whole population's favorites, and then place it in a personalized recommendation. These points of information gathering will be made clear to users, through the Why is This Recommended feature discussed in section 3.5.3 (p. 48) as well as when the system is introduced to the user after Help or Orientation Islands, so they know at what points their input is used to "teach" the system. This principle supports our findings that Residents strongly protect their privacy on Second Life, so information should not be gathered from them unknowingly. Listing generation is modeled after our observation that experts rely more heavily on their groups and word-of-mouth recommendations than any other source (Appendix C-D p. 95, E p.157). We want to share these practices with new users who show great difficulty in not only finding an activity but also determining what activities may be available (Appendix C-D p. 95, E p.157, U p. 266, N-P p. 195). Recommendations will never duplicate previously landmarked places or places rated negatively. In addition, the Recommendations feature will only repeat a listing after a lengthy amount of time has passed.

Tradeoffs: The Recommend feature does not have a directed search. We intend for this system to be used in exploration, not a tool to locate specific information. Even so, to help users explore within a specific arena, we have provided two features, discussed in sections 3.1.4 (p. 15) and 3.1.5 (p. 16), to direct the types of listings recommended: Show More Like This and Options. A participant of one of our early Think Alouds mention that the economic model of Second Life may not support what we are designing because many advertisements are paid "but I think your way is better and really hope they (Linden Lab) do it!" Since brand new events will not have a rating associated with their listings, we suggest charging the producers of these events a placement fee to help compensate for lost revenue. However, it is important that the proposed Categories for these events match the user's Interests.

3.1.2 List View



Figure 3 List View

Goal: To allow the user to view a number of listings at a time. This view fosters a user's perception of choice while maintaining a feeling of spontaneous listing generation.

Design & Rationale: The List View gives users the ability to quickly browse recommendations with important details such as the picture, the title, the listing type, and the overall rating along with the ability to take the action appropriate to the listing type. During our peer critiques, reviewers felt restrained when shown one listing at a time and requested a list view. When a new listing is generated, it 'poofs' onto the right-hand side of the window with animation techniques to give the user the idea of spontaneous generation. This animation helps combat the notion that this list is static and predetermined, another misconception repeatedly expressed in our class critiques and in our Think Alouds (Appendix W p. 300). All listings generated during that login session are easily reviewable and stored in the order in which they first appeared. We found from our Concept Validation that users enjoyed the saved searches from other systems, and commented that they would like a version in our design (Appendix U p. 266). A participant of our early Think Alouds asked that we make more apparent that there are more results available (Appendix W p. 300).

Tradeoffs: In order to show multiple listings at a time, numerous aspects of the listings had to be eliminated from this view, for example the written description and any comments about the listing, as well as some possible actions such as landmarking a place or reporting the listing as miscategorized. However, users can access a full detailed view by clicking the Details button at the center of their navigation. Although this does require an extra click, the list view allows users to feel more in control, an assertion supported by our peers and Resident reviewers.

3.1.3 Details View

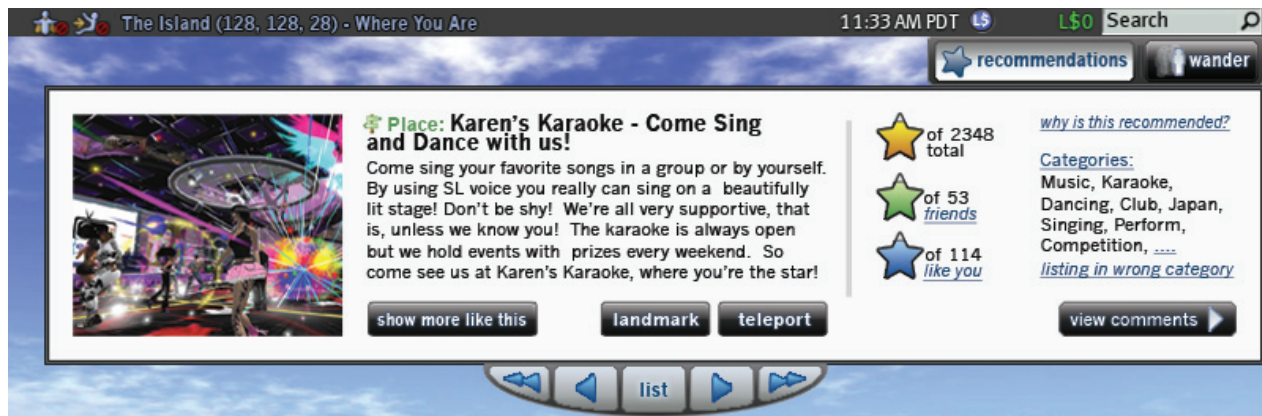


Figure 4 Details View of a Place Listing

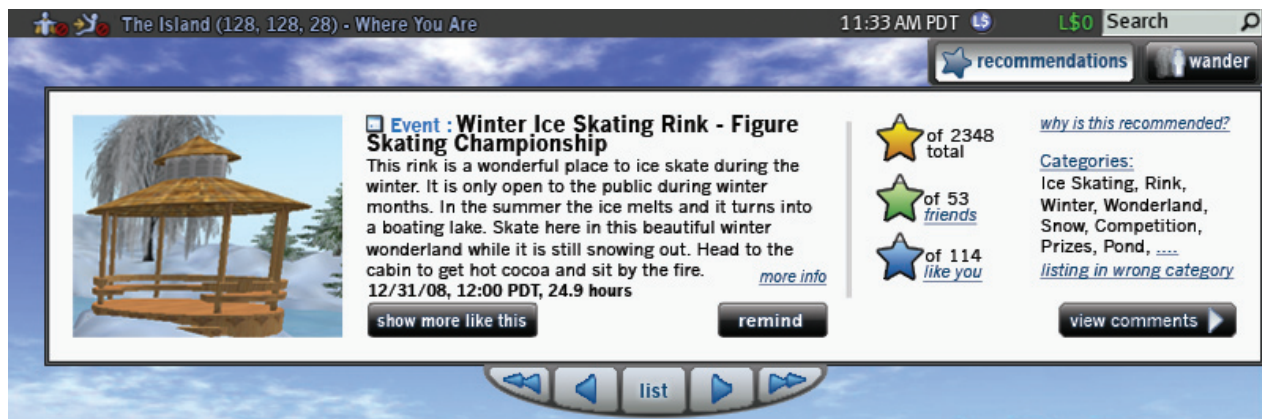


Figure 5 Details View of an Event Listing

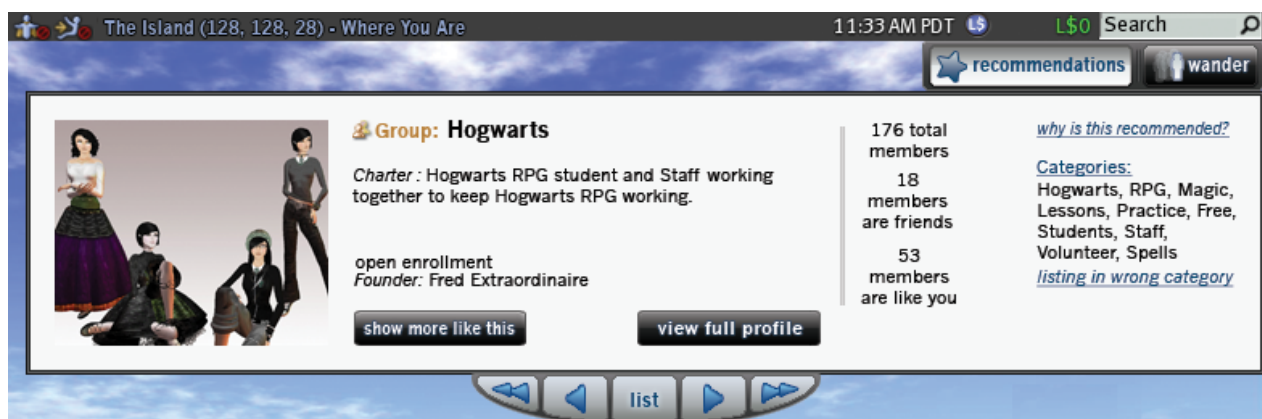


Figure 6 Details View of a Group Listing

Goal: To give users multiple points of reference with which to make their decision about a listing.

Design & Rationale: The Details view provides both static and dynamic information about a recommendation. This feature provides the user with a picture, title, listing type, written description, listing categories, and three types of ratings: the overall rating, the user's friends' rating, and the rating of people with similar interest to the user. In addition, this feature serves as a consistent home for all of the actions available to a user for a particular listing. We found that users' preferred points of reference vary, with instances of preference for each available feature (Appendix U p. 266).

Tradeoffs: While we gain the benefit of a simplified list view by having the details a click away, the user does have to perform an extra click to see this view. However, if the user prefers this view, he or she may navigate the listings using the navigation bar while remaining in the Details view. The features from the List View, as well as those omitted, are presented in this view, putting the design in jeopardy of being cluttered. The Details View has undergone several iterations on the layout as a result, with this arrangement receiving the most positive feedback, as shown through the progression of our Think Alouds (Appendix W p. 300, Z p. 327).

3.1.4 Show More Like This

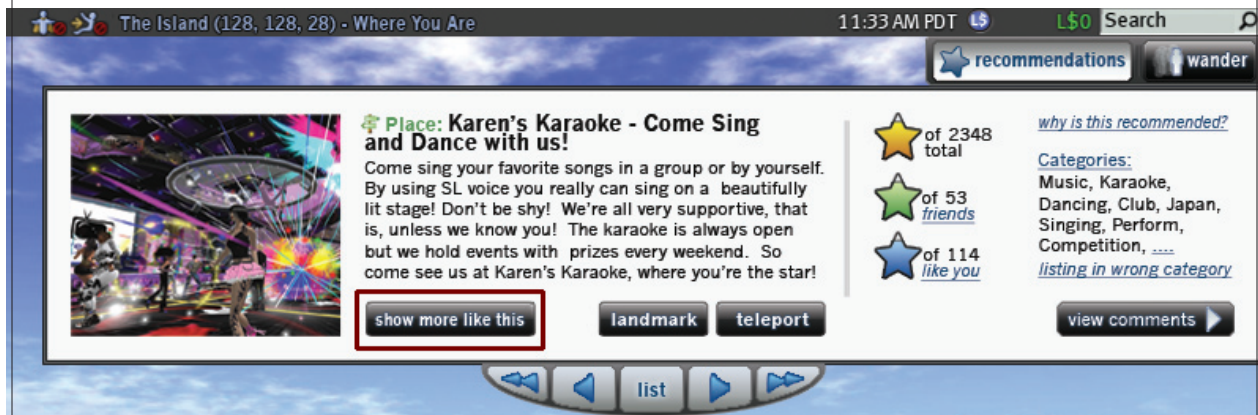


Figure 7 Show More Like This Button

Goal: This feature has two purposes: to help train the system to be more tailored to the user's interests and to allow users to immediately find more listings of a certain type.

Design & Rationale: This button takes the user to the List View and presents two new listings that share similar categories to the original listing. This feature was first represented by a check box with the sole purpose of training the system for more accurate results. During testing, many users expected that this feature would pull up similar listings to the current one being viewed (Appendix W p. 300, Z p. 327). We found that our team's and our users' expectations were not mutually exclusive, and both functionalities were incorporated into the feature.

Tradeoffs: The user is taken outside of the Details View back to the List View, but the user can easily toggle back to the Details view with one click. In addition, the number of similar listings that can be generated at one time is limited by the size of the Recommendations window.

3.1.5 Options



Figure 8 Options Button

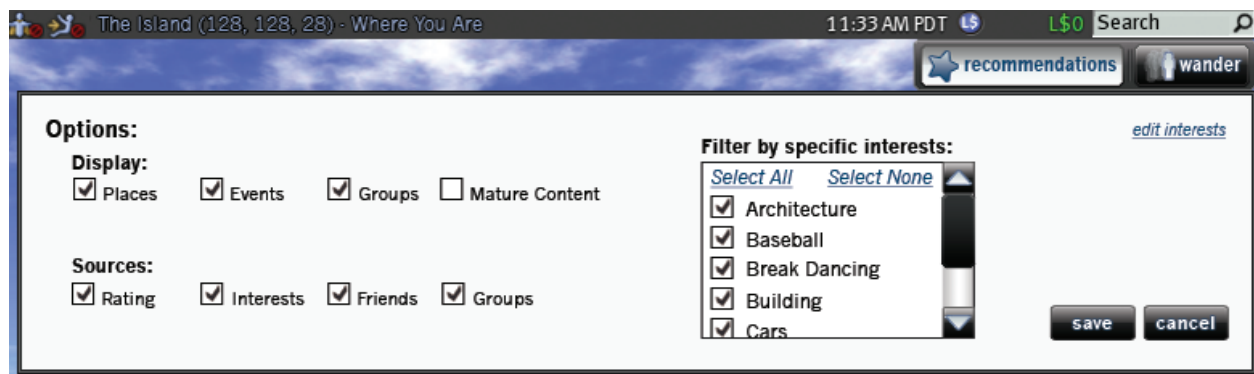


Figure 9 Options Window

Goal: To allow for more fine-tuned control over the generated listings.

Design & Rationale: Designed with the expert user in mind, Options allows a Resident to edit the filters used to generate listings. The user may edit what type of listings are displayed by any combination of places, events, or groups as well as toggle on or off mature content. They may include or eliminate any combination of the four possible sources for the listing: rating, interests, friends' picks lists, or groups' picks list. Finally they can filter the results by specific interests from their Interest list, reproduced here from their profiles. During our Concept Validation and current system Think Alouds, users often searched by type, preferring to have only one kind of listing displayed (Appendix N-P p. 196, U p. 266). During an early Think Aloud, two participants requested to be able to filter out the results within recommended section by place, event, or groups (Appendix W p. 300).

Tradeoffs: The Options feature presents the user with a multitude of items to check in many possible variations, which could be overwhelming to some users. However, this feature was designed for experts, who should be familiar with advanced searches. In addition, we help users gain an idea of what to do in

this window by making the reasons an individual listing was recommended available in the Why is This Recommended feature, discussed later in this document in section 3.5.3 (p. 49).

3.1.6 Remind



Figure 10 Remind Button and Confirmation

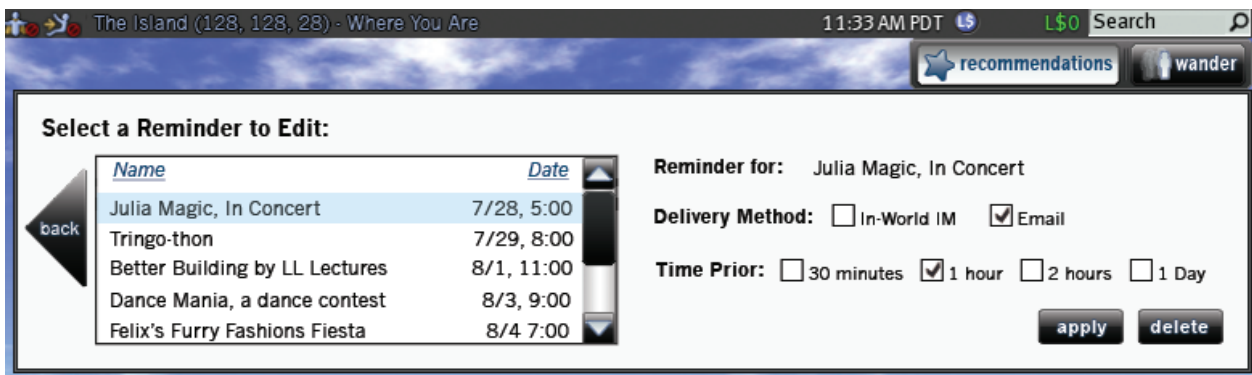


Figure 11 Reminder Edit Screen

Goal: To modify and extend the existing Notify feature so that users have more control over event notifications.

Design & Rationale: The Remind feature is first shown to the user when is viewing an event that has not yet begun, in place of the Teleport button. The first time Remind is clicked, the user is shown the Reminder Edit screen, which displays which event the reminder is for and then asks the user to select their preferred delivery method of either In-World IM, email, or both. Next the user selects the time or times prior to the event when the notification should be sent. Once the user has set these options, pressing Remind applies them to each event. These options can be edited by clicking the edit link that appears when the Remind button is clicked. By selecting multiple items from the list in the Remind Options pane, settings can be applied to several events at once. This view also allows for reminders to be deleted. From our spring survey, one responder wrote that he or she “would love an ability to group events that are posted by search” in an easily accessible way (Appendix C-D p. 95). The Remind feature received positive feedback during our Concept Validation and Think Alouds, with specific requests for this feature not to be removed (Appendix U p.270, W p. 300).

Tradeoffs: We have changed the wording from Notify to Remind, as we feel this better expresses our redesign of the features functionality. While this made lead to some confusion, from our positive feedback from our Concept Validations and Think Alouds, we predict the effects will be minimal. Also, the functionality provided by the Remind Options is limited and does not support publicly announcing attendance of the event or sending invitations. These concerns are addressed in the Future Directions section of this paper, specifically Datebook on page 5.3.2 (p. 78).

3.1.7 More Info

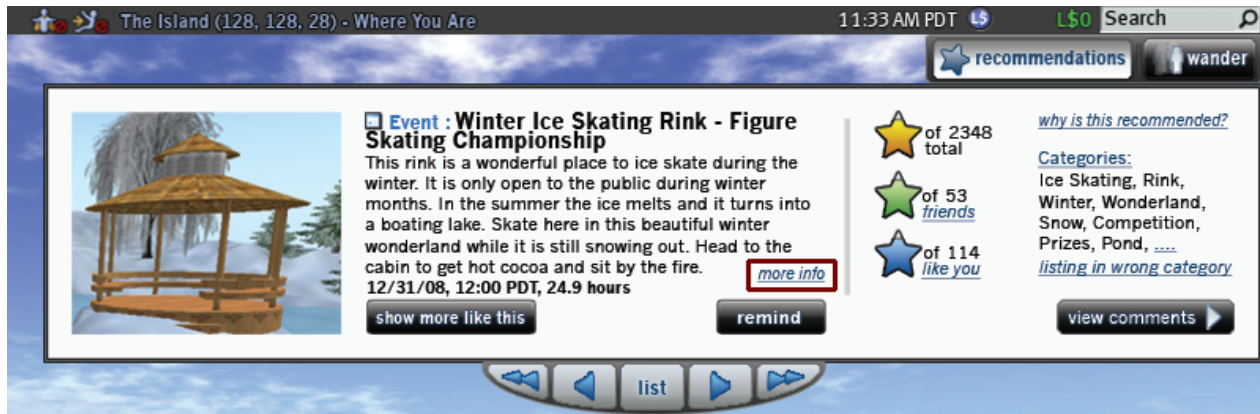


Figure 12 More Info Link

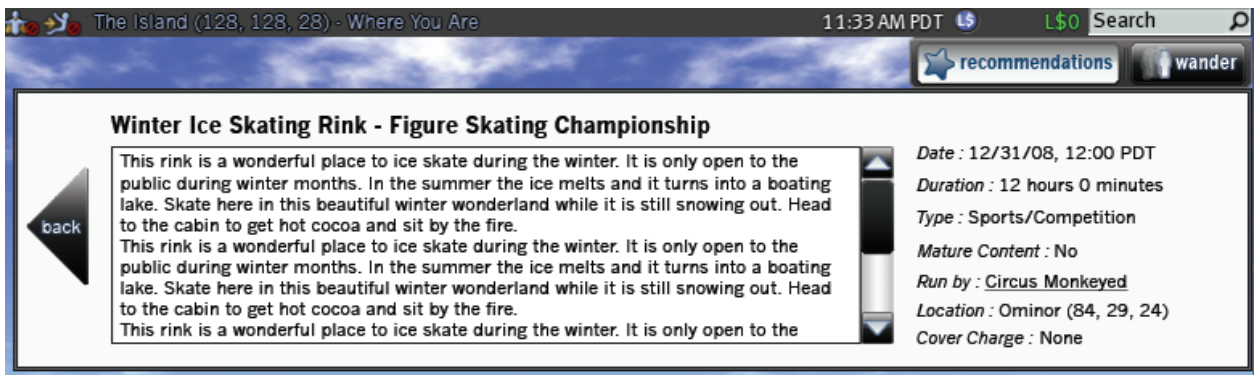


Figure 13 More Info Pop Out

Goal: To give the all the information available in a Search feature event listing without crowding the Details View.

Design & Rationale: More Info appears on the Details View of an event just after the description. More Info repeats the date, time and duration and informs users of the events' type, whether it has mature content, who is running the event, it's location and whether a cover charge is required, information currently in event search listings. This view allows the user to see the entire description of an event, which often has several paragraphs, usually in the format of one paragraph per performer.

Tradeoffs: The user will have to have clicked a minimum of two times to see this information.

3.1.8 Wander

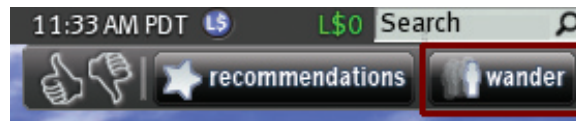


Figure 14 Wander Button

Goal: To aid in spontaneous exploration of the virtual environment.

Design & Rationale: The Wander button lives on the main tool bar and is available at any point in the user experience. Once clicked, the user is teleported to a place or ongoing event that has not yet been seen by the user in the Recommendation feature, but would be in the generation pool. Experienced users talked about how they like teleporting into a random place, often by using the map feature, to see something new, fulfilling their need to experience totally random places for the fun of it (Appendix T p. 258, U p. 266).

Tradeoffs: Users will be unaware of where they will end up. While this is part of the fun and the location is placed in small type at the top of the current interface, informing the users of their destination in the current Teleport Loading screen may be advisable. Due to the long amount of time it takes a new location to render, or, in Second Life terminology, rez, the user may have to wait some time before being able to see the world around them. While this a problem for all teleportations, we developed a wireframe concept that would more completely resolve this issue, which we named Regional Information. A discussion of Regional Information can be found in section 5.3.1 (p. 69).

3.2 Resident Feedback

User participation is the anchor of Resident Recommendations. Our research showed that older Residents missed the old Reputation system, used to evaluate other Residents, like the one used to evaluate sellers on Ebay (Appendix E p.157). Picks lists are already popular to share in a user's profile, second only to group memberships (Appendix C-D p. 95). Picks in the current profile only shows locations that a user went out of their way to add to the page, and there is no way to get an aggregate across all Residents. In addition, negative feedback is not recorded anywhere In-World, denying cautious users of a way to avoid undesirable situations. Several responders asked for the ability to leave feedback in the form of comments and ratings with one user requesting, "A list of recommended/favorite landmarks, outside of picks. Ratings for favorite locations/picks, along with comments about them." (Appendix D p.127)

In our Concept Validation, users responded enthusiastically to a remaking of the reputation system. They enjoyed the idea of being able to leave direct feedback, in the form of comments and being able to review the feedback of other Residents (Appendix U p. 266, W p.300). Ratings were equally well received, though mixed with words of caution from our Focus Group and Concept Validations (Appendix U p. 266, Y p. 315). During our class critiques, we were shown how important presenting various types of ratings can be, with Netflix's 'people like you' rating particularly highlighted.

Residents' feedback will be incorporated in the listing generation algorithm as well as being publicly displayed in various ways to create multiple touchpoints to aid the user in making an informed decision about a listing. Users can also keep track of their positive ratings through their profile.

3.2.1 Thumbs Up and Thumbs Down

Feature: Rating a Place

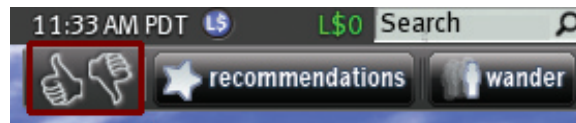


Figure 15 Thumbs Up and Thumbs Down (Place)

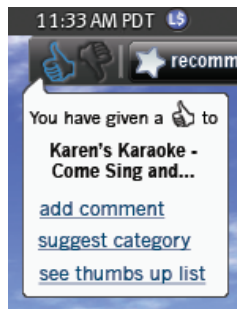


Figure 16 Thumb Up Menu (Place)

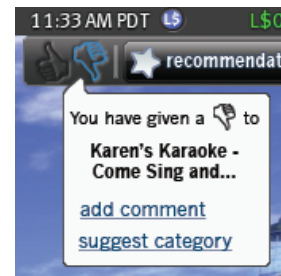


Figure 17 Thumbs Down Menu (Place)

Goal: To give a more trustworthy representation of the desirability of a place grounded in the shared community's experience.

Design & Rationale: The user's experience with the rating system begins with the ability to give a 'Thumbs Up' or 'Thumbs Down' to a place or event. The rating for a place is available at all times except when the Recommend window is open, to avoid the confusion of users trying to rate a listing (Appendix Z p. 330), whereas the event rating only appears when a user is currently at an event. After rating, a user is presented with a window containing links to add a comment, suggest a category, and in the case of a positive rating, see thumbs up list.

The rating is used in three ways:

- In the calculation of approval ratings for both the Total Rating, the Friends Rating, and the Like You Rating
- Gathering information about a user's preferences to be used to suggest Interests and inform his or her Recommendations
- Thumbed-up locations and recurring events are placed in the Picks List in the user's profile for sharing and future access

Users expressed distrust of traffic as a major weight to search results, in no small part due to its corruptibility by campers - Residents paid to hang out at a location (Appendix T p.262).

Tradeoffs: A major concern is corruption of the rating system by gaming. Since ratings can and will effect the monetary gain of the owners of and vendors at a listing, Residents will be motivated to try and tilt the odds in their favor. To help combat this type of behavior, we propose that all ratings are tallied only once,

at a random time, in a twenty-four hour period, to make it more difficult to tell who rated what and in what manner. In addition, no names will be attached to the total rating, and you must have someone in your contact list to see their rating or have so closely shared interests as to be grouped in the Like You List. While all positively rated listings go into a user's Picks, they default to private, making it more difficult to determine if someone paid to rate a place positively actually did so. However, these provisions will not eliminate all gaming, which is why we will provide multiple types of ratings to help the user make their decision.

Feature: Rating an Event



Figure 18 Thumbs Up and Thumbs Down (Event)

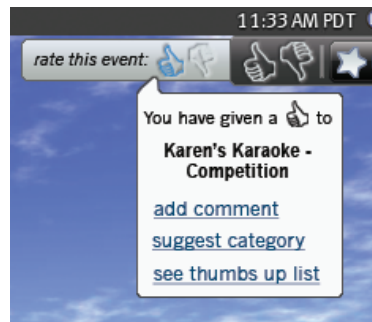


Figure 19 Thumb Up Menu (Event)

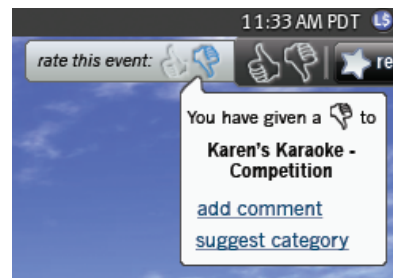


Figure 20 Thumbs Down Menu (Event)

Goal: To give a more trustworthy representation of the desirability of an event grounded in the shared community's experience.

Design & Rationale: Similar to rating a place in the feature above, rating an event had to have its own set of thumbs because even while a Resident is at an event, the user is also at a place. Owners determine the vicinity of the event when submitting it to the Recommendations system. When Residents walk or teleport into the vicinity, the event subbar appears, allowing them to rate the event. We tried several variations to represent these dual rating options, including adding a drop down menu to select either place or event, but found only this design maintained the correct mental model of the rating behavior. During our peer critiques, after the drop down menu appeared at an event then disappeared upon exiting, many people questioned whether they were now rating an event or a place, even though they were not at an event.

Tradeoffs: Having two sets of rating thumbs when at an event is initially confusing for users. However, as mentioned above, other methods of representation clouded a user's understanding of the function of the main set of rating thumbs.

3.2.2 Comments



Figure 21 Comments Window

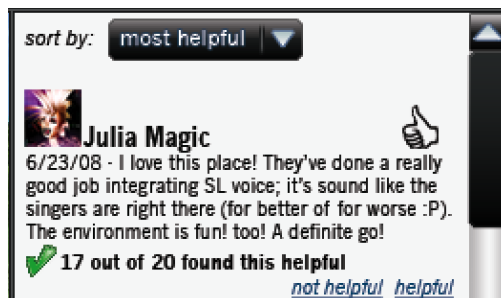


Figure 22 Comment Close-Up

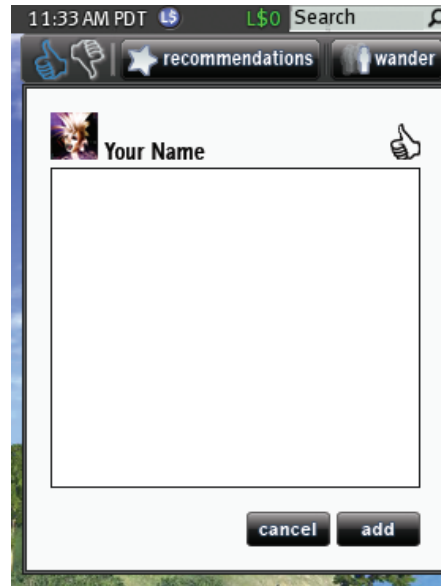


Figure 23 Add Comment Window

Goal: To allow for users to leave detailed feedback about a listing to be shared with the community, giving a point of reference that is harder to game.

Design & Rationale: After rating an event or place, a menu appears confirming the rating and asking the user to leave a comment. Comments are limited to 300 characters. If the list of comments becomes excessively long, page numbers will appear at the bottom of the comments, allowing users to traverse through the pages. While optional, the comments lend more validity to the user's rating and allow the Resident an opportunity to be publicly recognized as an articulate and trustworthy commenter. A Resident's name and profile picture is attached to each comment, along with his or her rating, which can be clicked to allow access to a user's profile, which opens to the Picks page. Through the profile, a user can easily contact the commenter. This provision allows for accountability of the commenter. The comments are displayed by recency by default, but can be sorted by: recency, thumbs up, thumbs down, and most helpful. Comments addresses the concerns of gaming expressed in our Focus Group and Concept Validation (Appendix U p. 266, Y p. 315).

Tradeoffs: Again, attempted gaming is a tradeoff of the system in general, as mentioned in our Focus Group and during our Concept Validations (Appendix U p. 266, Y p. 315). Comments, with their more specific information than just positive or negative, will help combat gamed ratings, because not all comments will be from those who are paid. In addition, we predict that it will be less socially acceptable to outright lie than to be paid to camp at a location. While the fact that comments are tied to a Resident's identity somewhat negates the value of an anonymous rating, being able to recognize unbiased commenters will help concerned Residents locate valid feedback. Some comments may be incendiary or not about the listing; the way the community can police this is addressed in the next section. If owners or the community have a serious problem with the comment and would like it removed, they can report it to

Linden Lab's existing reporting system. One detail worth mentioning is many users have either a full-body or group shot as their profile picture. It may be necessary to allow users to decide on a cropping boundary of their profile picture to use in Comments (Appendix Z p.330).

3.2.3 Helpful and Not Helpful

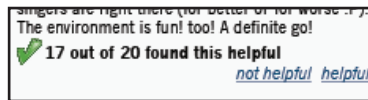


Figure 24 Helpful/Not Helpful

Goal: To give users a way to separate the useful, appropriate comments from the less useful, inappropriate comments.

Design & Rationale: This feature exists below each and every comment, aside from the user's own, and consists of two links with which to cast the user's vote: helpful or not helpful, and a phrase with announces the tally: "X out of Y found this helpful" where X is the number of helpful votes and Y is the number of total votes. The phrase is preceded by an eye-catching green check mark if the approval rate is 60% or higher. Being able to rate incendiary or irrelevant comments as not helpful will aid users in avoiding these comments and will place them at the bottom of the list when the Comments are sorted by 'most helpful'. These ratings address the concern that comments may be unreliable, as voiced in our Focus Group and during our Needs Validation (Appendix T p. 260, Y p. 315).

Tradeoffs: While gaming is still a possibility, paying Residents to rate the target comment as helpful will be much more complicated than paying them to stay in one place. Malicious Residents may target commenters they dislike and rate their comments as 'not helpful' regardless of their content.

3.2.4 Total Rating

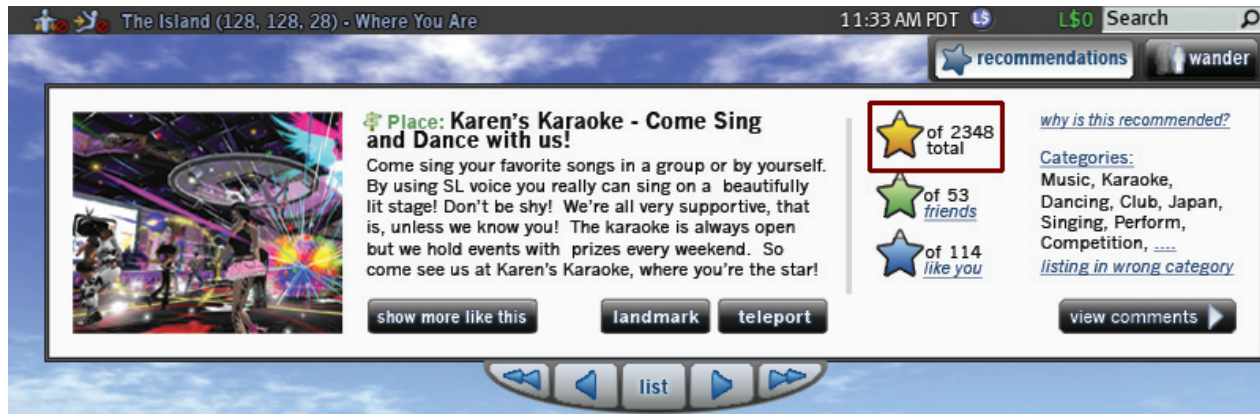


Figure 25 Total Rating

Goal: To give a more trustworthy representation of the desirability of a location grounded in the community's experience.

Design & Rationale: The Total Rating takes into account every Thumbs Up and Thumbs Down given by each Resident who has rated the listing. The Total Rating is displayed both in the List View and the Details View and is represented by a star, which is filled, from bottom to top, with the proportion of positive votes. For example, if the rating is 70% positive, the star will be 70% filled. Total Rating is distinguished from the other two ratings by having a different fill color and with the label 'total' following the total number of Residents who rated the listing. The Total Rating is the first in a series of touchpoints that are grounded in community opinion and are presented in response to our users' reactions and comments to the way results are weighted in the Search feature. We saw in our survey, interviews, and Concept Validations that the current system was not trusted, and that word-of-mouth and group notices were received more confidently (Appendix C-D p. 95, E p.157, U p.267).

Tradeoffs: The Total Rating is not personalized to the user. Since it may be susceptible to being gamed, a user may come to trust it less. However, two personalized ratings are available to allow for more reliable points of reference, presented in sections 3.5.1 (p. 47) and 3.5.2 (p. 48).

3.3 Tagging

Personalizing the listings to each user is the most visible benefit of the Recommendation system. During our current system Think Alouds, the user that made a connection between his or her real life and Second life, in this case the enjoyment of golf, was the only one that reported an enjoyable experience and a desire to continue exploring Second Life (Appendix N p. 195). During our Needs Validation, we learned from Mentors, Residents who assist new users on Help and Orientation Islands, that asking users what they enjoy in real life often helps them find content they enjoy in Second Life. This information directed us to strengthen the ties between a user's real life and their Second Life.

We heard concerns about inaccurate information in the categories and keywords that exist in the current system, which are submitted by the landowners, during our Concept Validation (Appendix U p. 266). People did like the idea of sharing these Interests on their profile, so that they may find other Residents like themselves (Appendix U p. 266).

The idea of tagging originated along with the Resident Recommendations itself, as tags need to be in place for the system to function. To aid a user's mental model, we call these tags by two different names: Interests and Categories. An Interest refers to the tags a user keeps in his or her profile and denotes the tags they would like to apply to the Recommend feature but presented in a way that they can reveal aspects of a Resident's identity that he or she would like to share with the community. Categories are tags applied to a listing and reflect the community's estimation of that appropriate description of a listing by having the top ten most commonly suggested categories used and displayed. Interests and Categories are paired to generate recommendations.

3.3.1 Interests

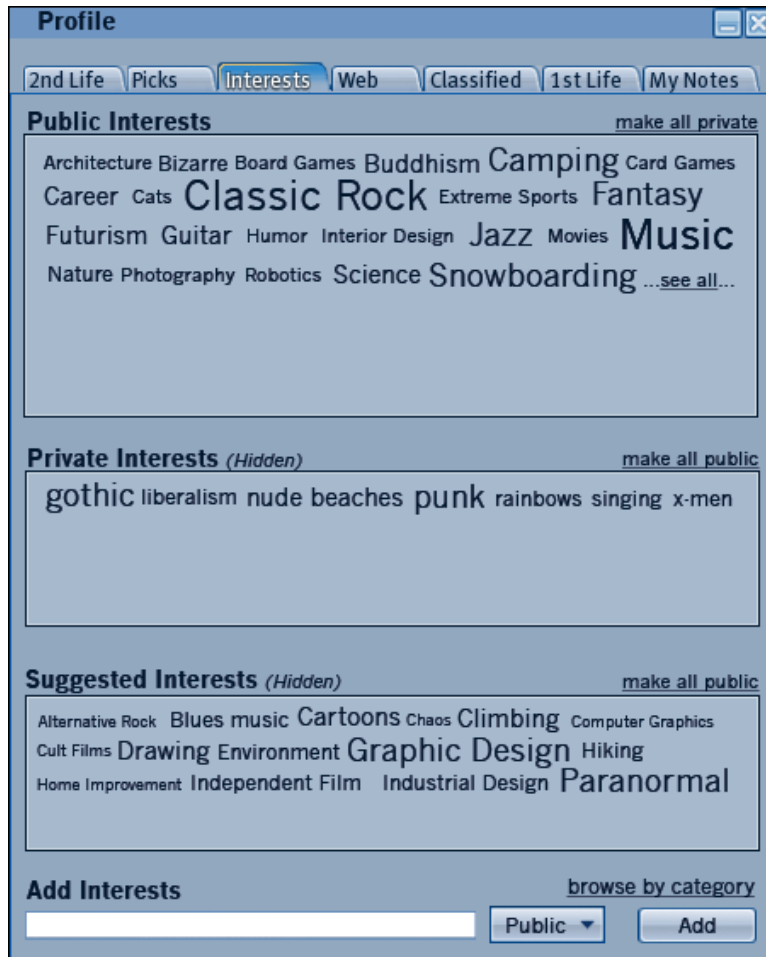


Figure 26 Interests View (Yours)

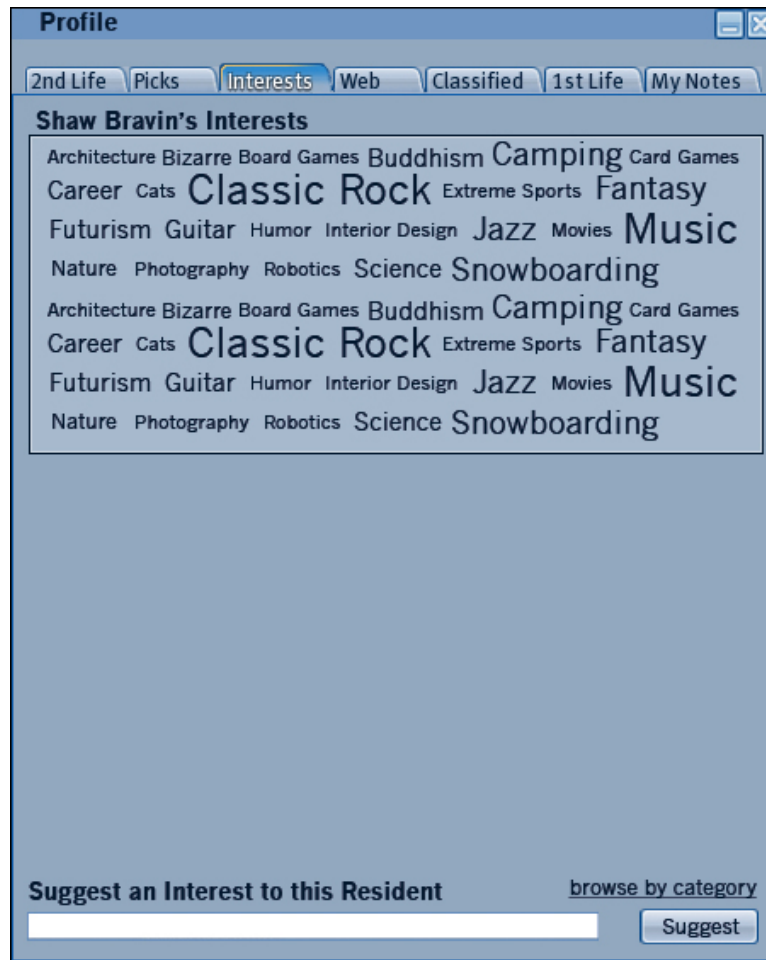


Figure 27 Interests View (Others)

Goal: To allow users to designate which Categories attract them, allowing for public sharing of that aspect of a user's identity as well as contributing to personalized recommendations.

Design & Rationale: Interests are stored in a user's profile and can be marked as public or private. The third kind is Suggested Interests, which are generated by the Recommendation feature through a user's rating history and the listings the user has requested to 'Show More Like This'. Once users visit several places that have the same tags, then those tags are added to their suggested interests. If the user ends up with many words in their suggested interests, the interests with the least amount of hits eventually drop off. Interests can be added directly by text field or browsing, available within a user's profile, as well as clicking on interests in other Residents' profiles. The user can also add Interests by clicking categories displayed within a listing. We provide these alternate ways to add Interests because recognition is easier for users than recall, which will help the user add more Interests and therefore expand the areas they will explore in Second Life. During our Concept Validation, a user remarked that simply being asked what interests them in real life, without pairing those interests to places in Second Life, was not very helpful (Appendix U p. 266). People liked the idea of sharing these Interests on their profile, so that they may find

other Residents with similiar interests (Appendix U p. 266).

Tradeoffs: Interests are a new concept within Second Life and may require an acclimation period for broad adoption. Current Residents may not see the value of adding Interests, since they were not introduced to Second Life through the Recommendation system. However, we intend for all new Residents to Second Life after the Recommendation system's launch will exit either Orientation or Help Islands through the system and will therefore be much more likely to see the value of inputting Interests. In addition, users may find managing and inputting Interests requires more effort than they are willing to spend. We address this by generating Suggested Interests that will seed users' Recommendations and appear, albeit privately, within the users' profiles where they can easily be made public.

3.3.2 Categories

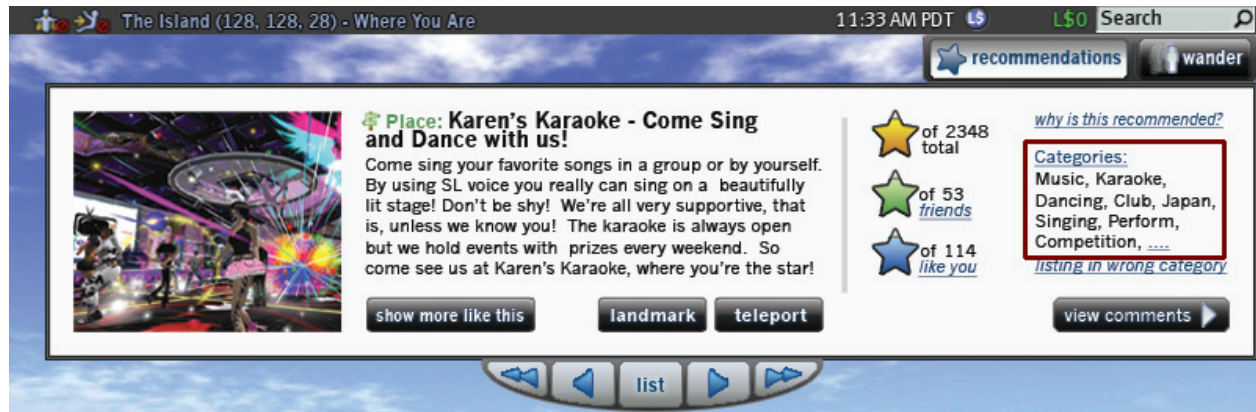


Figure 28 Categories



Figure 29 Categories Pop Out



Figure 30 Categories Pop Out with Mouse Over

Goal: To allow users to quickly identify the nature of a listing in order to make an informed decision as well as contributing to personalized recommendations through paired Interests.

Design & Rationale: Each listing will have ten viewable Categories determined by the most commonly

suggested Categories, a process discussed in the next section. Categories reside within the Detail View of a listing, with enough space to display ten short words, but as this will not always be the case, the most popular categories that fit within the space provided will be displayed and the rest will be viewable through a ‘...’ link, which will take the user to the same pop out as the section title (see Figures 29 and 30). The pop out window pushes the right-hand side of the listing off screen and slides the left-hand section over until the picture is off screen, allowing the user to still see the description of the listing. This link gives users the list of the top ten Categories and the opportunity to suggest a new Category. In the initial stages of the launch of the system, we suggest allowing the owners of the listing in question to submit five Categories. We feel that limiting the number of Categories allowed to each owner will force owners to be more specific. In the case of groups, which are not rated, the Categories, and the manner in which they are determined, will be provided by the groups themselves. Categories and keywords exist in the current system, though not in this form. We heard concerns about inaccurate information in these two fields, which are submitted by the landowners, during our Concept Validation (Appendix U p. 266). This sentiment was reflected by our Focus Group, who also raised concerns about Residents submitting inappropriate Categories (Appendix Y p.315). We predict that using the ten most popular Categories will eliminate a lot of these issues.

Tradeoffs: Initially Categories will be owner-suggested and may or may not be representative of the nature of the listing. In addition, suggested Categories, particularly in the early stages, may be equally mismatched or intentionally inappropriate. Two practices exist to combat both of these cases: The displayed Categories will, once the system is more established, be the most commonly suggested categories by the population as a whole, and Residents have the ability to report an incorrect or inappropriate Category, discussed in section 3.5.4 (p. 51).

3.3.3 Suggest Category

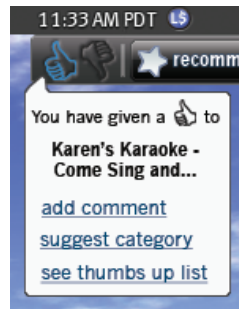


Figure 31 Suggest Category Link

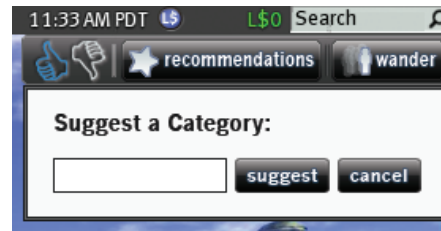


Figure 32 Suggest Category Drop Down



Figure 33 Suggest Category (Categories)

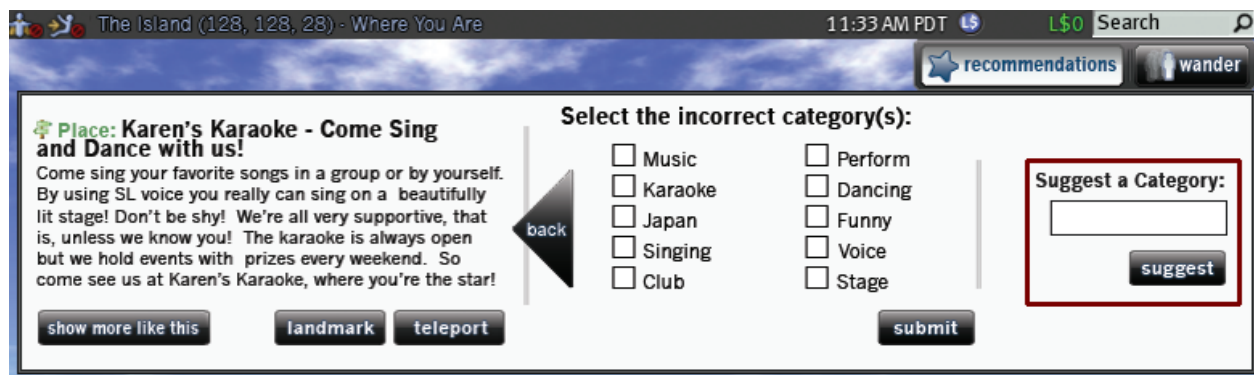


Figure 34 Suggest Category (Listing in Wrong Category)

Goal: To maintain the Categories of a listing that best reflect the estimation of the Second Life community.

Design & Rationale: Suggest a Category is accessible in three ways:

- immediately after a place or event is rated, a drop down menu appears with the option to 'Suggest a Category' and remains available until the

rating is negated by user action.

- as a secondary option when a user reports a listing is in the wrong Category
- as a secondary option when a user clicks the Categories or ‘...’ links

The suggested Categories for events and places are totaled regularly and the ten most popular suggestions are displayed in the listing’s category section on the detailed view, which may change overtime as new Categories become more popular. A pop out window pushes the right-hand side of the listing off screen and slides the left-hand section over until the picture is off screen, allowing the user to still see the description of the listing. In the case of an event or place, if a listing does not have a full ten Categories, new Categories will not be added until a certain number of Residents suggest the same Category. In the case of groups, the suggested Categories will be sent to the owner of the group for consideration. In our Concept Validations, users raised concern that listings contained misinformation, singling out categories and keywords as offenders (Appendix U p. 266); Categories suggested by the population would not be as easily compromised.

Tradeoffs: Suggest a Category can be accessed in three ways, which some users may find confusing. We have used the same wording and look and feel in all three locations to eliminate as much confusion as possible. The wording ‘suggest a category’ was very clear to users participating in our Think Aloud studies (Appendix Z p.330). Free typing Category suggestion may lead to votes not being counted due to misspelling; we suggest the employment of predictive text, which will show previously suggested categories as well as possible word matches, to aid in some of these instances. We also suggest that singular and plural entries are counted as the same suggestion. In addition, variations of the same word root, for example dance and dancing, could be counted as the root word. Similes of a word will not be counted as the same Category and may cause interchangeable Categories or the exclusion of a popular concept suggested in various synonyms. While this could be corrected with the use of a thesaurus database, we believe the cost in memory and development will outweigh the benefits.

3.3.4 Picks

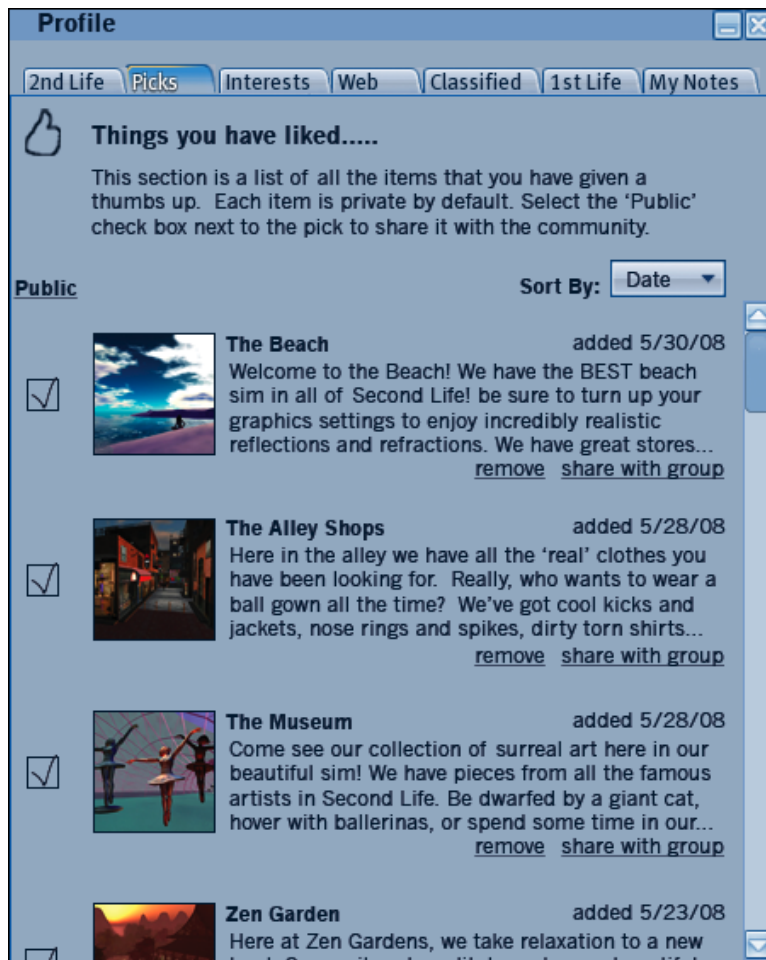


Figure 35 Picks (Yours)

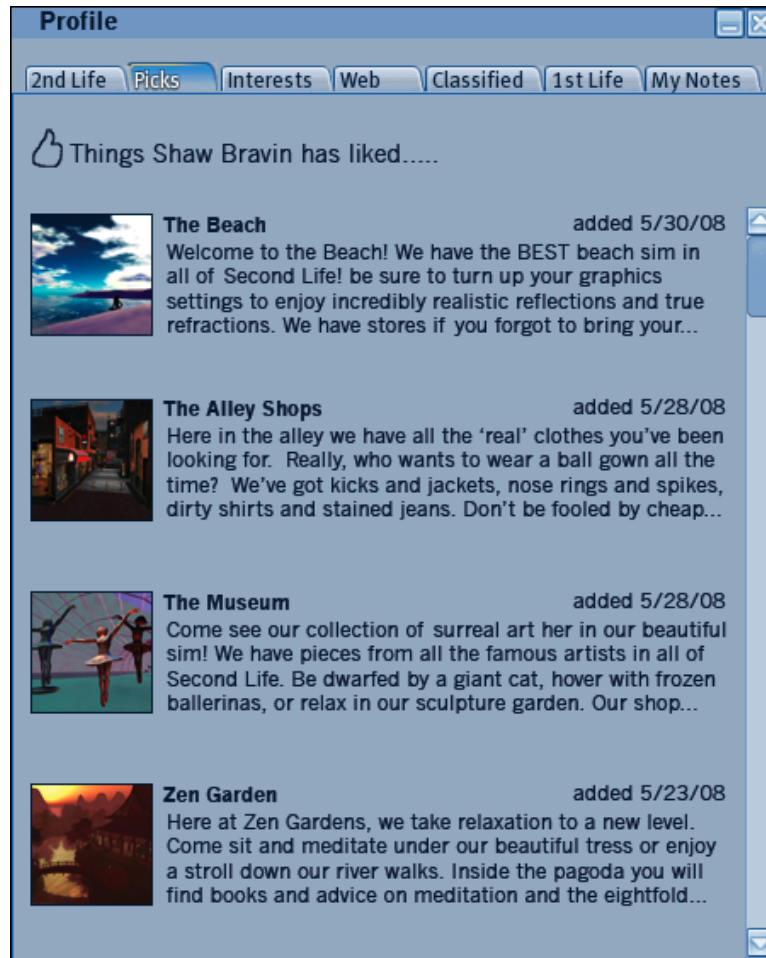


Figure 36 Picks (Others)

Goal: The Picks list has three goals:

- To allow users to maintain a collection of all the places and recurring events they have enjoyed in Second Life so that they may easily return
- To allow the enjoyed listings to easily be shared amongst friends and the community
- To use as one of the factors in generating Recommendations.

Design & Rationale: A Resident's Picks reside within his or her profile and are populated by the places and recurring events which a user gives a positive rating. Each listing in the Picks list can be either public or private, with each new addition defaulting to private. Residents may view their own lists in various orders such as date added, public, or private. When viewing someone else's profile, the listings are always in order of date. The need for this list was originally conceived during our Creative Brainstorming sessions and validated during our Concept Validation (Appendix U p. 266). In one particular case, a user mentioned that landmarks are generated in his or her landmark list whether he or she specifically added them or not, either by buying items, mis-clicking notices, or merely entering a location. The user

approved the concept of a list of places that actually had something to do his or her enjoyment of the location (Appendix U p. 266). We also saw support in our survey, where most expert users relied heavily on word of mouth to find new locations and events (Appendix C-D p. 95). In our Think Alouds, users often asked other people in order to find an activity in which to participate (Appendix N-P p. 196).

Tradeoffs: All additions initially default to private, so maintenance is required on the user's part in order to make this information available to the community. The decision to default to private was made after users expressed unease with having their ratings be easily publicly accessible during our Concept Validation (Appendix U p. 266). In addition, the order this list is not editable, but this type of editing was outside our scope. Because the list is not editable, we named it Picks instead of Top Picks. Users may also wish to organize their Picks into collections, such as fashion and clubs, but this would add complexity to the lists maintenance and organization was outside of our scope. The Picks list may grow to be quite a bit longer than what is currently afforded in the profile. While this is a cost on bandwidth, many responders to our survey specifically wrote out that they would like to be able to have more items in their Picks (Appendix D p. 122).

3.4 Community Connection

Feeling connected to the community greatly increases a Resident's enjoyment of Second Life. Users rely on each other asking the advice of other Residents when determining where to explore (Appendix C-D p. 95, E p. 157, N-P p. 195), and expert users often relied on group notices to locate new events (Appendix E p. 157). We found that positive community interaction creates a more positive experience for new users (Appendix N-P p. 195). Yet while meeting new people is stated as a priority for new users, they do not spend much time fostering this interaction (Appendix C-D p. 95).

We found that Residents embraced the idea of finding people like themselves, shown in our Concept Validations, Focus Group, and Think Aloud studies (Appendix U p. 266, W p.300 Z p.327). They also liked seeing the locations their friends enjoyed (Appendix Z p.330).

The Resident Recommendations pivots around the Second Life community; it is a compilation of their Picks, their suggested categories and their ratings. But the connection to the community goes deeper than shared opinion. Resident Recommendations has several features built in to foster community exploration and to strengthen ties between Residents. Not only can users peruse their friends Picks lists, but also they can see how their friends feel about a particular listing. The connection extends beyond a user's pre-established friends to encompass Residents who have similar Interests and rating histories. This feature aids the user in expanding their circle of friends and tying them closer to the community.

3.4.1 Group Picks

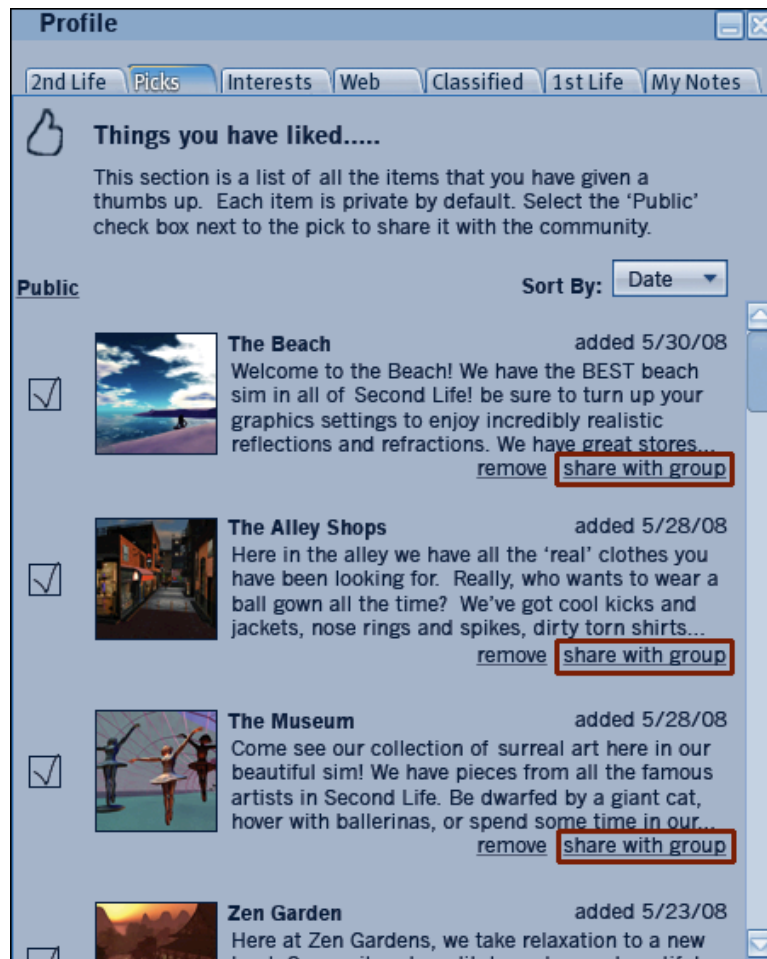


Figure 37 Share with Group Link

Goal: To allow for another avenue of discovery within the virtual environment, to provide another focus for forming groups, and to provide another resource for generating Recommendations.

Design & Rationale: Group Picks looks and behaves similarly to regular Picks, however listings are suggested by group members, via their personal Picks lists, rather than by a Thumbs Up rating. The means of acceptance onto the Group Pick list is up to the group to decide, though the moderator must approve all submissions. From our survey, interviews, expert Contextual Inquiries, and Needs Validation, we discovered that many expert users rely on their groups for a good source of discovering new activities (Appendix C-D p. 95, E p.157, I p. 176, T p.263).

Tradeoffs: Nominating a listing and not having it published may offend some users. The list will require additional maintenance by the owner of the group. Furthermore, the quality of the group's picks will be dependent on the activeness of the group members and group owner.

3.4.2 Friends List

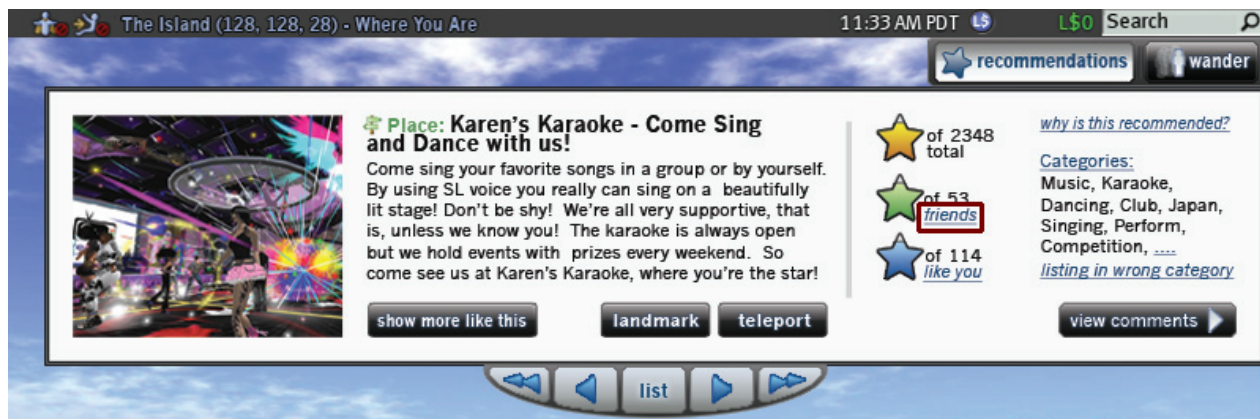


Figure 38 Friends Link



Figure 39 Friends List

Goal: To allow a user to see specific friends' ratings of the listing being viewed and to promote the browsing of friends' Picks lists.

Design & Rationale: The Friends List is accessible by clicking the Friends label by the Friend's Rating. A pop out window pushes the right-hand side of the listing off screen and slides the left-hand section over until the picture is off screen, allowing the user to still see the description of the listing. The list contains the profile picture, name, and rating of every friend whose has rated the listing. The list, along with the rating, is disabled if no friends have rated the listing. Interviews revealed that Residents rely on their friends for recommendations (Appendix E p.157). In addition, our survey showed that hanging out with friends was by far the most popular activity in Second Life (Appendix C-D p. 95), and it follows that Residents will value knowing where their friends enjoyed being.

Tradeoffs: Some users may not want their ratings shared, even with friends. This could be remedied by a privacy setting. New users may not have acquired any friends before they use the Recommend feature, causing this list to always display as disabled. However, the Like You Rating and list will always be enabled, minimizing the impact. We predict that users in this situation will be encouraged to browse the Like You list and as a next step, some will pursue friendships with those Residents.

3.4.3 Like You List

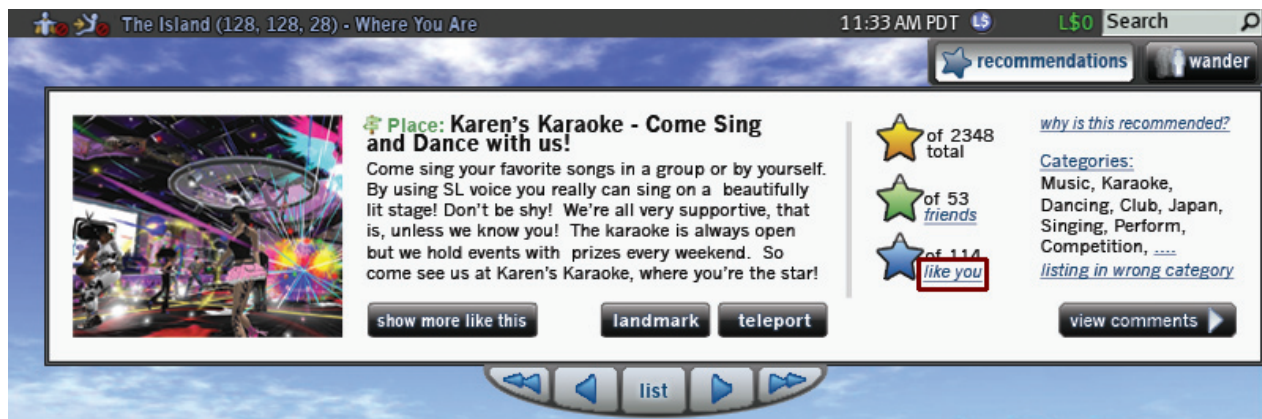


Figure 40 Like You Link



Figure 41 Like You List Confirmation



Figure 42 Like You List

Goal: To give the user easy access to Residents, and their corresponding Picks lists, with similar interests and rating habits.

Design & Rationale: The Like You List is accessible by clicking the Like You label by the Like You Rating. A pop out window pushes the right-hand side of the listing off screen and slides the left-hand section over until the picture is off screen, allowing the user to still see the description of the listing. The system determines this group by comparing Interests, both public and private, and rating histories; new Residents

will have other new Residents, who joined around the same date and speak the same language, in this grouping until a month In-World. The first time the users attempts to view the list, they are informed that they must first allow the system to display their name, picture, and rating in similar lists for other Residents to see. The list contains the profile picture, name, and rating of Residents the system has determined to be most similar in Interests and rating history to the user. Clicking the name or picture of any list member will direct the user to that Resident's Picks page. The participants of our Focus Group, Concept Validations, and Think Alouds all expressed a desire to meet Residents similar to themselves (Appendix U p.268, Y p.315, Z p.330). In addition, during our interviews, one user specifically requested a 'find people' button to locate new Residents to meet (Appendix E p.157).

Tradeoffs: Users must first opt-in to the service before being able to view the list, which runs the risk that some users will not utilize this feature. Even so, we felt it was important for a user to opt-in to sharing their rating and information with strangers and placing the confirmation in this obvious location encourages more to do so. If a user decides to no longer participate, clicking the 'hide me' link will discontinue his or her participation.

3.5 System Integrity

Gaming the system has always been prevalent in Second Life. During our user testing of the current system, Residents complained about the distortion of campers, people paid to remain at a location to increase its traffic measure, on their Search results (Appendix E p.157). Concerns about inaccurate information in the categories and keywords that exist in the current system, which are submitted by the landowners, were voiced during our Concept Validation (Appendix U p. 266).

Our Focus Group immediately raised concerns about the Recommend feature being gamed as well (Appendix Y p.315). This concern was also raised during our Concept Validations (Appendix U p. 266). Due to their concerns, as well as our own, we have implemented several additional features to combat gamers; some allow users to police the system and others give them multiple points of reference upon which to make their decision.

3.5.1 Friend Rating

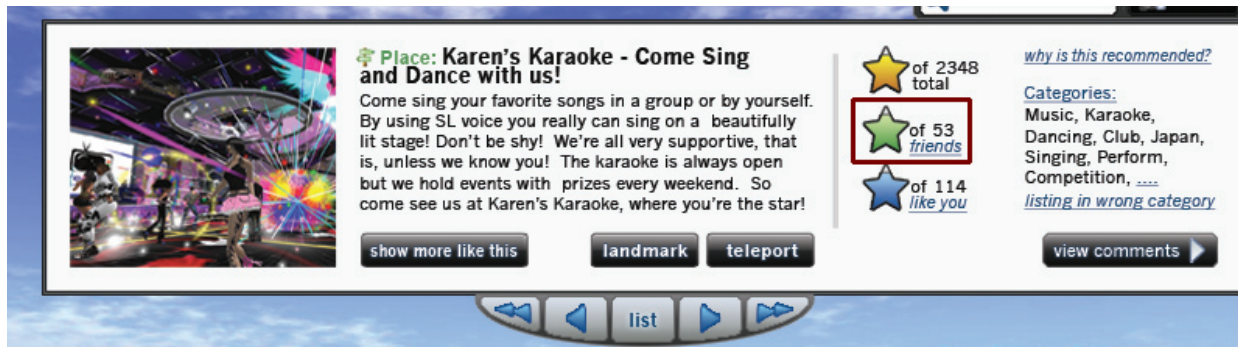


Figure 43 Friend Rating

Goal: To give the user a rating grounded in his or her own community.

Design & Rationale: The Friend Rating is displayed on the Details View under the Total Rating and is represented by a star, which is filled, from bottom to top, with the proportion of positive votes. For example, if the rating is 70% positive, the star will be 70% filled. Friend Rating is distinguished from the other two ratings by having a different fill color and with the label 'friends' following the total number of friends who rated the listing. The Friend Rating shows a user how much a listing was liked by his or her friends and acts as another touchpoint on which to make a decision. Friend Rating helps reduce the corruptibility of the system, a major concern of the Focus Group and participants in our Concept Validations (Appendix U p. 266), by giving a figure that is grounded in the user's close community. Our survey and interviews showed that users care about how people they know in Second Life feel about an activity (Appendix C-D p. 95, E p.157). During a Think Aloud study, a participant stated, "(It) would be nice to show recommendations that your friends make to you, someone who knows your interests" (Appendix Z p.330).

Tradeoffs: New users may not have acquired any friends before they use the Recommend feature, causing this rating to always display as disabled. However, the Total Rating and the Like You Rating and List will always be enabled, minimizing the impact. In this situation this will likely encourage new users to browse the Like You list and some will pursue friendships with those Residents.

3.5.2 Like You Rating

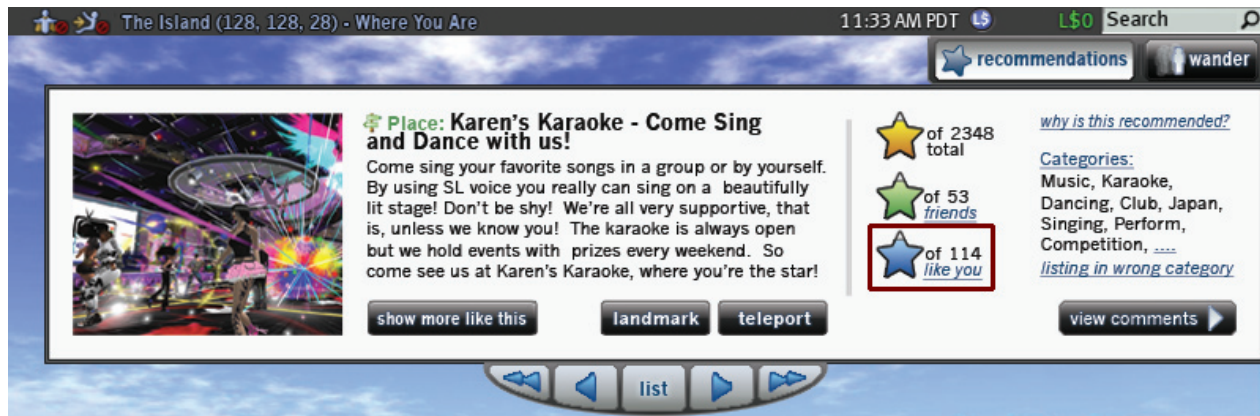


Figure 44 Like You Rating

Goal: To give users a rating from people with similar interest and to give a touchpoint that combats corruption of the system.

Design & Rationale: The Like You Rating is displayed on the Details View under the Friend Rating. The Like You Rating is represented by a star, which is filled, from bottom to top, with the proportion of positive votes. For example, if the rating is 70% positive, the star will be 70% filled. The Like You Rating is distinguished from the other two ratings by having a different fill color and with the label 'like you' following the total number of similar Residents who rated the listing. The Like You Rating is the average rating of a group of Residents that the system has determined to be similar to the user. The system determines this group by comparing Interests and rating histories; new Residents will have other new Residents, who joined around the same date and speak the same language in this grouping until a month In-World. Like You Rating helps reduce the corruptibility of the system, a major concern of the Focus Group and participants in our Concept Validations (Appendix U p.271, Y p.315), by giving a figure that is generated through complex and somewhat unpredictable calculations as users' Interests are subject to change at any time. Our Think Alouds on the current version of Second Life revealed that new users care about what other Residents think about an activity, even if they do not know them (Appendix N-P p. 196). One of our Think Aloud participants specifically stated that he or she enjoyed knowing the opinion of people like him or herself (Appendix Z p.330).

Tradeoffs: Users will have to trust that the system can make an accurate decision about which Residents are similar themselves. Users can confirm the accuracy by viewing the profiles of the Residents the system deems 'Like You', accessible through the Like You List. In addition, we feel that this list should be limited to no more than 50-100 Residents, allowing the results to appear more valid.

3.5.3 Why is This Recommended?

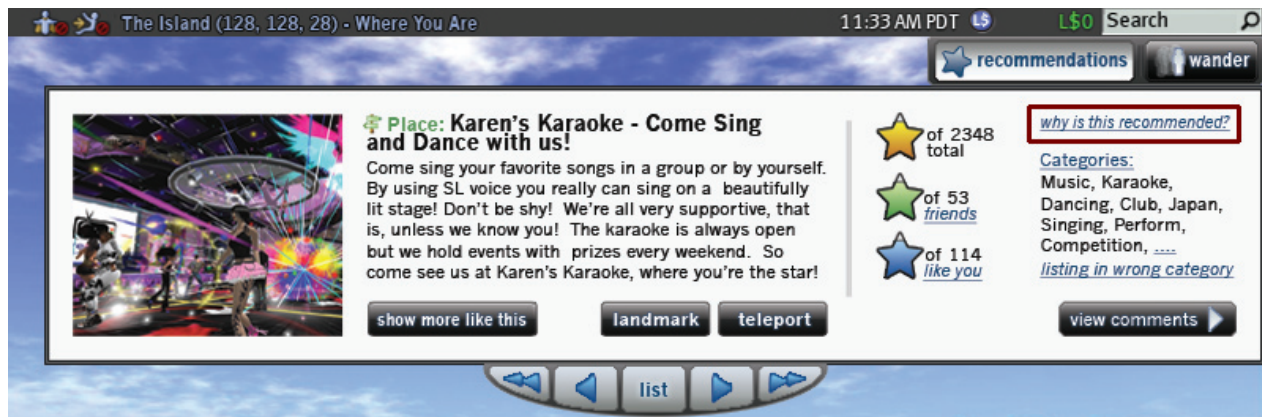


Figure 45 Why Is This Recommended Link



Figure 46 Why Is This Recommended Pop Out

Goal: To give users an accurate mental model of how Recommendations are generated.

Design & Rationale: The Why is This Recommended feature shows users the factors that caused a particular listing to be recommended. This feature is located within the Details View in proximity to the Ratings and Categories. The placement reflects the information used to generate the Recommendation. A pop out window pushes the right-hand side of the listing off screen and slides the left-hand section over until the picture is off screen, allowing the user to still see the description of the listing. The feature is divided into two sections: Your Interests and Community. Your Interests displays a list of all of the user's Interests that matched this listing and whether those Interests are public, private, or suggested. A link to edit the user's Interests is available at the top of the list so that a user may easily remove an Interest that brings up undesirable results. The link takes the user to the Interest section of his or her profile, which has the added benefit of informing the user where his or her Interests are located and that they can be made public. The Community Section displays the three ratings and any friends or groups whom have the listing on their Picks page. The ratings are repeated here so that this section is never blank, even if the user has yet to add any friends or join any groups. During our Think Alouds and Concept validation, one of the first questions users asked was how the listings were generated and requested a feature that would explain the contributing factors to them (Appendix W p.300, U p. 266). The Think Aloud participants enjoyed

seeing how their interests matched the Categories in the listings (Appendix Z p.330).

Tradeoffs: As it does not tell the whole story, the Why is This Recommended feature gives the feeling that the calculation is more shallow than it is. For example, the Pick lists of those that the system deems to be Like You are also taken into account. While including those rating implies that these lists are utilized, their incorporation is not stated explicitly. Yet eliminating this complexity makes this section more easily digestible for users.

3.5.4 Listing in Wrong Category

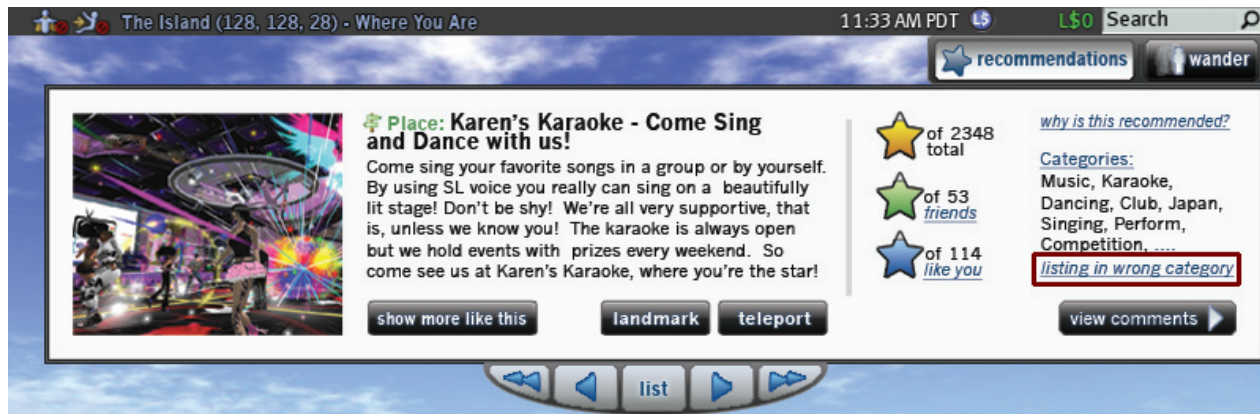


Figure 47 Listing in wrong Category Link

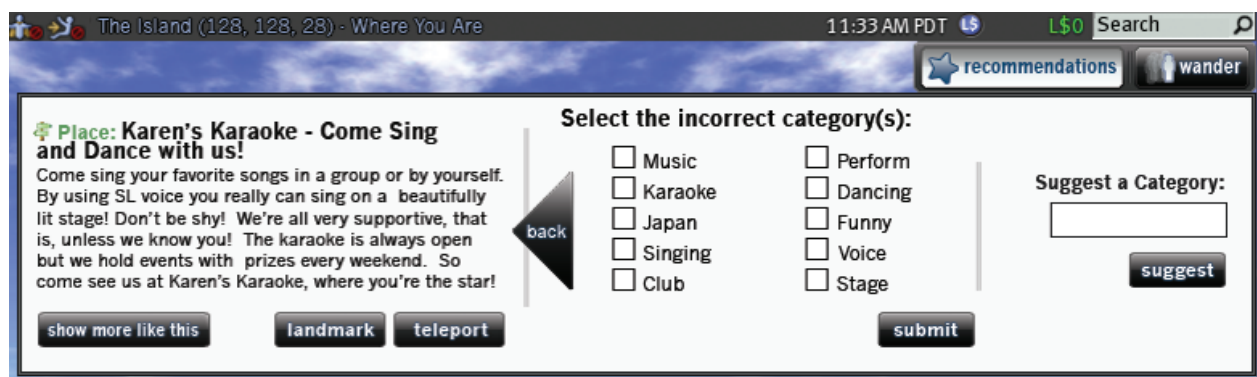


Figure 48 Listing in wrong Category Pop Out

Goal: To allow the community to police the system by giving feedback on the listing Categories.

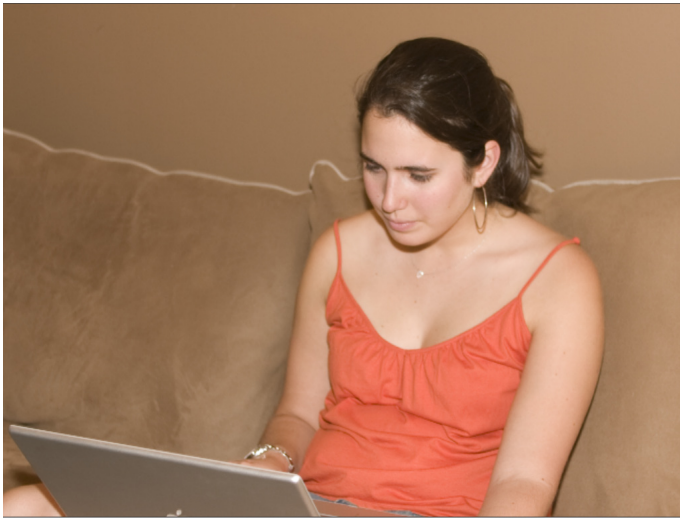
Design & Rationale: The Listing in Wrong Category feature provides a way to report a miscategorization of a listing. The link to the feature is found directly under the Categories on the Details View of a listing. The current Categories are displayed with check boxes so that the user may select the incorrect Category or Categories. To the right of the window, the user is given the opportunity to suggest a Category that they feel is more appropriate. When a Category is marked as incorrect, the owner of the listing, who has the ability to delete Categories, is notified. If the Category is deleted, the next most popular Category takes its place. If complaints continue to come in and the owner has not taken action, the category will be taken down and the owner has the option to appeal to Linden Lab's reporting group. During our Concept Validation, users voiced concern that the current search listings sometimes contain information that has nothing to do with the listing (Appendix U p. 266). Allowing the community to leave feedback about the content of the listing will help stem the occurrence of misinformation.

Tradeoffs: The Listing in Wrong Category feature has the possibility of being abused by grievers, those

in Second Life who make trouble just to make trouble. It is conceivable that a large group of malicious Residents may report a valid Category in attempts to remove it. In this case, the owner should be able to preemptively contact Linden Lab to state their case and allow Linden Lab to ignore the issue. Dishonest landowners may delete accurate Categories to serve their own interests. We suggest that if an owner has deleted a Category and the same Category rises to the top ten again, the owner will need to appeal to Linden Lab for its removal.

4. Use Scenarios

4.1 Exiting Help Island

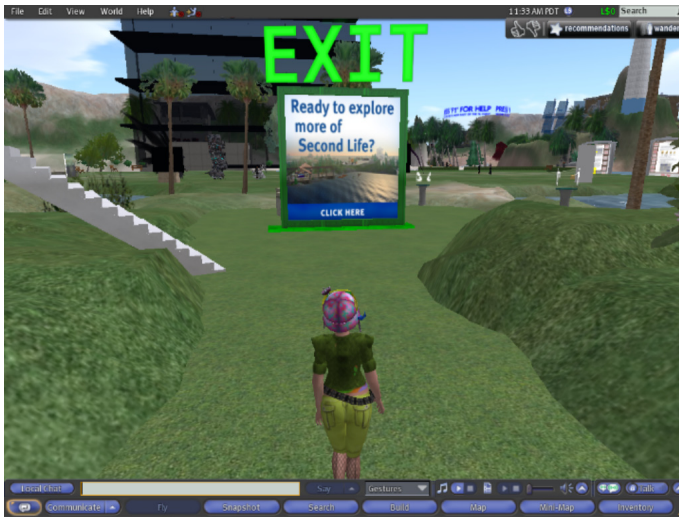


Pamela first heard about Second Life while watching *The Office*. One weekend, she decides to create an account.

She downloads the software and creates an avatar, whom she names Punkie Twine.



After Punkie goes through orientation, she begins to explore Help Island..



Punkie is ready to leave Help Island to explore the wide world Second Life. She looks up and sees a giant Exit sign, so she heads that way.

Under the sign, she sees another billboard, this one talks about Resident Recommendations, a tool to help her explore the virtual world. She clicks the sign, and the Recommendation window opens.



The window shows her several listings, many of which are places to help her start her Second Life. She sees a location called Shopaholics Square, which advertises free clothes. After seeing that it is highly rated, Punkie decides to teleport.





While browsing the wares, Punkie finds a shirt she'd like to get, but she's not sure how. She asks an avatar standing next to her what to do.

The avatar introduces herself as Marilyn, and not only does she tell her how to click to get the item, but she also offers Punkie friendship and tells her to contact her if she ever needs any help.



Punkie has a good time at Shopaholic Square so she gives the place a Thumbs Up.



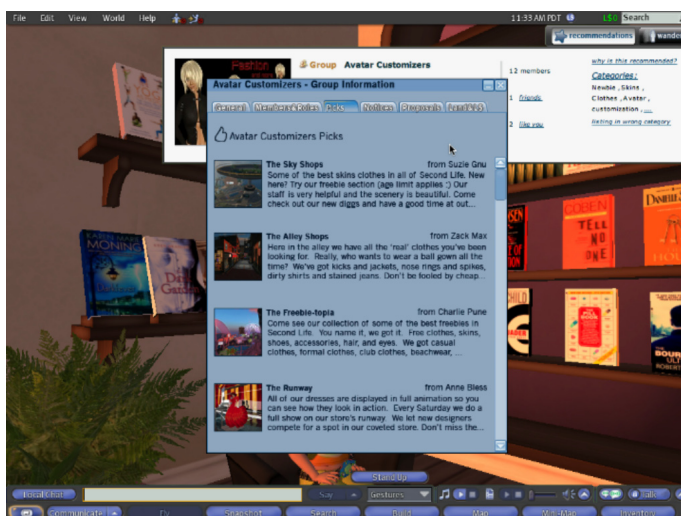
Not sure what it is, Punkie decides to click the 'see thumbs up list' link. She sees that Shopaholic square has been added to her list.

4.2 Groups

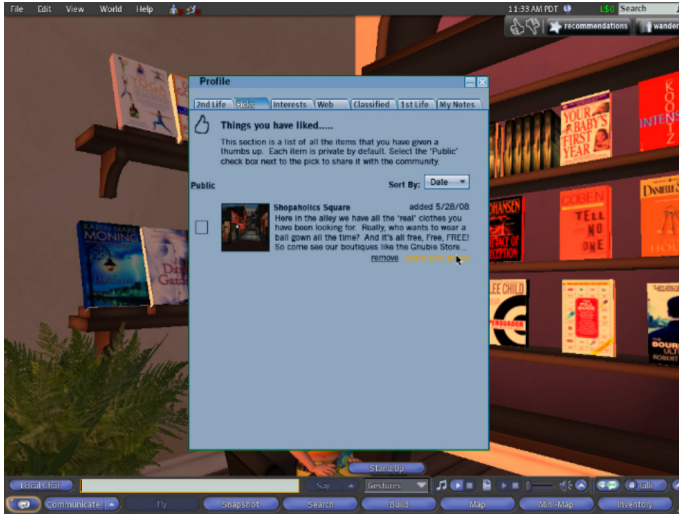


While browsing through her Recommended listings, a group pops up called Avatar Customizers.

Punkie clicks the link to view the group's profile and looks through the Picks tab.



It's full of different freebie stores, some for clothes and others for hair and even avatar skins. Punkie thinks this group will be useful and decides to join.



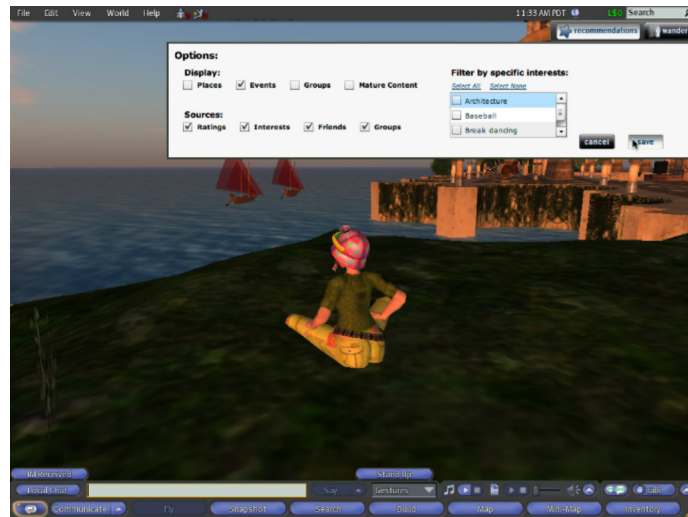
Punkie remembers Shopaholic Square and thinks this would be a great place for Avatar Customizers and decides to share it with the group by clicking the link at the bottom of the entry.

4.3 Finding an Event

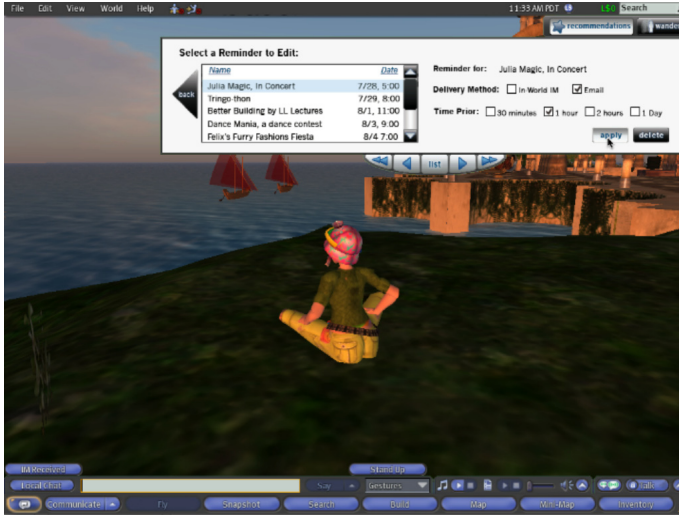


Punkie has been in Second Life for about a week when she logs-on one saturday. She heard that there are a lot of fun events in Second Life so she opens the Recommend window.

She clicks Options and unchecks places and groups then hits save.



Punkie finds a rock concert and wants to teleport but the button says 'remind'. She sees that the concert doesn't start until tomorrow and understands why she can't teleport.



Punkie clicks 'remind' and sets up a remind to be sent to her email.

Punkie clicks Show More Like This to try and find a concert thats going on now.



An event called "Julia Magic, Live at the Ultra Lounge" catches her eye. The Like You star is almost full. Curious what Like You actually means, she clicks the link.



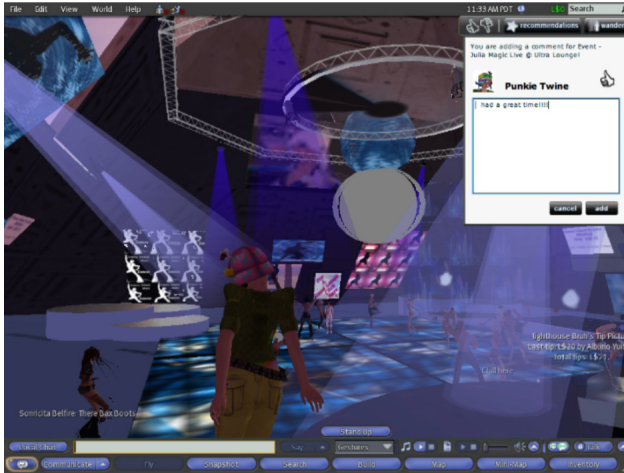
She sees that Like You means that these Residents share similar interests and rating histories. She thinks it's pretty neat and decides to opt-in.

After poking around the Like You list, Punkie returns to the listing and she sees that one friend has rated this event.



She clicks the friend link and sees that Marilyn gave the event a thumbs up.





Punkie teleports to the event and has a great time. She thumbs up the event and decides to leave a comment.

4.4 Fine Tuning



After the show, Punkie opens the Recommend window to find a new place to visit. The window is open to the last listing she looked at, Julia Magic’s concert.

She had a good time at the show and wants to know what categories it falls under to find more events like it in the future. When she clicks Music, a bubble pops up with the link ‘add to interests.’ Delighted, she adds Music, as well as concert and singing.



She browses through the list and stops on a place called Karen’s Karaoke. Not sure how karaoke would work in Second Life, she decides to look through the comments.

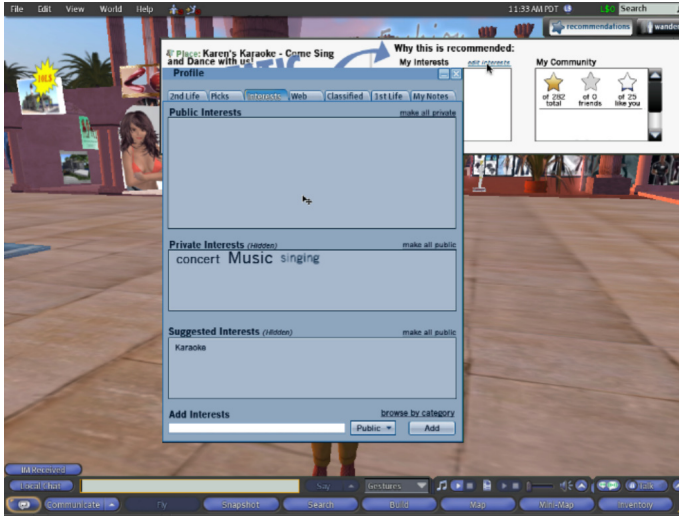


She sees a comment by Julia Magic! It says that SL voice is well integrated, and Punkie realizes she'll need a microphone, something she does not have, to participate. Since this comment helped her make her decision, she rates it as helpful.

Since she has never set up SL Voice, she wonders why this was recommended to her, so she clicks "Why is This Recommended?".



She sees that the interests that she added, Music, Concert and Singing, are listed as private and there is a Suggested interest of karaoke.



Since she can't participate, Punkie doesn't want to see karaoke places in the future, so she clicks the edit interest link. She deletes karaoke from her suggested interests and decides to make Music and Concert public, so she might meet people who more people know of good shows in Second Life.

She closes her profile and sees that in the categories it says Voice, not SL Voice, so she clicks Listing in Wrong Category.



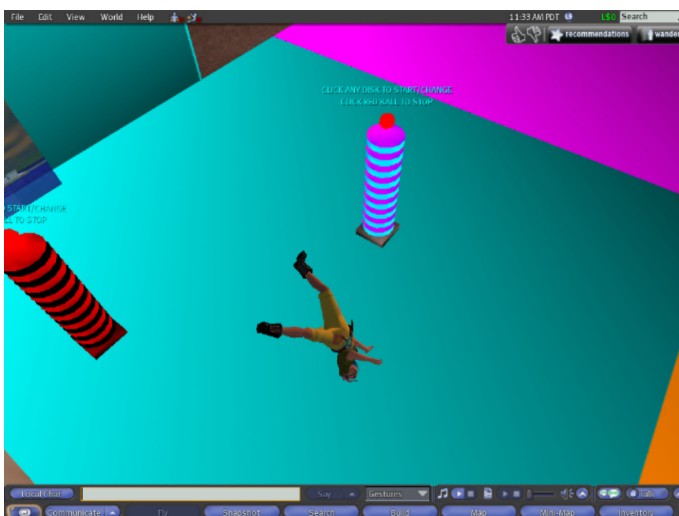
She submits Voice as incorrect and suggests SL Voice.

4.5 Wander



After spending a few weeks in Second Life, Punkie has developed a list of regular places she visits in world. When she shows up at one of her favorite clubs, she finds the place almost empty.

Feeling a bit spontaneous and wanting to try something new, Punkie decides to click the Wander button to be taken to a random location.



She finds herself at a place that sells really original dance animations. After trying a few out, she buys the break dancing set. She can't wait to bust them out at the next event she attends.

5. Future Directions

Our current design addresses many of the needs revealed during our generative research phase. We selected these features to address the most urgent and deeply impacting issues with the current system. However, many opportunities exist to expand the functionality of the proposed system to encompass a wider range of needs. In addition, some previous design directions will both enhance and compliment our proposed design. We have broken this section into three parts:

- Phase 1 – Deployment and implementation of Resident Recommendations
- Phase 2 – Expanding the initial system to encompass more needs and provide greater versatility.
- Phase 3 – Additional ideas that compliment and enhance the proposed system.

5.1 Phase One

Phase One will introduce Resident Recommendations to the Second Life community. This phase consists of the features that address the most urgent and deeply impacting issues with the current system and those required for Resident Recommendations to function. This phase is primarily concerned with aiding new users in discovering content that is meaningful to them by mimicking practices employed by current experts, giving a forum for Resident feedback to increase the trustworthiness of listings, and fostering community connections. Creating ‘Did you know?’ screens to appear every so often within the Recommendations window that describe key points such as adding Interests and the new Picks list may help make the system more robust sooner, as well as help explain this new tool to Residents. In addition, the Group Picks may be held off if its implementation is impeding the project.

Landowners will have a special role in the system. Owners can decide when the location is ready to be rated so the rating would not be disadvantaged by lack of readiness or when it is in the testing period or other undesirable situations. If the land is sold and the architecture remains mainly the same, the rating will stay same unless the new owner requests to “reset” the rating. One potential effect is that the ratings will affect the sale price of the land. If the quality of the place significantly changes after new ownership, it will be reflected in any new ratings and comments. Residents who have rated the location will be notified that the owner has changed. The user decides whether he or she wants to re-rate the location and if he or she wants to keep it on his or her Picks list. After the first phase of Resident Recommendations has been deployed, features from Phases Two and Three should be considered and prioritized based on the feedback from Phase One.

5.2 Phase Two

Through the development of the Recommendation system, we have seen opportunities to extend and strengthen the system. Phase Two will involve expanding and refining the features from Phase One, allowing additional functionality that is not necessary for the system to function but desirable for frequent use.

Feature: Incorporating into Search

Goal: To lend the positive aspects to the Search feature that user have become accustomed to in the Recommendations window.

Design & Rationale: We suggest incorporating the Ratings, Comments and suggested Categories into the current Search feature. We developed these tools to aid the user in making a decision about a recommended listing, however we predict that these features will be useful for all listings. Eventually, the Recommendations feature and the Search feature could be combined to allow for a versatile way to find content in Second Life.

Tradeoffs: Incorporating these features will not be possible for all types of Search listings, such as classifieds and profiles, nor will ratings be available for groups. Unfortunately, Linden Lab's economic model may be affected by incorporating Resident feedback into Search results. However, increasing the number of enjoyable experiences a Resident has in Second Life will increase the number of active accounts.

Feature: Editing Comments

Goal: To allow users the freedom to edit their comments.

Design & Rationale: We suggest giving users the option to edit their comments in the Picks section of the profile. This is common behavior in commenting systems. If a comment is edited, the comment should lose its Helpful or Not Helpful rating.

Tradeoffs: The editing of comments will cause some later comments to no longer make sense, and one user specifically requested that comments not be editable (Appendix Z p.330). In addition, a separate list of negative comments would be required since the Picks list only keeps track of positively rated locations. Another option is to allow users to edit their comments in the Search feature, if comments are incorporated in these results. Residents may also use the comments section as a discussion forum, particularly if multiple comments from a single user are allowed.

Feature: Expanding Category Mouse Over Menus

Goal: To provide greater versatility to power users in the Recommendations window.

Design & Rationale: The Phase One release of Recommendations window will have the ability to add and delete interests from the Categories section of a listing. When a Think Aloud participant thought that clicking a Category would behave like Show More Like This (Appendix Z p.330), we considered the various types of interactions that could be added to those menus. One logical extension is to provide a link to the Search feature, allowing users to pull up results in the selected Category.

Tradeoffs: This feature would add extra complexity to the interface. If the suggested features were already integrated into Search, this may become less desirable.

Feature: Live Preview

Goal: To give users a real-time estimation of a location or event before teleporting.

Design & Rationale: A play button would appear when a user moused over the picture for a place or ongoing event listing. Once clicked, the view would turn into a live feed, not unlike a webcam. During our peer critiques, many people expressed the desire to see what a location was like before investing in teleporting there.

Tradeoffs: Bandwidth is a major obstacle for this feature. A possible compromise is to allow a mouse over to play a slideshow of pre-captured images. However, this would not give information on what is currently happening at a location and still would require extra memory to store multiple photos per listing.

Feature: Subscriptions and Top Contributors

Goal: To allow users to gain from other Residents experience without the intimacy of friendship as well as to provide a reward for those Residents that have the type of knowledge that would deplete the personal value of the Recommendations window.

Design & Rationale: Users could subscribe to a Resident's Picks and comments either through the Resident's profile or on the comments window. Links to these subscriptions should be kept in the user's profile. This would allow access to the Contributor's Picks list for recommendations as well a way to easily access the Contributor's comments. Contributors with high subscription and Helpful rates can be recognized as a Top Contributor, which can be demarcated in some way when that Resident leaves comments, perhaps by a star on the corner of their profile picture. This feature would encourage those with enough knowledge not to need Recommendations to share that knowledge with the community.

Tradeoffs: Yet more space would be needed in the profile page to accommodate a Resident's subscriptions. We propose a Community section, which would also list a Resident's groups and friends. This arrangement frees up space on the About tab to display Top Interests. This feature may create a hierarchy amongst Residents where those on the top will constantly be prone to exploitation from landowners for their own monetary gain.

5.3 Phase Three

During the course of our project, we reduced our scope significantly. In the following section, we will outline three designs, both of which have undergone user testing, but never made it to the interactive

stage.

5.3.1 Regional Information:

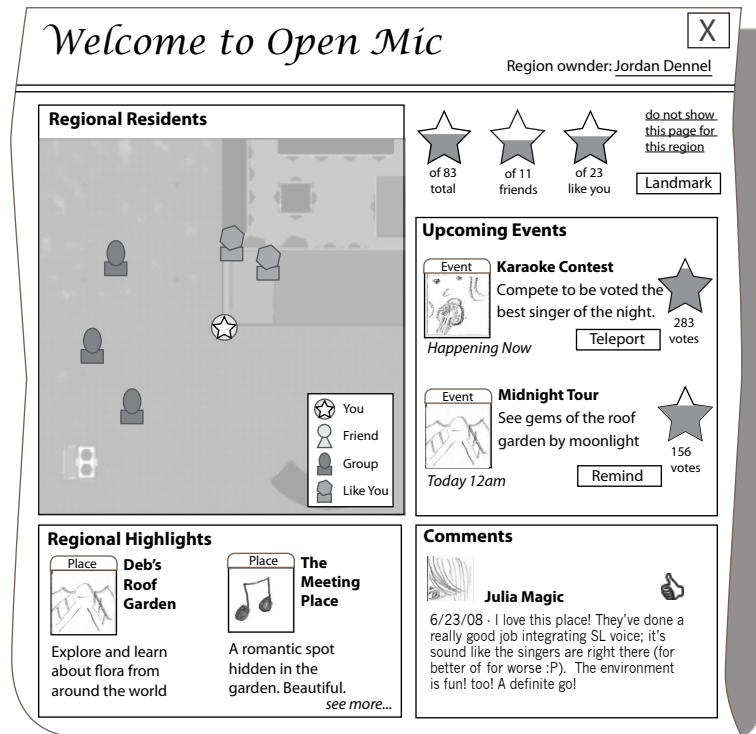
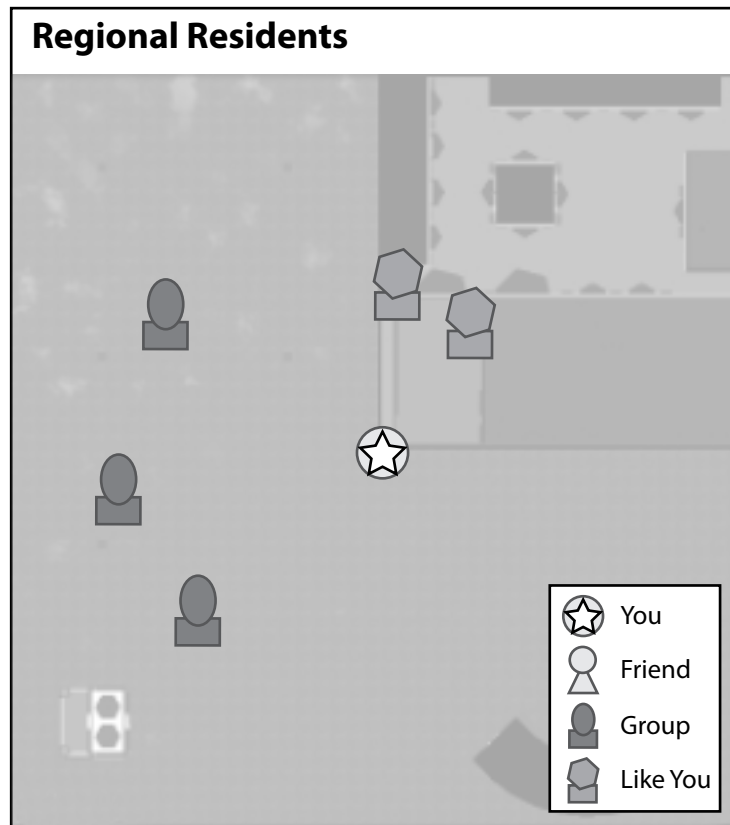


Figure 49 Regional Information

Goal: To address the agitation experienced with slow load times when teleporting to a new location and to orient the user to their current location.

Design & Rationale: This feature is presented to the user as an HTML page immediately upon teleporting to a new location. The HTML page resembles a newspaper and contains location-specific information including a map, regional highlights, comments on the region, the region's ratings, and upcoming events. In our Think Aloud studies of the current system, we observed that new users are prone to confusion when teleporting into a new environment, either by the slow load-time of the graphics, their position in relation to other Residents, or both (Appendix N-P p. 196). The survey revealed that new users have a hard time finding events to attend (Appendix C-D p. 95). Our Needs Validation showed that slow render time is frustrating for users (Appendix T p.258); a low-cost display of pertinent information will help alleviate this frustration. In our Concept Validations, Regional Information received some of the most positive feedback (Appendix U p. 266). Think Alouds conducted both in the spring and the summer showed that both new and expert users will explore the environment around them to locate something to do (Appendix N-P p. 196, W p.300). This feature has the added benefit of announcing to users where they are located if they have arrived by using the Wander button.

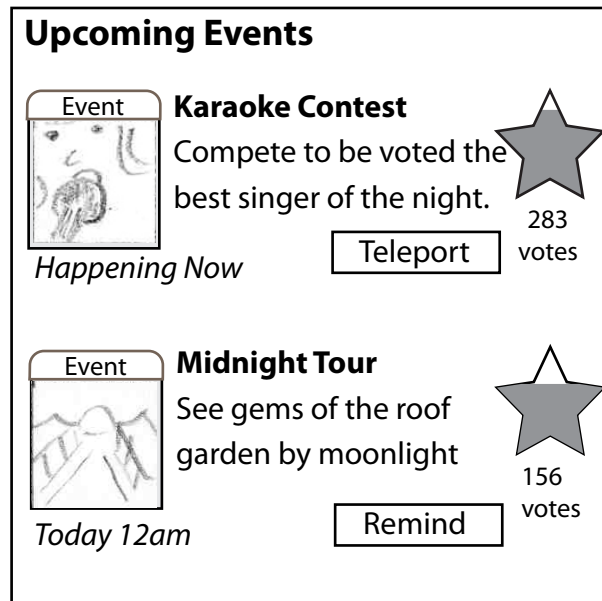
Tradeoffs: Regional Information will require maintenance to be fully effective. Someone needs to be in charge of placing the listings in the Regional Highlights and possibly the Upcoming Events as well (see pages 75 and 72 respectively). We propose placing this responsibility with the landowner to minimize the resources required by Linden Lab. Displaying Regional Information for frequented locations may annoy users. To combat this, we have a 'do not show this page for this region' option located on the top right corner. If a user has wandered to an event, this feature will still only display the title of the region at the top of the page. The page will have the event at the top of the Upcoming Events section, discussed on page 72, which could be highlighted. The user will still have the events rating bar and most likely an event notice to clue them in.

Feature: Map*Figure 50 Map*

Goal: To orient the user to the location they have just entered and to provide information about the people within the boundaries of the map.

Design & Rationale: The central feature of Regional Information, the Map displays the location of the user within the region along with the people around him or her. The Map distinguishes between friends, group members, and people like you with the employment of different icons. All other Residents are displayed as the same green dots that are currently used in Second Life's map and mini-map. In our Think Aloud studies of the current system, we observed that new users are prone to confusion when teleporting into a new environment, either by the slow load-time of the graphics that make up the environment, their position in relation to other Residents, or both (Appendix N-P p. 196). We also observed during these studies that new users are more likely to look around their near by places to find something to do or people to talk to than going using the search feature (Appendix N-P p. 196). Having a map will help them to orient themselves to find people, activities, and events.

Tradeoffs: Some users will not want to appear on this map, however this privacy issue also arises in Second Life's map and mini map features. Linden Lab has addressed this issue with privacy settings for who may find a Resident on these maps. We propose extending the same settings to this feature to minimize maintenance.

Feature: Upcoming Events*Figure 51 Upcoming Events*

Goal: To promote upcoming events to regional visitors.

Design & Rationale: Upcoming Events is a scrollable window that displays events in the order in which they will occur; those with the closest start time will be displayed first. Each listing will consist of a picture, a title, two lines of description, the start time and date and the total rating, if applicable. In addition, each listing will have a button which either teleports the user to the exact location of the event or allows the user to set a reminder for future events. The survey revealed that new users have a hard time finding events to attend (Appendix C-D p. 95), and in the Concept Validation, this aspect of Regional Information was most liked by users (Appendix U p.270). By providing this information while a user is waiting for the environments graphics to render, we hope to fill aid new users and booster event attendance. We do not feel that these listings require a mature content filter as the user will have already made the decision to teleport to a region that has mature content.

Tradeoffs: The display position of concurrent events needs to be resolved in a manner that satisfies both event producers. A nonpartisan solution would be to display the event with the most positive rating on top, however brand new events will not have been rated and so this solution will not be effective in all situations. Other meters on which to make the decision exist such as alphabetical order or random placement. We suggest persistent conflicts be resolved by the landowner.

Feature: Ratings

Figure 52 Ratings

Goal: To inform users of the community opinion of the location, which may remind the user to rate the place themselves.

Design & Rationale: Three Ratings appear in the upper right corner: Total, Friends, and Like You. These ratings mirror the Detail View of the Recommendation window. Throughout our users studies, Residents requested a better way than traffic, a measure used by the Search feature, to determine whether a location was worth visiting. These ratings hark back to the Reputation system that was sorely missed by one of our interviewees (Appendix E p.157), but to make it more reliable, we split the ratings into three groups as above.

Tradeoffs: In addition to the tradeoffs mention in sections 3.2.4, 3.5.1, 3.5.2, the information may be repetitive if the user has teleported from the Recommendations feature. Negative ratings may cause some landowners to request that the page is not displayed. Landowners can take their locations out of the rating system, causing the ratings to be removed, but the listing will not show up in the Recommendations feature.

Feature: Comments

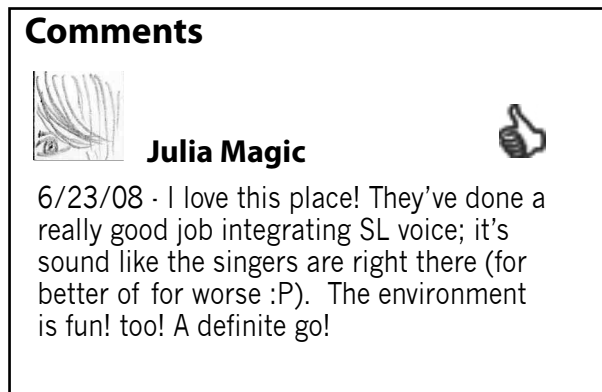


Figure 53 Comments

Goal: To give the visitor more information about the current location, informing readers of sites to see and things to avoid.

Design & Rationale: The Comments are located in the bottom right corner of the screen and are displayed similarly to the comments section of the Detail View. The Sort By option of that view should be added to this Comments section for versatility. The information in the comments will be valuable to some users as our Think Alouds on the current version of Second Life revealed that new users care how other Residents feel about an activity (Appendix N-P p. 196).

Tradeoffs: In addition to the tradeoffs mention in section 3.2.2, negative comments may cause some landowners to request that the page is not displayed. Landowners can take their locations out of the rating system, causing the ratings to be removed, but the listing will not show up in the Recommendations feature.

Feature: Regional Highlights

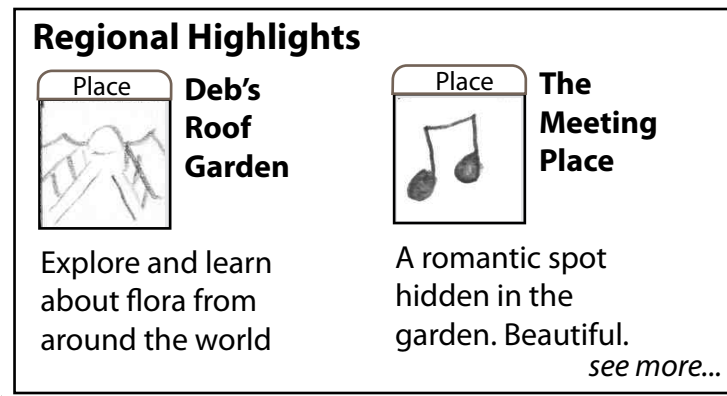


Figure 54 Regional Highlights

Goal: To promote specific activities and vendors within a region.

Design & Rationale: A region consists of many autonomous locations and activities, each with their own listing. Covering all of this information in the description of a region's listing is impractical, and once at a location, users may wish to experience activities that are located near by. Regional Highlights displays information about various listings that reside in the region and consists of a picture and short description. The user also has the option to see more of these listings by clicking a 'see more' link, which would refresh this section of the window. From our peer critiques we observe that people with minimal or no experience in Second Life often assumed that proximity to their current location was important. Displaying nearby activities should encourage new users to do more exploring. Think Alouds conducted both in the spring and the summer showed that new and even expert users will explore the environment around them to locate something to do (Appendix N-P p. 196, W p.300).

Tradeoffs: Competition may arise for placement in this section of the page. This could be resolved by paid placement in the Regional Highlights section, providing a monetary resource, but users may feel it is less trustworthy. Another option is a rotating feed of listings submitted to and approved by the landowner, which display in a cycle independent of who is viewing the page, evenly distributing which listings display first across users.

5.3.2 Profile Adjustments:

In this section we assume that the layout of the profile is as it is in its current state. While we are aware that the profile is soon to be remodeled, as we do not have the future format, we will be working with the structure as is.

Feature: Publicly Displayed Friends List

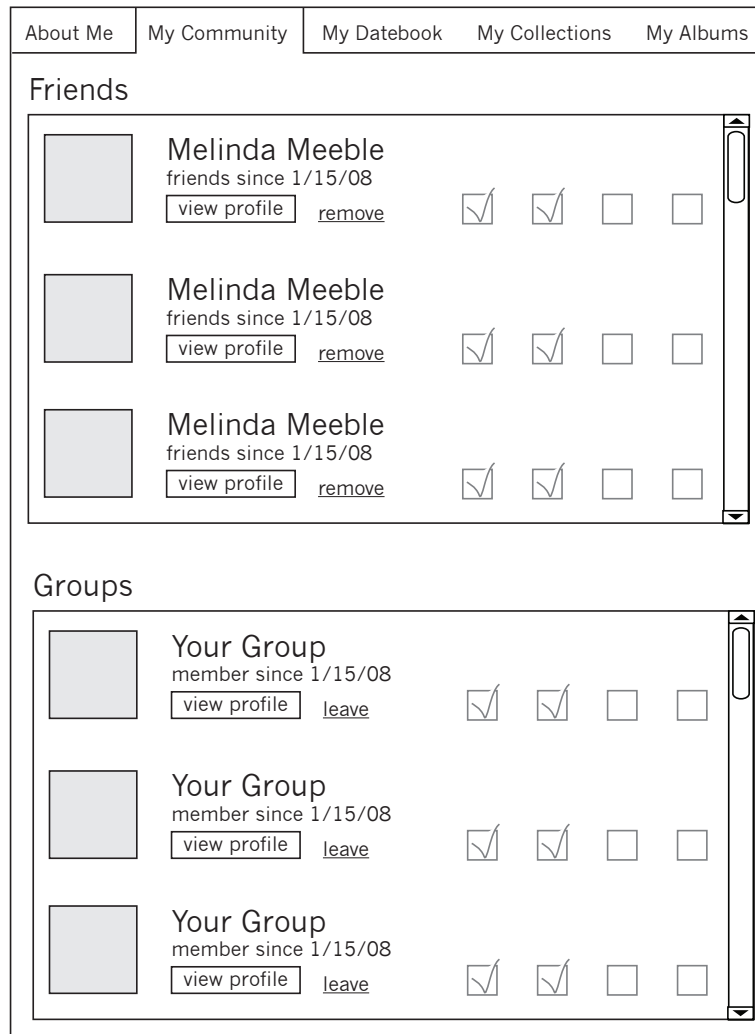


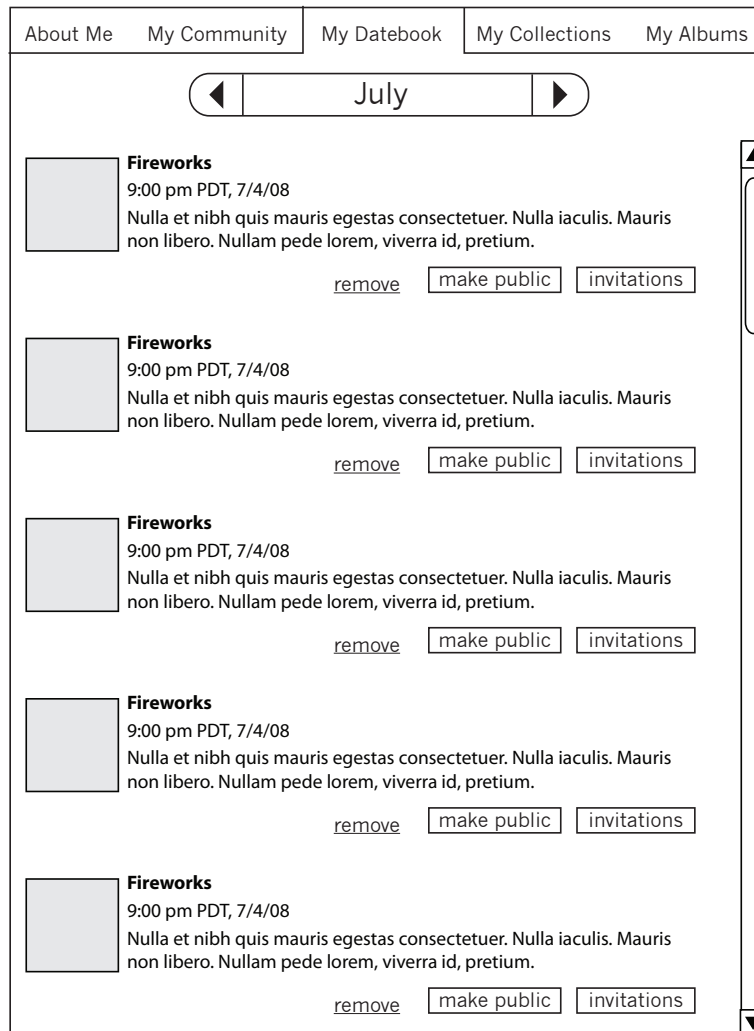
Figure 55 Community Tab

Goal: To encourage network crawling, the creation of new friendships, and trust of mutual connections.

Design & Rationale: We recommend devoting a tab of the profile to a publicly displayed friends list. This is in response to the current practice of using the current Picks section of the profile as a Friends List. This practice was brought to our attention by Linden Lab and confirmed by our survey and an expert Contextual Inquiry (Appendix I p. 176). In our survey, four respondents took the time to write in specific requests for a Friends List, especially on that was separate from their Picks List (Appendix D p.122). We

suggest avoiding the Top Friends feature available in some social networks and instead adopting a non-ranked list like what is available in Facebook to avoid any competition or hurt feelings.

Tradeoffs: Some users may want all or part of their friends list to remain private. Providing a visibility setting for each contact would resolve this issue but would have a high maintenance cost for the user.

Feature: Datebook*Figure 56 Datebook Tab*

Goal: To give the user a central organizer for his or her plans in Second Life, and to encourage other Residents to attend the same events.

Design & Rationale: Datebook should have its own tab in the profile and should allow the user to:

- store and maintain his or her In-World plans
- create alerts for those plans
- selectively display those plans to the public
- invite other Residents to join in those plans.

In the survey, people asked for more connection to their real life (Appendix C-D p. 95). This triggered the idea of the Datebook in our Creative Brainstorming session, and the event-alerting concept was favored during our Concept Validation and Think Aloud studies (Appendix Q p. 227, U p. 266, W p.300). A user's

experience in Second Life can be quite complex; having a tool to remove some of the cognitive load will assist the user in easy management of his or her In-World commitments.

Tradeoffs: While some users may not find this tab useful, since all plans default to private, we do not foresee any real cost to the user. However this is yet another tab within the profile and will add to its cluttered appearance.

Feature: Albums

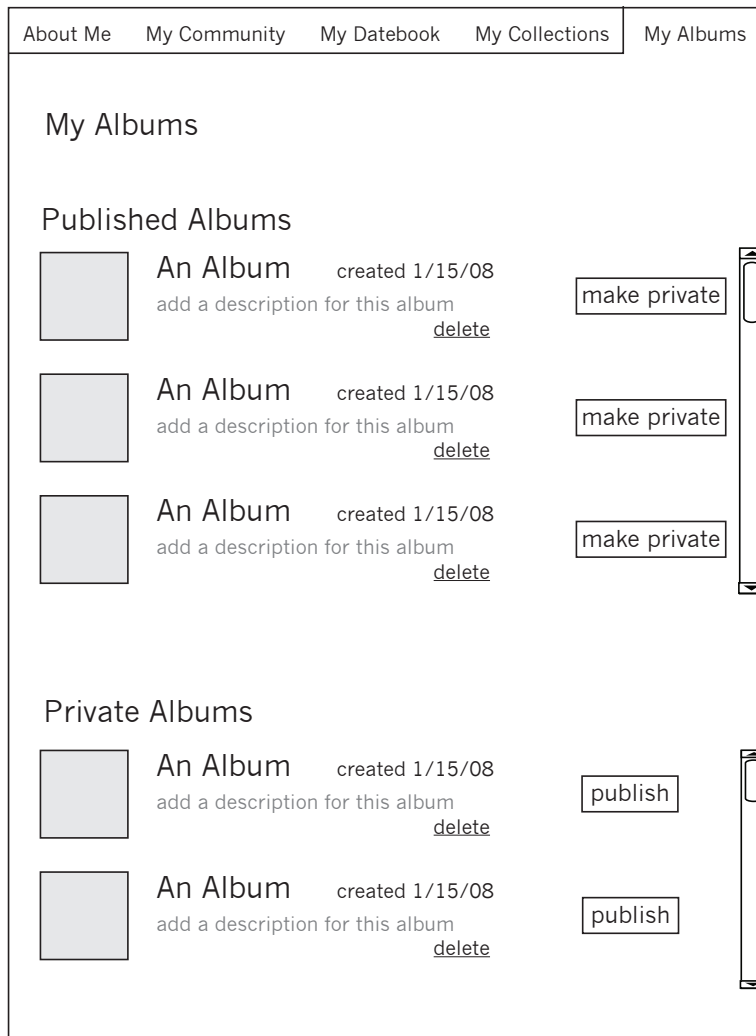


Figure 57 Album Tab (Manage)

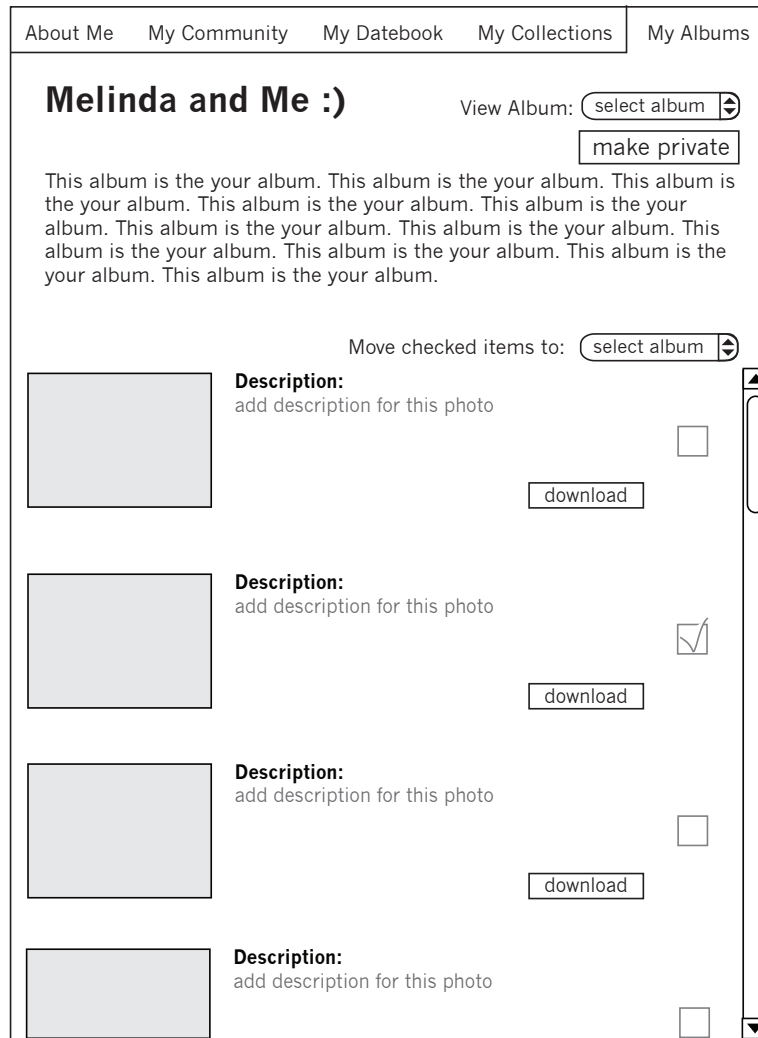


Figure 58 Album Tab (Single Album)

Goal: To give a home to the images that so many Residents enjoy producing and sharing.

Design & Rationale: A concept was first developed in our Creative Brainstorming session, Albums should be another tab within the profile and consist of all the snapshots a user has taken in world. These snapshots would default to private, but public sharing will be encouraged. The user may create separate albums to organize the pictures. We have seen in our Contextual Inquiries with social networking experts (Appendix F-H p.164) that image updates receive more attention than textual ones. As Second Life is more object centric than ego centric, we feel the images importance will be even higher than they were in our tests conducted in ego-centric social networks. We also observed in both our novice Contextual Inquiry and two Contextual Inquiries with Second Life experts that a photo album of In-World pictures is a cherished possession (Appendix K p. 182, M p.191).

Tradeoffs: A major concern is the increased memory required to house these images. Being that Second

Life already requires a large amount of bandwidth, storing the full-resolution images on the user's hard drive may be advisable. A second concern is that these albums may be used to sell items In-World, circumventing the need for rented or purchased retail space. However, a leap of faith will have to be made on either the seller or the buyer's part to complete the transaction, which diminishes the desirability of conducting business in this manner.

6. Conclusion

Our team has created a system that utilizes social networking to address the needs of both new and experienced users. Resident Recommendations takes into account community opinion and uses that contribution to enhance the searching experience. Our system facilitates directed network crawling by allowing users to see Residents similar to themselves. We enable users to customize their recommendations and their contribution to the community. We couple Residents' real life interests with their Second Life experience through interests and categories, which allows for an additional way to share their identity while remaining anonymous. Our system does not encompass all features necessary to make a complete social network, but provides a focus on which such a network should be built. By making Residents' Second Life experiences the focus of a Second Life social network, the greater concern of exposing the value of Second Life to new users can be addressed and more Residents can be retained.