SparkInfo: Designing a Social Space for Co-Creation of Multimedia Contents

by

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ABSTRACT

People can have more insights and social experiences when they collaborate on collecting, revisiting, and utilizing their contents, such as images and videos; however, designing a social space that offers rich co-creation and exploration of multimedia contents remains a challenge. I propose a new system, SparkInfo, which enables users to create, exchange and augment their multimedia elements in ways that are personally unique and sociable. SparkInfo is designed for a group of people, who have created multimedia elements for the same purpose or at the same event, to collect their elements in one place and have a meaningful experience of their co-created media resources. SparkInfo provides a social space for the co-creation of multimedia resources. In the process of exploring and embellishing their materials, SparkInfo users can create new ideas, stories, and information. By utilizing this process, the users are able to experience how SparkInfo can embody the cycle of knowledge building, re-mixing, and sharing.

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Chapter 1

Introduction

The Internet was initially used as a one-way communication platform where viewers consumed static content from the content providers. The one-directional model has shifted to incorporate users' feedback and to enable users to even create and share content with other users. Social media, wikis, and comment systems allow users to add information and enhance discussion around the content itself. Most of the systems are text-based and display information in lists (Figure 1-1), because those systems have been built to limit users' participation as cumulative additions to the initially posted articles.

Beyond that approach, I have explored ways to build a system for a group of users to create and share multimedia resources. Some of the existing systems encourage interactive participation through multimedia contents, such as photos and videos. However, current systems for collaboration on multimedia content are designed to pull content from multiple sources into a single list or timeline (Figure 1-2), and they lack the potential for social and playful interactions. Therefore, I created a new system, SparkInfo, whereby users can explore multiple timelines and perspectives of the shared multimedia elements.
The SparkInfo system is designed to provide an explorative environment where users can create, exchange, and play with their multimedia elements in ways that are personally unique and sociable. SparkInfo enables a group of users, who have a connection based on a common event, to share the scenes and information they have taken at that event as casual documentary without demanding organizing their posts.

After creating and posting their materials to the SparkInfo shared space as creators, the users become viewers who make playful selections to visualize the shared collection of media elements in multiple ways. In this respect, viewers can utilize the shared elements as building blocks for their own stories. The user’s creating, sharing, commenting, and remixing activities in the SparkInfo space and customized views can then be appropriated as starting points for other users’ reconstruction of their own interpretation of the space.

The SparkInfo system aims to provide a playful visualization experience and the new influence of its shared space where users can create, collect, and seek interesting media elements as part of their ongoing process of embracing,
relating, and exploring multiple multimedia elements that they have made at their special event. The SparkInfo users can build and remix knowledge through a series of actions and reflections, a process of making relations, and information found that emerges from the playful construction of the hyperlinked media.
Chapter 2

Previous Work

CommenTV is a time-sensitive social commenting system for multimedia content [Hwang 2012]. It is able to take and display texts, images, and related videos as social comments (Figure 2-1 and 2-2). In CommenTV, multimedia comments appear in parallel to the audiovisual content. In this way, users can experience both content and comments as authors and audience, i.e., producers and consumers. As a co-creative comment system for video content, CommenTV informs content creators about how viewers perceive the content and lets viewers participate in creating more social content.

Figure 2-1. Share Images as Comments on Audiovisual Content
While working on the CommenTV project, I found a new value of system for co-creation. People tend to add information and see the diverse perspectives of their contents [Diakopoulos 2011]. Beyond CommenTV, I have designed a social space, SparkInfo, for users to participate in the co-creation on their own multimedia contents rather than augment the information on the given video content.

The CommenTV system displays the comment layer, which is able to contain relevant image, video, or web page, on top of the video content. Though the system enables users to easily navigate the multimedia comment layer, this approach is mainly useful for annotating a video with multiple comments. In order to provide a more flexible plane where users can create, view, and change their multimedia elements and active comments in multiple ways, the SparkInfo system organizes the multimedia contents in the shared space.

SparkInfo empowers user to find personally meaningful information and casual linkage of the multimedia elements through viewing and interacting with various multimedia materials shared by a group of people who took part
in the same event. In addition, SparkInfo enables users to embed multimedia comments into the shared elements as part of their co-creation activities.
Chapter 3

Related Work

To design SparkInfo that enables users to present and share dynamic perspectives of their media elements using co-creative interactions, I reviewed the following related work.

3.1. Media Fabric & Stories

Media fabric is a collection of media artifacts and programs that allows participants to make meaningful dialogues, arts, stories, and social interactions [Davenport 2004]. In the media fabric, the future media explorer needs to move fluidly between creation and consumption, between making, sharing, and exchanging. SparkInfo extends the media fabric approach and provides an experimental tool for users to participate in creating and exploring the interconnected and evolving multimedia elements.

SparkInfo offers users the ability to create their own stories by providing an expressive way to play with and explore the construction of meaning. Storied Objects [Lee 2007] and StoryMat [Ryokai 1999] show how they are integrated into the social and living environment, but they have only audio input and output. When it comes to multimedia content, Storied Navigation [Shen 2007] lets users combine a sequence of video clips based on their roles in telling a story, and Mindful Documentary [Davenport 2004] assists the videographer by predicting and suggesting potential next scenes with the
mindful camera. Instead of integrating the scenes into a single channel, SparkInfo enables users to spread multiple images and videos in the shared space as creators and to explore interesting information, interconnections, and visual layouts of the shared multimedia contents as viewers in their own ways using the SparkInfo system.

3.2. Co-Creation Elements

Peers [Cohen 2005] and Dandelion [Chi 2010] are examples of workspace for collaborations in design and research. Sketching and collaborative writing/blog posting are one of the most widely studied aspects of creative collaboration. In many settings, the artifacts generated throughout the creation process are not only texts, but also pictures, videos and more flexible, improvisational or abstract artifacts. SparkInfo utilizes multimedia elements for users to have a playful experience and create special meanings among them and their elements. In this way, SparkInfo blends the co-creation process with users’ ongoing events and practices of everyday life.

3.3. Active Essays

Active Essays are forms of narrative expression in which computational objects are integrated with text, image, and video [Resnick 1996]. For example, an interactive multimedia object of a new concept can be connected to the text description of the concept, so that viewers actively explore the concept. SparkInfo supports not only active viewing but also active creating through its multimedia elements and comments.

The SparkInfo system utilizes the multimedia content as a medium for active essays. Most systems for sharing and collaboration contain texts, images, and videos as passive objects. On the other hand, SparkInfo enables users to
create and mix their multimedia contents as active objects with other media forms in the shared space.

While sharing new multimedia elements in the interactive SparkInfo space, users can also refine and enrich the shared elements by adding their active multimedia comments. In this manner, SparkInfo provides new possibilities for creative expression and collaboration.

In active essays, small variations in the initial configuration of the parts can lead to dynamic changes in the resulting patterns. Similarly, through creating new multimedia elements and changing the elements with comments in the SparkInfo space, users can find new information and patterns and have new perspectives on the shared materials and events.

3.4. Externalizations and Internalizations through Actions and Reflections

Creativity arises from the interaction between a person's thoughts and a socio-cultural context [Engeström 2001]. The dynamic cycle of externalization and internalization is an essential part of creativity and knowledge building in socio-cultural and technical environments. Externalizing ideas is a matter of actively reconstructing it, forming new associations, and expressing concepts in external representations [Fischer 2004]. SparkInfo provides a social space where people can externalize their thoughts by sharing and remixing their multimedia elements and internalize diverse perspectives on the shared elements by reviewing and interacting with the externalized elements and comments. Their actions in the shared SparkInfo space and reflections on their interactive experiences promote collective externalization and internalization.
SparkInfo can be a reflective design space that awakens and contextualizes people’s thoughts and ideas by offering them new ways to experience multimedia objects and reflect their actions on the objects collaboratively. The SparkInfo users can obtain dynamic and reflective feedback regarding their creation and interaction. They are able to respond by both reflection in action and reflection on practice [Winograd 1996]. They can receive instant feedback about their activities while interacting with multimedia elements and comments in the SparkInfo space. They can also imagine their further externalizations while experiencing and internalizing the repetitive design and creation process in the shared space.
Chapter 4

System Description

4.1. System Design Approach

SparkInfo is designed for a group of people who have prepared or attended the same event and want to collect their multimedia elements related to the event into one place where they all can visit and have a meaningful experience of their co-created media elements. SparkInfo aims to support users’ everyday life experiences and creative interactions by letting them share and redesign their multimedia elements in ways that are personally unique and sociable.

In online creative collaboration projects, the thread creator typically takes on the role of leader, while every other participant takes on the role of artist [Luther 2010]. The leader can set criteria or modify their work. Instead of having a single leader or author, SparkInfo lets all users be creators or viewers. They can switch from creator to viewer mode at any time. In this way, SparkInfo democratizes visualization and offer each user a unique kind of media experience.

Users can create new multimedia element and add multimedia comments to the shared elements in the SparkInfo space. When users find certain multimedia elements interesting, they can annotate them and share their comments with others. Groups of people are able to produce more insights when they can re-interpret each other’s ideas [Paulus 2000]. Social commenting
is an example of sharing ideas and shifting from viewer to co-creator. The major motives of comment writing include sharing information (e.g., facts, insights, knowledge, context) and adding information in order to further discourse [Diakopoulos 2011]. In addition, the top motive of comment reading is social interaction because people tend to see diverse views in the comments, such as other perspectives or dimensions. In particular, there is unexplored potential in embedding rich information as a related comment to the shared multimedia content. Thus, SparkInfo enables users to incorporate multimedia comments to the multimedia elements in the shared space.

Figure 4-1. SparkInfo User Interactions
All users are able to participate in embedding, commenting, and utilizing their multimedia contents. When users revisit the shared space, they can have unique and different experiences. They will be able to experience how SparkInfo can embody the cycle of knowledge building and sharing, which supports a process of creating, using, and re-mixing.

4.2. The SparkInfo Elements and Comments

SparkInfo enables a group of users to trigger co-creation of their media collection by sharing a unique link to the SparkInfo space. SparkInfo provides a shared space where users can upload their multimedia elements as creators and interact with the elements as viewers. In addition to the shared space, the SparkInfo system has the publish function for users to keep the information they created in the personal space.

As a web-based system with HTML5, JavaScript, PHP and MySQL, SparkInfo lets users add multimedia contents as new elements to the shared space (Figure 4-2-1) or comments to the corresponding elements (Figure 4-2-2). The multimedia comment is displayed in the expandable comment area of the element. In other words, each element is a component of the SparkInfo space and a post that can display users’ multimedia comments. Users can easily navigate, expand, or change the elements anytime. The comments can be utilized to augment and explore the shared multimedia elements in new ways.
Figure 4-2-1. Add Multimedia Content as a New Element to the Shared Space

Figure 4-2-2. Add Multimedia Content as a Comment to the Corresponding Element
The SparkInfo’s shared media collection consists of the user-generated multimedia elements and comments. The system provides menu options for viewers to explore the media collection in various ways based on key information of the elements and the comments. The system creates unique information (e.g., media type, category) of the elements and comments when users post them. The information is useful for finding new connections among the multimedia elements and comments during the explorative visualization of the media collection.

The users’ knowledge, stories, and information needs are not satisfied by one or several multimedia elements but rather by a series of visualizing selections, a process of making relations, and bits of information found along the way. In this respect, SparkInfo introduces a new way of exploring and interconnecting the shared multimedia contents, comments, and their real space event.

4.3. The SparkInfo Spaces

When logging into the system and clicking the system title, “SparkInfo,” the system displays links to spaces of various groups (e.g., Festival of Learning, Ashdown House Events). User can create a new space or select one of the links to get into the group’s space and start interactions with the group’s users (Figure 4-3).
4.4. View and Create Everything in One Space

The SparkInfo users can design and view everything in one space (Figure 4-4). SparkInfo gives users an overview of the rich information, a set of multimedia elements, to let them share and comment on the information easily. After having this overview of titles, preview icons of media types, images, and videos of elements in the SparkInfo space, users can select and zoom in to focus on elements of interest. When an element is clicked, the element is displayed as an individual component in full length of the page in order to let users see its multimedia contents and add comments in larger view (Figure 4-5).
Figure 4-4. Design and View All Elements in One Space

Figure 4-5. Design and Review Each Element in Larger View
4.5. Elements in Columns of the Flexible Plane

Unlike the fixed lists of current online communities and commenting systems, the SparkInfo space organizes its multimedia elements in the flexible plane. The plane is designed for the SparkInfo users to switch from creator to viewer mode anytime. The users have capabilities to view and arrange the multimedia elements in multiple ways within the plane. They can select, drag, and drop the shared elements to reorganize the elements, or retrieve some elements to focus on a specific element using menu options.

SparkInfo provides a space where users can display and manage multimedia resources effectively by combining the advantages of both the breath-oriented plane and the depth-oriented list (Figure 4-6). The SparkInfo space has the list-like frame in order to prevent too much overlaps among elements on its flexible plane and arrange elements in a constructive way. To provide the neat layout and some margins among the components, SparkInfo has three columns within the flexible plane. Users can rearrange components across the loosen columns.
4.6. Create, Share, and Change Multimedia Contents

The SparkInfo system empowers users to create multimedia elements and comments with others collaboratively in the shared space. The system enables them to create, share, and change multimedia contents easily. The system provides the content creation and editing tools to let them create, share, and remix different types of contents as elements and comments and see their activities in one space. By providing fully integrated front end and back end tools, the system supports three types of content changes in the
SparkInfo space: creating new elements, changing the elements with multimedia comments, and rearranging the elements.

In order to allow users to add and edit multimedia contents easily and apply their changes quickly, the SparkInfo system enables direct content creation and editing on the SparkInfo plane with its front-end tools (Figure 4-7). When the user hovers the mouse over the editable area of the SparkInfo space, the system presents the ‘Edit’ button of the in-line content editing tool. By clicking the button, the user can start creating and editing contents within the space. First of all, the user can create and customize a title of the SparkInfo space and a sub-title for short description of the space (Figure 4-8). The user is also able to customize an existing element’s title (Figure 4-9).

![Figure 4-7. Addable and Changeable Contents in the SparkInfo Space](image-url)
Figure 4-8. Create and Customize a Title and Sub-Title of the Space
The multimedia content creation starts with adding a new element to the SparkInfo space. The system provides the front-end menu, Add New, with rich content editor in order to create a new element. When the user creates and submits a new element to the SparkInfo space, the system saves the element’s author and content information to the database server. The system allows the user to assign a category to the element in order to use the category later for filtering and viewing elements in the shared space (Figure 4-10).
Figure 4-10. Create a New Element and Assign a Category
After the user submits the new element to the shared space, the user and other users can add multimedia contents, such as messages, pictures, and videos, to the element as comments and change contents of the elements by using the SparkInfo's in-line content editing tool (Figure 4-11). The in-line tool activates its functions on the SparkInfo space with other elements, so the user has an overall view of the space while changing the element.

The in-line editing tool has easy-to-use interface and ability to foster collaboration in designing and sharing multimedia resources. While the in-line editor is in use, the system highlights the border of the change-in-progress part of the element (Figure 4-12).
SparkInfo

MIT Media Lab Festival of Learning

Lunchtime Talks

We had a picnic lunch on Day 2 of the Festival of Learning. We introduced the interesting sessions we attended to each other.

Festival of Learning, Day 2

Sessions included Ruby on Rails, Chiptune Laptop Orchestra, CAD, Making Mochi, the Frontiers of Physics, Listening on Repeat, Beer Brewing, MMOs, Settlers of Catan, Improv Comedy, etc.

Day 1: Learning from Each Other

This is a short summary video of what happened during Day 1 at the Festival of Learning. A two-day festival from January 27–28, the Festival of Learning is a time for us to teach, learn, and collaborate on any topic we wish. We had participants from the MIT Media Lab, CMS, and ACT. This video was shot, edited, and presented in the same day.
Figure 4-11. Add or Change Content of the Element Using In-Line Editor

Figure 4-12. Highlighted Borders of the Change-in-Progress Part of the Element

If the user tries to leave the element without saving changes, then the system highlights the border of the change-in-progress part of the element in yellow to help the user remember to save or cancel changes.
The in-line content editing tool is designed not only for inserting a new photo, but also for resizing and rearranging photos in the element (Figure 4-13). When the user adds more than one photo to an element, then the system automatically creates preview photo gallery of the element with jQuery (Figure 4-14).

Figure 4-13. Resize and Rearrange Photos in the Element
By using the front-end content creation and editing tools, the SparkInfo users are able to experience different types of comments: Text comment in the list vs. multimedia comment in the element, and one element as a comment vs. multiple comments inside of an element. These types of comments that the SparkInfo system provides will be described in the following sections.

4.7. Active Multimedia Comment vs. Text-Only Comment

The SparkInfo’s multimedia commenting is different from typical text commenting because it is a more active and co-creative commenting with utilizing the multimedia elements in the shared space. To offer the new type of commenting, the SparkInfo system enables the in-line content editor, photo and video comments, preview photo gallery, title and category creation, etc.

SparkInfo supports both new multimedia comments and traditional text-only comments to let users experience and compare both types of comments. The list of text-only comments has a separate space apart from the element
(Figure 4-15). On the other hand, multimedia comments are applied to the content of the element as augmented and remixed information of the element (Figure 4-16).
4.8. Comment as a New Element or as a Change in an Element

The SparkInfo system enables the user to add multimedia content and thoughts as a comment in two different ways: a comment on the overall SparkInfo space that contains many components (i.e., elements) by posting a new component (Figure 4-2-1), and a comment on the specific component by adding new content to the component (Figure 4-2-2).

Adding a new component could be a way to express the user's overall impression on the shared components or spark new insight with more content. When commenting, the SparkInfo users preferred to add and remix some parts of the shared components (Figure 4-17) rather than post a new component. They usually created a new component in order to share information about another sub-event or start new sub-story of their event within the SparkInfo space.
The SparkInfo users added pictures and videos to the elements as their comments.

Figure 4-17. Comments as Changes in the Elements
4.9. Review and Refine Elements Using the Back-End Menus

In addition to the direct changes on the SparkInfo plane, the system also enables users to review changes and refine settings of the space and the elements using the back-end menu items.

Each element can describe its essential media type with presenting its preview icon in the SparkInfo space. From the back-end menu, users can select and assign the element’s media format (e.g., image, text, video) and its preview icon (Figure 4-18).

![SparkInfo](image)

**Figure 4-18. Preview Icons Represent the Media Formats of Elements**

While the SparkInfo system enables users to filter and rearrange elements by using its front-end keyword and category searches, the system also supports their rearrangements of the elements by using its back-end drag and drop.

The SparkInfo system maintains the list of changes of each element for users to review and compare changes among users. The system introduces a new
type of remix by giving them the opportunity to review, undo, and redo their changes on elements.

4.10. Rearrange Elements

The SparkInfo system supports three types of changes and remixes: creating a new element, changing elements with multimedia comments, and rearranging elements. The third type of remixing is the rearrangement of elements. Drag-and-drop (DND) is the comfortable and intuitive method of reorganizing elements. The SparkInfo system has the jQuery-based function for DND and another jQuery-based function for in-line editor. When the functions are called from the front end together, they conflicted with each other. That’s because they access the same fields and table of elements in the database. Therefore, the DND arrangement of elements is implemented and imported in the back-end menu (Figure 4-19).

By using the back-end rearrangement menu, drag the element, “Day1: Learning from Each Other,” and drop it under the “Playful Learning” element. After updating this rearrangement, “Playful learning” is shown upper than “Day1: Learning from Each Other” in the SparkInfo space.
Figure 4-19. Drag and Drop Rearrangement of Elements
4.11. Review and Compare Changes

The SparkInfo users can create new elements, add multimedia comments to the elements, and rearrange the elements. While they have those active changes in the SparkInfo space, their changes can be reviewed by each other.

When they make the changes, their usernames, types of changes, and time stamps are saved on the server. The SparkInfo system calls its PHP script to retrieve information of the users, changes, and time from the server and display the information in the list of changes (Figure 4-20). The system lets users select any two items from the list to compare changes, which are made by different users or at different times. They can also undo and redo changes and apply the changes to the shared space. This comparison function enables users to review and remix their changing processes.

![List of Changes](image)

Figure 4-20. Review and Compare Changes of the Element
4.12. Filtering Options

The SparkInfo system has menu items to provide more meaningful experience with elements and visualize the elements based on the augmented information and comments of the elements. By assigning and selecting categories to their elements, the SparkInfo users can more easily discover and understand the relationship between media elements. They can filter some elements to focus on a particular element by using category and keyword searches (Figure 4-21). In this manner, users can adjust salience of the shared content to themselves. All of their adjustments affect only their own perspectives.

Figure 4-21-1. View elements categorized as Day 2 related contents
SparkInfo supports the user to save an instance of the shared space as a published perspective using the back end menu. The user can keep a personal perspective, special meaning, or specific arrangement of the elements apart from the shared space.

To maintain both a shared page that applies activities from all users and multiple pages that separate and keep activities from individual users, the system creates a connection of the pages. When users make changes on the shared page, the SparkInfo system updates the same database table. When
they publish their own pages from the shared space, the system starts using separate database tables. In this manner, users are able to have both public and personal perspectives while using the SparkInfo system.

Not only the shared page but also the published page can be appropriated as a starting point for other users to change and re-create as their own interpretation of the space. The user is able to share the published page with other users or place a link of the page to other online spaces where it can fascinate newcomers. In this way, SparkInfo can motivate users to find potential values and to start social behavior.
Chapter 5

Evaluation

SparkInfo aims to offer explorative environment where users can share and experience their multimedia elements in ways that are unique, playful, and sociable. SparkInfo enables users, who have created multimedia elements at the same event, to collect their elements in one place and have meaningful experience of their co-created media resources.

I had user study sessions to evaluate the impact of the SparkInfo system on people’s experience of the shared multimedia elements within the SparkInfo’s social space that reflects their events in real space. The purpose of this user study is to assess how the system provides better and easier ways to create, organize, and navigate the co-created multimedia resources. I asked groups of people to create and exchange multimedia resources of the events that they attended using the SparkInfo system and complete questionnaires about the system. The user study sessions were designed to test SparkInfo with participants of the actual events, such as social events at the MIT Ashdown House and the Festival of Learning sessions at the MIT Media Lab.

The questionnaire results, open-ended feedback, logged user interactions, and the created views during the user study sessions have been reviewed to investigate the role of SparkInfo in sparking and facilitating meaningful media experiences.
5.1. Study Procedures

I selected two groups for my evaluation after reviewing their sense of community event and their configuration of multimedia and social space. People in those two groups are (1) student officers who have organized social events at the MIT Ashdown House and (2) student members who have attended the Festival of Learning sessions and other group events at the MIT Media Lab. I recruited participants from those groups by sending email messages.

For the user study sessions, participants from group (1) explored multimedia resources of weekly coffee hours at the Ashdown House, and participants from group (2) utilized multimedia resources of the Festival of Learning at the Media Lab. SparkInfo users from the two groups had different contents and comments based on their group events, but they had the same study procedures and similar interactions (Figure 5-1) within the SparkInfo space. A personal computer with the system was used in a typical office environment. As an investigator and facilitator, I seated in the same office when participants interact with the system.

Participants were instructed to interact with the SparkInfo interface using a mouse and keyboard. I briefed participants on the system and instructed them to read an informed consent prompt screen. After logging in and starting using the SparkInfo system, participants were asked to create a title of the SparkInfo space for collecting and organizing materials of their event. They also added a new element to the space and several multimedia contents (e.g., images and short video clips) taken from their event to the related elements.

The SparkInfo users customized parts (e.g., title, content, and category) of an element and added both text and multimedia comments to elements. In addition to experiencing different types of comments, they compared their comments with others. The SparkInfo users had enough time to explore the
multimedia elements and comments. They also experienced creating and saving the customized arrangement of the multimedia elements and comments. After trying this system, participants completed a questionnaire about the system.

- Login
- Create a title of the SparkInfo space
- Create a sub-title for short description of the SparkInfo space
- Customize the title of an existing element
- Create a new element
- Add a message to an element
- Add a picture to an element
- Add another picture to the element and view those pictures in the element’s photo gallery
- Resize and reorder pictures in the element
- Add a video to an element
- Select or Change the element format and its preview icon
- Assign and change category
- Experience different types of comments
  (1) Text comment in the list vs. Multimedia comment in the element
  (2) One post as a comment vs. Multiple comments inside of an element
- Review comments and compare changes among users
- Rearrange elements by drag-and-drop and filtering functions

Figure 5-1. Study Procedures and User Interactions

5.2. Questionnaires

In order to measure the overall impact of SparkInfo on exploring and co-creating the shared multimedia elements, I asked the SparkInfo users to complete the Likert-scale, multiple-choice, ordinal, and open-ended questionnaires after using the system.
The study participants reported their usage on a Likert scale of 1 (Strongly Disagree) to 5 (Strongly Agree) (Figure 5-2).

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Overall, I am satisfied with this system.

The system makes the multimedia-based task I want to accomplish easier to get done.

The system is useful in organizing and navigating multimedia resources.

The system is flexible to interact with.

The system has increased my interactions with multimedia resources.

It is easy to explore new features of the system by creating resources.

I would recommend it to friends.

Figure 5-2. Users’ Reported Usage of SparkInfo on a Likert Scale

The SparkInfo system can support both individual creation and collaborative sharing of multimedia resources. Participants were asked to state their preferences in using the system alone or with friends. There was a clear
preference (90%) for using the system and its capabilities with friends (Figure 5-3).

Would you prefer to use the system alone or with your friends?

- Alone: 10%
- With friends: 90%

Figure 5-3. Using the SparkInfo System Alone or with Friends

Unlike the fixed list of current commenting systems, SparkInfo organizes its multimedia contents in the flexible plane. To display and manage multimedia resources, 70% of participants preferred the breath-oriented plane to the depth-oriented list (Figure 5-4). Some participants would like to have the list-like frame to arrange resources in a structured way. To provide the neat structure and some margins among the components, SparkInfo has three columns within the flexible plane. Users can rearrange components across the loosen columns.

Which one do you prefer to display and manage multimedia resources?

- Depth-oriented list: 30%
- Breadth-oriented plane: 70%

Figure 5-4. Depth-Oriented List vs. Breath-Oriented Plane
Participants actively utilized both multimedia and text comments while using the SparkInfo system. When they were asked to select one of the comment types, 60% of participants chose multimedia as more preferred type for their comments. Other participants, who preferred text to multimedia, said they would take a shorter route to leave comments with text though they also liked the SparkInfo’s multimedia commenting and remixing functions (Figure 5-5).

While using the system, you experienced both text-based comments and multimedia-based comments. Which data type do you prefer to use as comments?

The SparkInfo user is able to add the user’s contents and thoughts as a comment in two different ways: a comment on the overall SparkInfo space that contains many components by posting a new component and a comment on the specific component by adding new content to the component. When commenting, participants preferred to add and remix some parts of each component rather than post a new component to express their overall impression on the shared components (Figure 5-6).
Which one do you prefer to do in order to leave your comments and thoughts while using this system?

- Posting a new component: 30%
- Adding and remixing some parts of the shared components: 70%

Figure 5-6. The Users’ Preferred Methods of Adding Comments

The SparkInfo system can support both one shared page and multiple pages for a group of users. All participants would prefer to see their final outputs in one shared page rather than multiple pages when adding, sharing, editing and remixing multimedia resources. Though some participants would like to have sharing settings to control their changes in a shared page, all participants prefer to interact with one shared page that applies activities from all users rather than the multiple pages that separate and keep activities from each user (Figure 5-7).

When a group of users add, share, edit and remix multimedia resources, would you prefer to see their final outputs in one shared page or multiple pages?

- Multiple comparable pages, which contain activities of each user: 0%
- One shared page, which contains activities of all users: 100%

Figure 5-7. One Shared Page vs. Multiple Pages
Many participants chose “creator & designer (31.7%)” as the primary role they would take when interacting with the system (Figure 5-8). They would also like to grasp the collaboratively shared and remixed contents as a viewer (28.9%), read and write comments as an active communicator (20.2%), and rearrange and filter components as an organizer (19.2%).

**Please provide the primary role you will take when interacting with the system. Please also state your priorities within the roles. (Figure 5-8: Average Percentage Score)**

<table>
<thead>
<tr>
<th>Role</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creator &amp; Designer</td>
<td>31.7</td>
</tr>
<tr>
<td>Viewer</td>
<td>28.9</td>
</tr>
<tr>
<td>Communicator</td>
<td>20.2</td>
</tr>
<tr>
<td>Organizer</td>
<td>19.2</td>
</tr>
</tbody>
</table>

![Figure 5-8. The Roles of the SparkInfo Users](image)

The SparkInfo users expected to access “image (32.7%)” most frequently from the system in terms of data types (Figure 5-9). In addition to image, they would like to interact with other types of content: video (28.9%), text (25.9%), and sound (12.5%).
Please select one of the following data types that you expect to access most frequently from the system. Please also state your priorities. (Figure 5-9: Average Percentage Score)

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image</td>
<td>32.0</td>
</tr>
<tr>
<td>Sound</td>
<td>15.0</td>
</tr>
<tr>
<td>Text</td>
<td>28.0</td>
</tr>
<tr>
<td>Video</td>
<td>35.0</td>
</tr>
</tbody>
</table>

*Figure 5-9. The Commonly Used Data Types in the SparkInfo System*

The most preferred type of changes and remixes the SparkInfo users would like to have when using the system was editing and adding some contents to the existing elements (i.e., commenting on posts). They also consider remixing and changing multimedia materials in the SparkInfo space by adding new posts and rearranging elements (i.e., reordering or filtering posts) (Figure 5-10).

**Which type of changes and remixes do you want to do with this system? Please also state your priorities. (Figure 5-10: Average Percentage Score)**

<table>
<thead>
<tr>
<th>Change Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adding new elements</td>
<td>35.5</td>
</tr>
<tr>
<td><strong>Editing and adding some contents to the existing elements</strong> (i.e., commenting on posts)</td>
<td>38.7</td>
</tr>
<tr>
<td>Rearranging elements (i.e., reordering or filtering posts)</td>
<td>25.8</td>
</tr>
</tbody>
</table>

*Figure 5-10. The Users’ Preferred Types of Changes and Remixes*
Participants indicated their primary purpose of using the SparkInfo system was sharing multimedia resources and comments (34.6%). They also used the system to explore and navigate various multimedia resources effectively (26.9%), create multimedia resources with others collaboratively (26.0%), and customize multimedia resources (12.5%) (Figure 5-11).

**What would be your primary purpose of using this system? Please also rank the selection category. (Figure 5-11: Average Percentage Score)**

- Exploring and navigating various multimedia resources effectively: 26.9%
- Customizing multimedia resources: 12.5%
- Sharing multimedia resources and comments: 34.6%
- Collaboratively creating multimedia resources with others: 26.0%

*Figure 5-11. The Purposes of Using the SparkInfo System*
5.3. Open-Ended Feedback

In the questionnaire, I asked the following open-ended questions to users in order to gain a better understanding of benefits and values of specific features in the SparkInfo system: What’s your favorite feature or function of this system? Did you have any interesting experience while using the system? When asked these questions, their responses were generally congruent with my research goal of supporting collaborative creation and sharing of multimedia resources in the SparkInfo’s social space.

One of the interesting experiences that participants had while using the system is creating, sharing, and changing multimedia content easily. UserS1 said, “Sharing different types of materials in one page without executing many commands. I think this is the characteristic of the SparkInfo system. It’s distinguishable and not a common feature. Everyone can create multimedia element with others and see what others are talking about and changing. The interesting experience I had was sharing things easily and creating multimedia elements collaboratively within the SparkInfo space.” UserA2 said, “What I like about SparkInfo is that it is easy to add and edit multimedia content and see the results very quickly.” Likewise, UserP1 answered that he was particularly interested in using the easy in-line content editing tool. UserS4 also said that easy-to-use interface and ability to foster collaboration with multimedia resources are his favorite things of the SparkInfo system.

SparkInfo users were also interested in active commenting and remixing. They liked to experience a new form of commenting that goes beyond general text commenting. UserH1 said, “I had the delightful experience of dynamic commenting and remixing instead of text-only commenting.” UserP1 said one of his favorite features was drag-and-drop rearrangement of components for remixing. UserS3 said her favorite function was active commenting using
multimedia content. She also said, “One of the interesting things is I could experience the combination of viewing, creating, remixing, and commenting on shared materials as a SparkInfo user.”

As UserS1 mentioned, placing multiple things in one space was one of their favorite features of SparkInfo. UserD1, UserS2, and UserS3 also liked to view everything in one space. UserS2 said, “The most impressive thing is the overall view of SparkInfo supports the mechanism of reflection. Sometimes, it’s even real-time reflection. By designing and viewing the SparkInfo space, users can give and get reflective feedback on their activities and events. I like to have this overview of titles, images, and videos in the SparkInfo space. I won’t even read all texts. I want to skim and grasp first and go deeper into details later.” UserS3 said, “It’s interesting to have a combination of overviews of some events, which a group of people joined, with all types of multimedia.

The SparkInfo users were interested in exploring the combination of the past, the present and the future. They were able to get a broader and deeper view of the events that they had been involved in by sharing their multimedia elements and comments about the events. UserS2 liked that SparkInfo could be used as a post-event tool for documentation, a current-event tool for reflection, and a pre-event tool for planning the next event together. UserS3 said, “One of my favorite things of SparkInfo is keeping history and memory that I have made with other people.”

The next outstanding attributes of SparkInfo that users liked are its design layout and visualization. UserJ1 said, “The SparkInfo’s great asset is enabling content sharing based on its visual information and layout. It’s hard to find both text and visual information associated with a shared resource in existing content sharing systems. On the other hand, SparkInfo offers more flexible and straightforward ways to start remixing and rearranging shared
resources by presenting visual information of the resources in the SparkInfo space effectively. In this way, it provides more collective and active ways than current file sharing sites.”

UserS4 said he liked visually appealing layout and consistency of SparkInfo. He said, “I particularly enjoyed being able to customize visual layout and organization while still within the WYSIWYG (What-You-See-Is-What-You-Get) interface.” UserA2 said, “I like how clean the design is. The SparkInfo design makes it a simple-to-learn-and-use system.” UserD1 also said “Its visualization is good” with mentioning his favorite feature that SparkInfo has preview icon as a summary of the content type.

I also asked participants how they would introduce the SparkInfo system to their friends in order to know how they recognize, use and describe the system. Participants accentuated multimedia capabilities of SparkInfo in its social space. They said, “This is a system that we can use to interactively share all types of content while retaining the ability to more fully customize and craft how that sharing and commenting is done.”

The SparkInfo users said they would introduce SparkInfo as a system for a group of users, who get involved in some type of social activities, to their friends. They said, “When we have series of social activities, we can exchange our materials, such as photos, videos, texts to share our experiences and opinions. We can keep using SparkInfo in more collective and active ways.”

UserS3 stressed that SparkInfo is a unique space for a group of people, who have a common interest, to share their multimedia materials, ideas and their previous events, experiences, etc. Similarly, UserP1 introduced the system as a mixture of social media and invitation system, which allows people who have a common event and interest to share user-generated content.
UserD1 said he would suggest his friends to explore and build spaces using this system. UserD1 said, “I have already had many shared projects with them using existing tools. However, they can’t support multimedia-based flexible interactions. I would say SparkInfo is a new type of collaboration tool.”

When introducing the SparkInfo system in their own words, some participants emphasized **collaborative reflection** among the SparkInfo users. They highlighted that SparkInfo provides great ways for a group of users to collaborate on reflection based on a diverse set of multimedia resources. UserS2 described SparkInfo as a “reflection wall.” To explain its co-creative and reflective features, UserA2 described SparkInfo as a good system to share multimedia “diaries” among users.

Some SparkInfo users focused on describing **interactive flow** among users as creators and viewers. UserH1 would like to introduce SparkInfo to his friends through hands-on experience: create an element, direct friends to his element, encourage them to add multimedia comments to it, and review their comments on the element.

As UserD1, UserJ1, UserS1, and all other SparkInfo users said, this system can be useful to share ideas and search information to spark a new discussion. By sharing and remixing multimedia contents, a group of people can start discussing, organizing, and proposing their events.
Chapter 6

Discussions and Improvements

Open-ended feedback from users yielded further discussions and improvements of the SparkInfo system. Discussions and improvements are described in the following paragraphs.

6.1. Public Perspective vs. Personal Perspective

The SparkInfo system can support both one-shared page for all users and comparable page for each user. As all participants prefer to see their final outputs in one shared page (i.e., public perspective) rather than in their own pages (i.e., personal perspective) when adding, sharing, editing and remixing multimedia resources, UserA1 also said, “I would use SparkInfo to share multimedia and participate in the shared experience of public view rather than organize my custom view.” UserS1 said that she would like to compare her page to others’ pages by keyword search if she would maintain and make changes to her personal page.

Some participants would like to control their changes in the shared page. For example, UserD1 talked about reviewing comments before they are applied to the shared page. He said, “I think sometimes it would be good to check sharing settings of initial author when making changes to the author’s element with comments in public page. On the other hand, if the changes are saved as changes in personal page, then it doesn’t need to review settings for changing the private page.”
Similarly, UserH1 suggested three types of pages (Figure 6-1. three types of view mode), which support control over changes:

(1) Unchangeable public page
(2) Changeable public page
(3) Customizable personal page

Login status makes the difference between (1) and (2). Before login or after logout, the user has (1) unchangeable public page. After login, the user comes into (2) changeable public page, which has complete control over changes. The user can make changes on an element in the public page after checking the sharing options of author of the element. The user can make all changes apply to (3) the user's personal page. The user is able to set customized content, layout, and menu in the personal page.
(1) Public Page: Unchangeable

(2) Public Page: Changeable after Login

(3) Personal Page: Customizable

Figure 6-1. Three Types of View Mode
The sharing options of the content to manage the user’s creations and changes will be further described in the following section. In this regard, several users talked about having control over their elements (i.e., posts) and comments in the shared page. On the other hand, many users would like to have direct and interactive experience with their elements and comments in the shared page without having delays in the approval process. That’s because they have already agreed to add and remix their multimedia contents in the shared space. They want to maximize their shared experience with the contents without any limitation. Therefore, they would consider the settings for sharing as their additional options.
6.2. Settings for Sharing, Changing, and Remixing Content

While some users enjoyed continuous sharing and changing in the SparkInfo space, some users would like to have control over their own posts and comments to some extent. UserH1 suggested providing default settings that enable users to define sharing and editing options on their posts and materials when they first enter SparkInfo.

UserA1 thought about having sharing settings for each component and each comment with utilizing the SparkInfo’s functions. For example, procedures of assigning categories to the SparkInfo components using its drop-down list can be applied to sharing settings for each component (Figure 6-2).

In addition, UserA1 proposed a new type of filtering capability that SparkInfo could support. After making and assigning subgroups, which is similar to categories, to posts, it’s possible to see the posts that are only assigned to a subgroup of users by clicking the subgroup’s name (Figure 6-3).

UserS3 also considered having subgroups within the SparkInfo space. As a Cultural Committee officer at the MIT Ashdown House, UserS3 has worked with people from Coffee-Hour, Brunch, and Social Committees. When preparing for special events and officer transitions, she would like to have the hidden layer that can be only visible to a special group of Ashdown officers.
Figure 6-2. Sharing Options Using Categories Drop-Down List

Figure 6-3. Filtered Posts by Subgroup Name
By including selectable radio buttons for sharing options (Figure 6-4) next to other menu tabs of the in-line content editing tool, SparkInfo is able to support the sharing settings for new comments.

![Figure 6-4. Sharing Options Using Radio Buttons in the In-Line Editor](image)

### 6.3. Display and Track Changes

Within the SparkInfo space, users create new elements and add multimedia comments to the existing elements. Those activities can be considered as “changes” in the space. When users make changes, their usernames, changes, and time stamps are saved and displayed in a list of changes. Users can select any two items from the list to compare changes made by different users or at different time.

UserS1 would like to assign a tag-like keyword to each change and use the keyword later to filter changes. She said, “When I can’t review or compare many comments from all users one by one, I want to find interesting comments based on keywords. Can I add a keyword to each comment and use it when retrieving comments related to the keyword? SparkInfo already supports keyword search and tag assignment for each element, so I think it can also support those functions for each comment.”

If keyword of each change (i.e., comment) is displayed in the list of changes as one of the list attributes, the keyword could represent and characterize the type of change the comment has. By searching keywords not from the overall
SparkInfo space but only from the list of changes (Figure 6-5), users are able to focus only on their interesting changes and comments.

![Figure 6-5. List of Changes with the Keyword Attribute](image)

On the other hand, UserJ1 thought adding keyword search or tag for tracking each change would generate too much load and cause too much extra work for both users and developers. As the current SparkInfo users do, she prefers to search keywords in posts and content rather than in the list of changes.

In order to display and track changes of an element effectively, UserA2 and I discussed another possible layout, which lets each element contain changes that users have made in multiple layers (Figure 6-6). After UserA1 heard about this layout, she also wanted to have the multi-layered element. She said, “Clicking on the tabs of layers could be easy way to track changes of the element from the front end. Just click it and take that layer to the top.” For other versions of the element displayed in the back layers, she would like to have highlighted boxes around the changed parts. As UserJ1 liked the highlight border around the change-in-progress area (Figure 6-7), UserA1 wished she could make the changed area distinguishable in a similar way.
Figure 6-6. Maintaining Diverse Perspectives in Multiple Layers of Elements

Figure 6-7. Yellow Border Appears during the Edition
6.4. Number, Amount, and Type of Changes

The number and amount of changes can provide effective information to users in order to view and compare their activities in the SparkInfo space. The number of changes in an element, in other words, the number of comments on the post, can be displayed and utilized as a useful index for users to select and view the post. The number of comments can represent users’ activities on that post. As UserH1 and UserS4 mentioned, some participants consider posts that have more changes are more popular and interesting posts. SparkInfo could use the number of comments as its sorting factor and display posts that have more commenting activities first.

In this respect, UserS3 wanted to get a quick view of the posts that have more comments. She also said, “I think I could find more interesting comments from the most commented post. Besides, if users assign and search for the tags of changes by utilizing the SparkInfo’s tags, then it would be easier to find more interesting comments. E.g., Adding two types of tags: local tags that represent types of changes and global tags that count and show the number of changes on that post.”

When it comes to the amount of changes, just adding a word to a post and adding an image or a paragraph to that post have different amount of changes. UserA2 said he would like to review posts that have radical changes first. UserH1 and I talked about measuring the active and radical changes on posts and designing a meter to display the amount, number, and type of changes. The meter increases more for more radical changes, such as adding an image or a video (e.g., word change = +1, image change = +3).

In addition to the amount and number of changes, the meter is able to give information on the type of changes (e.g., image, text, video) and the meter can be placed in the tag area of each post (Figure 6-8).
The meter blocks accumulate changes from previous participants. Therefore, the meter could encourage users to have more conversations and connections. After checking meters of other users' changes, User A can find a User B who has made interesting changes. Then, they can find their common interests or experiences and start having more conversation.
6.5. More Interesting Posts and Communications

According to UserA1 and other participants, the SparkInfo users could infuse a high level of creativity and new ideas into the shared space and communicate their ideas effectively by creating and changing posts within the SparkInfo space.

As the number of changes on posts could represent their activities on the posts, the number of clicks on posts could indicate more interesting posts. In this respect, UserS3 assumed that she could find more interesting communications and posts by utilizing the number of clicks.

Many participants including UserJ1 and UserS1 considered SparkInfo as an entrance to the special layer, where users can make and find a more interesting post using its editable multimedia content block. For each post, SparkInfo provides its unique multimedia content block between title and tag in order to let users get essential parts of the post without reading the whole text.

6.6. Filtering Options

In order to have more meaningful experience with posts, UserP1 talked about filtering by frequently assigned categories. “I wish SparkInfo could display ranking of categories in sidebar with clickable filters (Figure 6-9). In addition to add and assign categories to posts, I’d like to know which category is frequently assigned to posts by reviewing the number of assignments and which posts are included in that category by clicking the category.”

He compared this category-based filtering option to ‘word cloud’ that is used as a categorization method for content items. In a word cloud (Figure 6-10), also known as tag cloud, words are represented in a cloud where larger words represent the aggregated frequencies and quantity of content items in that
category. Similar to word clouds, categories can represent the most popular information or the most common ingredients of the SparkInfo's posts.

Figure 6-9. Rank Categories based on the Frequently Assigned Categories to Improve the Filtering Function

Figure 6-10. A Word Cloud with Terms Related to Web 2.0
6.7. Sidebar Menu

As UserP1 wanted to display the ranked list of frequently assigned categories in sidebar, other participants also thought about designing sidebar menu in different ways to improve their interactions with shared elements and comments in the SparkInfo space. For instance, UserH1 and I talked about having the list of “Recent Changes” rather than “Recent Comments” and the list of “Popular Posts” rather than “Recent Posts” in sidebar menu.

“Recent changes” embrace not only recent additions of comments but also other recent changes on shared multimedia resources, post title, arrangement, category assignment, etc. He considered and described “the most frequently changed post” as “the most popular post” within the SparkInfo space. Therefore, the linked title of post that has more changes than other posts comes first on the “Popular Posts” list.

UserH1 said, “If I maintain both personal perspective and public perspective, I would rearrange and move posts freely in my personal page. However, in public page, I would arrange posts by popularity. I would like to see posts that have active changes on the top-level space.”

In order to discover more interesting activities in the SparkInfo space, the SparkInfo users could more effectively utilize new sidebar menus, “Recent Changes” and “Most Frequently Changed Posts,” than “Recent Posts” and “Recent Comments” (Figure 6-11).
While some participants (e.g., UserA2) explicitly said that they liked to have the side menu to customize their perspectives, other participants (e.g., UserS2) said they preferred to see posts and comments in full screen mode without having the side menu.

UserS2 said, “If SparkInfo provides the collapsible and extendable side menu instead of the fixed one, I would hide the side menu and have a full screen view, where elements and comments use full width of the view.” That’s because UserS2 was mainly interested in getting an overview of titles, images, and videos in a full screen view of the SparkInfo space as a reflection wall.

On the other hand, UserA2 mentioned the advantages of keeping and using the sidebar functions. As he said, the SparkInfo’s sidebar menu enables users to see and select their activities in elements, comments, and the overall page in various ways and redirects them to other related places with links. In this respect, people can reach out to similar things within the SparkInfo space.
6.8. Drag-and-Drop Rearrangement

To prevent any conflicts among the jQuery functions and support the drag-and-drop arrangement on the front end, UserD1 and I talked about providing two modes, rearranging mode and editing mode, and add a button to the SparkInfo interface in order to change from one mode to the other.

UserA1 said, “I wish I could use the preview icon of each element as a handle to move the element.” Using the preview icon is another way to support draggable and sortable interactions from the front end (Figure 6-12).
Figure 6-12. Reorder Elements with Clicking and Dragging Their Preview Icons
When using the drag-and-drop arrangement from the back end, some users wanted to have multi-column layout, consistent with the front-end layout of multiple elements.

As UserP1 mentioned, some users particularly liked the drag-and-drop rearrangement of elements based on their preferences. Meanwhile, some users including UserS3 preferred to rearrange and display elements by filtering options than by drag-and-drop operations.

6.9. Intelligent Agent

A major focus of the SparkInfo system is to provide a social space where users can reflect themselves and create patterns and connections of their shared data by themselves collaboratively. On the other hand, a major focus of machine learning systems is to automatically learn to recognize complex patterns and make intelligent decisions for users.

Machine learning systems generate a function that maps inputs to desired outputs and attempt to decrease the need for human intuition, creation, selection and collaboration in data management and representation. However, within the SparkInfo space, not the system’s machine learning algorithm but the user specifies how the information is to be represented and what mechanisms will be used to add, remix, and categorize the information. That’s the difference between the SparkInfo system and machine learning-based intelligent agent system. During the evaluation, I asked participants their thoughts on embedding machine learning algorithms in the system.

UserD1 said, “It depends on people, event (i.e., topic of the Sparkinfo space), and amount of information. If I have too much text data to review for my group
project, then I would need machine learning system. However, for this kind of social co-creative purpose, I would prefer to have the SparkInfo interface.”

After having a discussion with several users, I have thought about having an intelligent agent that could influence the strength of a relationship between users. If the agent finds interesting content related to my post or comment and highlight the user who made it, then I would have more conversation with the user about our common interests and experiences.

6.10. Other Design Suggestions

The SparkInfo users and I also had other design-related discussions. After getting used to create multimedia-based elements and comments, the SparkInfo users tried to make the most of their abilities in the SparkInfo space. For example, they preferred to insert more than one sentence or multimedia content at a time. When UserD1 assigned a title and subtitle of the SparkInfo space, he would like to include longer description of the space. UserA1 tended to add more than one image as photo album to an element at once.

Some participants would like to add space or border between the shared contents. For example, UserA1 suggested inserting a line between comments in an element to give some margins between them, and UserS1 proposed giving some space in between groups of posts to classify posts for a specific time period. Besides, UserS3 wished she could have emoticons on posts and comments to attach additional meanings to the shared materials.
6.11. Connections with People and Time

The SparkInfo users share a link to the SparkInfo space and log in to the space to have further co-creation. As UserS2 and I discussed, there are advantages and disadvantages of utilizing existing social identity providers in order to invite people to the SparkInfo space. We can send the link to our friends of friends in connections with social identity providers. However, some people could be omitted or excluded if they are not already included in the providers. For instance, children can’t get this opportunity, because they can’t make accounts for some of those providers if they are under 15 years old. It’s difficult to include all participants who have attended the same event in the SparkInfo space through existing identity providers, so SparkInfo has accepted and maintained its own group of users apart from those providers.

The SparkInfo users share and remix multimedia elements, which they took from their social event. Therefore, by visiting and revisiting the SparkInfo space, they explore the combination of the past, the present and the future of the event. To apply what they have got from the multimedia elements of the SparkInfo space to the upcoming event effectively, SparkInfo already provides the archive function that supports close connections between their elements of SparkInfo and their activities at the event. In addition to the archive, the embedded calendar could make the multimedia elements influence over their plan for the next event.
Chapter 7

Conclusion

SparkInfo enables a group of people who have attended the same event to collect their multimedia elements related to the event into one place where they all can visit and have a meaningful experience of their co-created media elements. SparkInfo aims to offer an explorative environment where they can have creative interactions and share their multimedia elements in ways that are unique, playful, and sociable.

While sharing multimedia elements in the interactive SparkInfo space, users can also refine and enrich the shared elements by adding their active multimedia comments. SparkInfo empowers them to create, change, and remix their multimedia contents as active objects collaboratively in the shared space. During the user study sessions, the SparkInfo users mentioned that the outstanding attributes of the SparkInfo system are enabling them to create, share, and remix different types of contents as elements and comments easily and see their activities in one space.

By providing the flexible content creation and editing tools, the system supports three types of content changes and remixes in the SparkInfo space: creating new elements, changing the elements with multimedia comments, and rearranging the elements. When commenting, the SparkInfo users preferred to add and remix some parts of the shared elements rather than post a new element. They usually created a new element when sharing information about another sub-event or starting new sub-story of their event.
with having more content in the SparkInfo space. Some users particularly liked rearranging elements based on their preferences. Through creating new multimedia elements, changing the elements with comments, and rearranging them in the SparkInfo space, they could exchange new information and have new perspectives on the shared materials and events. In this respect, SparkInfo provides new possibilities for creative expression and collaboration.

The SparkInfo users would like to keep using the SparkInfo system in collective and active ways for a series of their social activities. Some participants particularly emphasized collaborative reflection among the SparkInfo users. As they highlighted, SparkInfo can provide great ways for a group of users to collaborate on actions and reflections on a diverse set of multimedia objects. Their actions in the shared SparkInfo space and reflections on their interactive experiences can promote collective externalization and internalization.

The SparkInfo users could get a broader and deeper view of the events that they had been involved in by sharing their multimedia elements and comments about the events. They were interested in exploring the combination of the past, the present and the future in the SparkInfo space. Thus, SparkInfo could be effectively utilized as a post-event tool for documentation, a current-event tool for reflection, and a pre-event tool for planning the next event together.

The SparkInfo system enables people to collect, construct, and find insights of the shared media elements by creating and exchanging interactive multimedia elements and comments. The SparkInfo users can reflect other’s perspectives in the shared elements and can enhance their social awareness and communication with other users. Therefore, SparkInfo could pave the way for new approaches to human-based computation and co-creative media space.
Bibliography


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