Interface and Feedback Factors in Social Bookmark Usage

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Statement of academic integrity

I declare that this research study is entirely the product of my own work and that is has not been taken from the work of others. When the work and ideas of others have been used in the study, the work has been properly cited in the text.

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Signature

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Abstract

Individual bookmarks are a fundamental feature of Internet web browsers, letting users save and collect their favourite web page locations, but users cannot use their bookmarks on other computers and cannot share their bookmarks with others. Social bookmarking aims to improve this situation by letting people share bookmarks on the Internet. The term was first used by Delicious in late 2003. They not only let users store, organise and access their bookmarks online, but also let them share them with other users. Social bookmarking lets people see what sites other people bookmark under the common tags that users commonly organise their bookmarks by. This research investigates the personal and social factors affecting social bookmark usage and suggests how they work together to influence usage. The two factors investigated were: cognitive effort and social feedback. To study them, a social bookmark simulation called Bligg was created, which allowed various levels of effort and feedback to be evaluated. In the first study, cognitive effort significantly affected willingness to use social bookmarking, but social feedback had no effect. However, in the second study that controlled for reading effort, it was significant. It was concluded that cognitive effort is an enabling factor for the effect of feedback on social bookmark usage.

Keywords: Social bookmarking; cognitive effort; social feedback; likelihood of use.

Chapter 1: Introduction

1.1 Background

Bookmarks are a fundamental feature of almost all web browsers, and are visible in web browser menus. Users use bookmarks to save and collect their favourite web page locations (URLs) into their computers. Folders let users classify and manage bookmarks and find their bookmarks easily on their own computers, but users cannot find their saved bookmarks on other computers or share their bookmarks with others.

In April 1996, the concept of shared online bookmarks was introduced on the website itList.com (Nie, September 17, 1999). Companies such as Backflip, Blink, Clip2, HotLinks and Quiver subsequently entered the online bookmark services market over the next three years (Festa, 1999; Lawlor, 2000). Tagging and the term social bookmarking were introduced by delicious.com (formerly del.icio.us) in late 2003 (Mathes, 2004), and Furl (diigo.com), citeulike.org and connotea.org were launched in 2004 (Nature Publishing Group, 2005). Since 2004, an increasing number of social bookmarking websites have been launched and sites such as digg.com, reddit.com and newsvine.com all provide an organisational system for “social news”. Meanwhile, IBM entered the social software market. IBM Lotus Connections 1.0.2, which included a social bookmarking service aimed at businesses and enterprises, was shipped on November 16th, 2007 (Kelley, 2007). IBM Lotus Connections has several integrated components, and a social bookmarking Dogear is included (IBM, n.d.).

1.2 Social bookmarking

Social bookmarking is a way for Internet users to store, organise, search and manage bookmarks of web pages on the Internet with the help of metadata

(Educause, May 2005). All social bookmarking services are free to use but require users to register. Once users have registered, they can begin bookmarking. Bookmarks can be public and shared with other users, or can be saved privately and hidden from other users. Users can also subscribe to other users' bookmark lists (TVB, 2007), enabling them to find helpful bookmarks from other users' bookmark lists and save them into their own bookmark list.

Tags are used in social bookmarking services to organise bookmarks. The tag cloud is a well known feature of social bookmarking services. Below is delicious.com's social bookmarking service tag cloud (Figure 1-1).

Figure 1-1: delicious.com tag cloud

If a tag's font size is large and bold, then there are lots of social bookmarks related to this tag. The smaller the font is, the fewer social bookmarks are related to the tag. The tag cloud's visual features communicate certain information to users, such as which tags are popular and which tags are used the least (Wann, September 4, 2008).

Some extra features have been added to social bookmarking services, such as ratings and comments on bookmarks, emailing options, web annotation etc.

1.3 Social bookmark buttons

When browsing the Internet, one will find that social bookmark buttons appear on many websites. For example, the bbc.com website shows several social bookmark buttons under each news story (Figure 1-2).

Figure 1-2: bbc.com social bookmark buttons list (BBC, 2008)

Social bookmark buttons allow users to bookmark favourite web pages via an automatic popup window. Users do not need to open their social bookmarking service in a new window or tab to bookmark web pages.

1.4 Purpose of the study

Social bookmarking offers the user several advantages, such as user created tag-based search resources and rank resources (Heymann, Koutrika and Garcia-Molina, February 2008), and has become tremendously popular (Millen, Feinberg and Kerr, 2006). In March 2008, nearly 20 million people visited the website digg.com (Compete, 2008). In just two years (2007–2008), digg.com had become the most popular social bookmarking website. In April 2009, nearly 38 million people had visited the website digg.com (Compete, 2009).

That being said, only 0.41% of all Internet users visited digg.com in May 2009, while about 18% of all Internet users visited facebook.com in May 2009 (Alexa, 2009). So although the number of visitors to digg.com seems large, in term of wider Internet usage relatively few people use social bookmarking.

Why are only a small number of people using social bookmarking? This research investigates how socio-technical and traditional Human Computer Interaction (HCI) factors combine to affect the usage of a socio-technical system. While many studies have focused on social bookmarking's functions and features, few have addressed its most basic element – the social bookmark button itself. This research compares and contrasts the roles cognitive effort (an HCI factor) and social feedback (a socio-technical factor) play in determining the likelihood of social bookmark usage. This research was conducted by creating different versions of social bookmark buttons that required different levels of cognitive effort and social feedback. This paper will be of interest to social bookmark sponsors, analysts, designers and operators.

Chapter 2: Literature Review

2.1 Introduction

A large number of people use social bookmarking: 19,706,430 people visited the website digg.com in March 2008 and the number of people visiting the website stumbleupon.com increased by 579.4% from 2007 to 2008 (Compete, 2008). However, a social bookmark buttons' usage survey was carried out on the website doshdosh.com in 2007, and 221 participants took part in the survey. Less than 40% of these participants used social bookmark buttons (DoshDosh, 2007).

Furthermore, another survey on the use of social web tools was carried out on the netsquared.org website in 2006. The survey lasted for three weeks (from April 10th to April 28th) and involved 949 participants. It was found that 41% of the participants used photo sharing, 37% of the participants used social calendaring, and just 13% of the participants used social bookmarking (NetSquared, 2006). These results suggest that social bookmarking is the least widely used of all the social web tools. Another survey on social bookmarking usage found similar results in 2008. This survey was launched on the website pcpitstop.com in 2008, and 1,073 people took part. Just 13.4% of these participants had ever used an online social bookmarking service (PCPitstop, August 01, 2008).

Some of the factors that affect social bookmarking usage are discussed in this chapter. This chapter also reveals some of the reasons why only a small number of people are using social bookmarking.

2.2 A brief literature survey

In order to study the factors that affect social bookmarking usage, social bookmarking must first be defined.

Social bookmarking involves saving bookmarks to a public website and using keywords to tag them, so that visitors can search and retrieve resources using keywords, usernames and tags (Educause, May 2005). Users provide metadata via social bookmarking, and social bookmarking services have added extra features, such as rating and comment options, emailing options, web annotation etc. (Educause, May 2005).

2.2.1 The tag feature

Each social bookmark can have several tags entered by users in social bookmarking services. Multiple tags can describe the social bookmark in more than one domain and can act as short, free-form labels (Sen et al., 2006; Millen, Feinberg and Kerr, 2006). Moreover, tags can help users remember and manage information, and can also be powerful tools for discovering and sharing new information (Sen et al., 2006; Millen, Feinberg and Kerr, 2006).

Because current social bookmarking services have used tags, tags are a key reason current social bookmarking services have had greater success than their 1990s equivalents (Millen, Feinberg and Kerr, 2005; Dugan et al., 2007). IBM used the sharing and tagging features of social bookmarking services to design and develop an enterprise-scale social bookmarking service called Dogear. Dogear's potential includes improving "information sharing, expertise location, and support of communities of interest within the enterprise" (Millen, Feinberg and Kerr, 2005, p.35). An enterprise could use the Dogear social bookmarking service to achieve individual, collaborative and organisational goals by creating records in the form of {user, resource, tag} (Dugan et al., 2007). The resource is a URL, and the tag is a word or phrase describing the resource.

Furthermore, in order to help people understand a social bookmarking service's characteristics, six tag metrics have been proposed (Farooq, Kannampallil, et al., 2007); two of these describe designs that could enhance social

bookmarking services (Farooq, Song, et al., 2007).

The six tag metrics are “tag growth, tag reuse, tag non-obviousness, tag discrimination, tag frequency, and tag patterns” (Farooq, Kannampallil, et al., 2007, p.351). These metrics are used to evaluate the tagging behaviour of social bookmark users and could be used as design heuristics to implement a social bookmarking service such as CiteSeer. Moreover, linking tag growth with tag reuse from the six tag metrics can provide a direct explanation of how often users rehash tags in a social bookmarking service. If a social bookmarking service has low tag growth and high tag reuse, its users do not create new tags; instead they just recycle previous tags (Farooq, Song, et al., 2007).

In order to make sure a social bookmarking service has high tag growth and low tag reuse, tag quality needs to be improved. Descriptions of the resource’s words or phrases need to be clear and correct, so that the right vocabulary is put at an important position.

However, tag duplication does occur on social bookmarking sites. The same idea described differently by users that makes high tag reuse, and users speak different languages would affect the value of other users’ tags (Sen et al., 2006). Moreover, the barriers to users adding social bookmarks are low, so any user can add tags into a social bookmarking service, which can result in inconsistent or otherwise poorly-used tags (Educause, May 2005). Because there is no standard set of controlled vocabulary and no standard for the structure of tags in a tagging system, tags with spelling errors, double meanings and unclear synonym/antonym use can occur with social bookmarking services (Educause, May 2005; Guy and Tonkin, January 2006). It is necessary to correct “sloppy tags” to increase a tagging system’s effectiveness (Guy and Tonkin, January 2006).

“Sloppy tags” also could affect users’ ability to discover useful resources using social bookmarking services.

2.2.2 The filter feature

Social bookmarking services operate using three main processes, which are the storing, managing and retrieving of bookmarks (Educause, May 2005; Bateman, Muller and Freyne, 2009). The storing and managing processes are related to tagging, while the retrieving process is connected to filter and metadata conceptions. Information filtering or information discovery can be accomplished through search and pivot browsing (Bateman, Muller and Freyne, 2009; Millen, Feinberg and Kerr, 2006).

2.2.2.1 Search method

The search method is one way that filtering can be achieved. It uses search boxes to find tags or usernames that match the user's queries (Bateman, Muller and Freyne, 2009). After users store a social bookmark on a social bookmarking service, other users can find that social bookmark using the search method to find the tag (Millen, Feinberg and Kerr, 2006).

There are many advantages to using social bookmarking data. The main advantages are the "high dynamics, attached metadata, available temporal and sentiment information", so data from social bookmarking services can be exploited to enhance web searches (Yanbe, Jatowt, Nakamura and Tanaka, 2007, p.115). Moreover, social bookmarking is a current phenomenon, which possesses the potential to provide a mass of data about web pages that are actively updated and prominent in search results, and tags are overwhelmingly relevant and objective. For instance, the annotated bookmark's tags can be a useful data source that can be harnessed to improve web searches (Bao, Xue, Wu, Yu, Fei and Su, 2007; Heymann, Koutrika and Garcia-Molina, February 2008; Yanbe, Jatowt, Nakamura and Tanaka, 2007) or web page classifications (Golder and Huberman, 2006).

However, social bookmarking cannot improve web searches at this stage (Heymann, Koutrika and Garcia-Molina, February 2008). One social bookmarking service, such as delicious.com, can only create small amounts of data when compared to the web's scale, and tags cannot annotate resources

such as URLs correctly (Heymann, Koutrika and Garcia-Molina, February 2008). For these reasons, URLs created by social bookmarking services are unlikely to be numerous enough to impact major search engines, and tags created by social bookmarking services are unlikely to be much more useful than a full text search accentuating web page titles (Heymann, Koutrika and Garcia-Molina, February 2008).

As mentioned earlier, social bookmarking is new and having only been around for a few years, it is still evolving. Over the next several years, social bookmarking may rapidly reach the current web's scale, and user interface features may improve tag quality (Heymann, Koutrika and Garcia-Molina, February 2008). At that time, social bookmarking may be able to improve web searches.

Social bookmarking services' small amounts could effectively enhance web searches. Moreover, "sloppy tags" could affect users' ability to discover information using social bookmarking services.

An experimental site ReMarkables was used to evaluate social bookmarking services' effectiveness for information discovery; this site lasted for 10 days from May 11th to 21st in 2007 (Klaisubun, Kajondecha and Ishikawa, 2007). A user questionnaire survey asked participants about the effectiveness of the social bookmarking service for information discovery. The results can be seen in the below diagram.

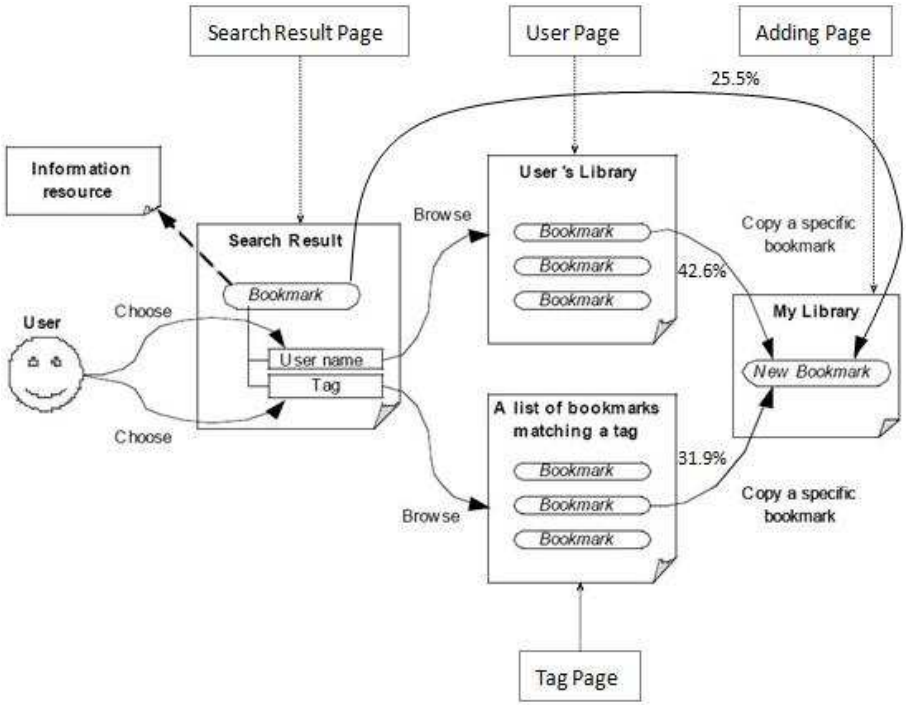


Figure 2-1: Information discovery in social bookmarking service (Klaisubun, Kajondecha and Ishikawa, 2007)

The percentages represent how often each transition was used; the results were that:

- Almost half of the participants (42.6%) copied a bookmark from a user page (by people)
- 31.9% of the participants found a bookmark from a tag page (by content)
- Just 25.5% of the participants copied a bookmark from the search result page

This experiment also found out that 60% of the participants think that being able to search by tags is the main benefit of using social bookmarking services (Klaisubun, Kajondecha and Ishikawa, 2007). This highlights that tags are an important part of social bookmarking services, and providing effective tags can improve social bookmarking services' usefulness. "Sloppy tags" affect users' ability to discover useful resources using social bookmarking services.

Moreover, there are two options to improve the efficiency of social bookmarking services' navigation function. These two options are that "the navigational function should provide sufficient information about tags attached with each bookmark", and that it "should provide social presence cue of other users in

order to judge which other's library is appropriate for the user" (Klaisubun, Kajondecha and Ishikawa, 2007, p.787). Improving the navigation function would enable more efficient usage of social bookmarking services for information discovery (Klaisubun, Kajondecha and Ishikawa, 2007).

Other research has focused on social bookmarking service's search results, and it has been suggested definition of purpose tagging in social bookmarking service's search area.

A fundamental problem was found when users searched resources in tagging based social bookmarking services. The search terms are usually different from the terms entered as tags by users (Heymann, Koutrika and Garcia-Molina, February 2008). For example, a user might search "top 10 social bookmarking services", but the keywords "top 10" and "social bookmark services" are not included in tag lists. This problem is referred to as the "gulf of execution", which means the cognitive gap between a system's functionality and a user's goals (Norman, 1990). Moreover, the most commonly used tags in social bookmarking services focus on representing content (Golder and Huberman, 2006; Yanbe, Jatowt, Nakamura and Tanaka, 2007) rather than intent.

For this reason, purpose tagging was introduced. Purpose tagging focuses on intent ("what it can be used for") rather than content ("what it is"), and can exchange a term of user intent with a term of content and tags that are provided by social bookmarking services (Markus, 2008). Moreover, purpose tagging facilitates goal-oriented social bookmarking searches (Markus, 2008).

2.2.2.2 Pivot browsing method

The other way to filter is pivot browsing (Bateman, Muller and Freyne, 2009; Millen, Feinberg and Kerr, 2006). Pivot browsing is an interaction technique, and can explore, discover, and refine bookmark lists easily after users click filter terms. Pivot browsing is a simple and expedient way to find information (Bateman, Muller and Freyne, 2009; Millen and Feinberg, 2006). For example, if a user wants to find bookmarks with the tag "social", he/she can click "social" in a tag cloud, and all bookmarks with the tag "social" will be displayed. If the

user wants to find more bookmarks with the tag “social” from other users, the user can click one username from the bookmark list. The below figure shows pivot browsing’s working theory:

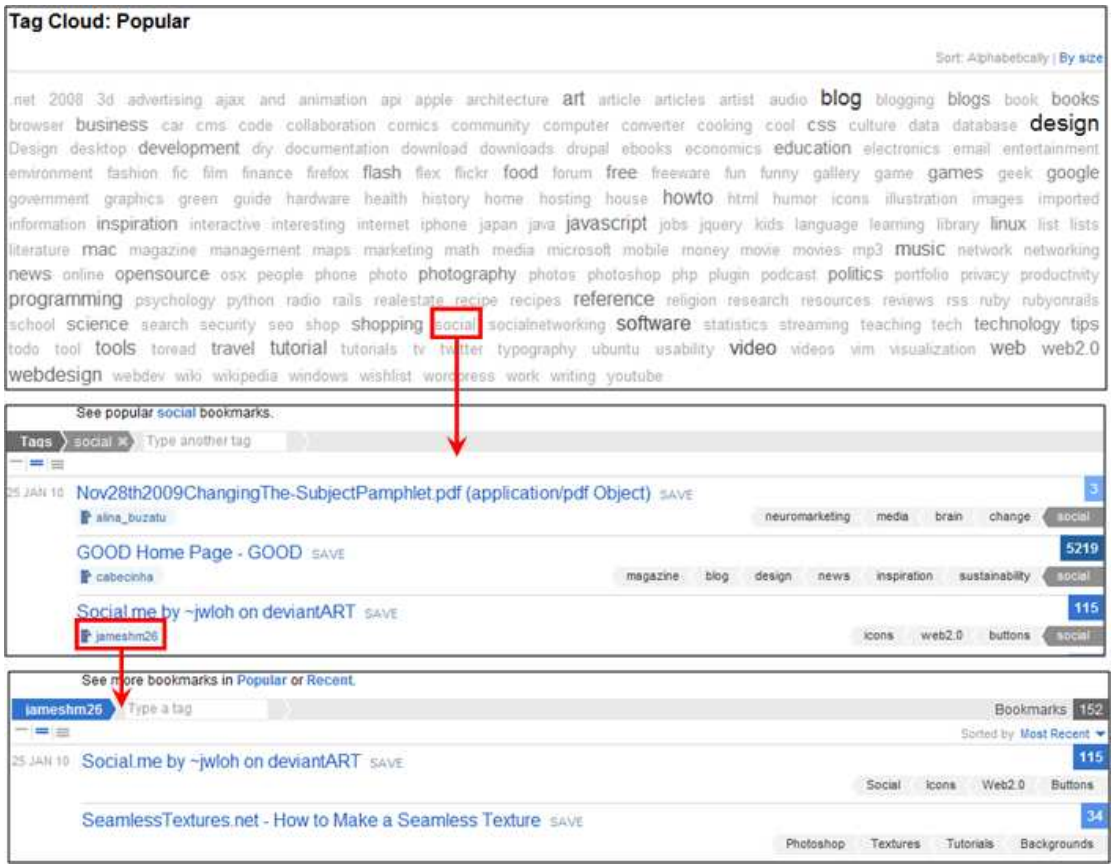


Figure 2-2: Pivot browsing’s working theory

However, if the user wants to find bookmarks with the tag “social” from another user’s bookmark lists, there is another step. This step is a refinement step. A refinement step is “the selection of each filtering criterion”, and bookmark lists are displayed depending on the current criteria (usernames or tags) (Bateman, Muller and Freyne, 2009, p.92; Millen and Feinberg, 2006; Millen, Feinberg and Kerr, 2006). For this reason, users have to take multiple steps to reduce bookmark lists to a tractable size, and then find the right one (Bateman, Muller and Freyne, 2009).

Moreover, an overload of information also affects users’ ability to find the right social bookmark (Bateman, Muller and Freyne, 2009). Social bookmarking services suffer from issues created by enormous bookmark collections and a high percentage of invalid bookmarks (Bateman, Muller and Freyne, 2009;

Cockburn and McKenzie, 2001). Because of the gigantic social bookmarks in social bookmarking services, users have to take several steps to find their desired bookmarks using pivot browsing; 70% of successful retrievals are accomplished via multiple steps (Bateman, Muller and Freyne, 2009).

Social bookmarking services' ordering method is another factor that affects users' ability to find information (Bateman, Muller and Freyne, 2009). Each social bookmark has four components: a URL, a username, a tag(s), and a timestamp. Tags and usernames can be used as filtering criteria, and URLs and timestamps can be used in ordering metrics (Bateman, Muller and Freyne, 2009). Most social bookmarking services' default ordering metrics display social bookmarks in the most recent (date-based) order, the most frequent (popularity) order (Bateman, Muller and Freyne, 2009) or using the hybrid method (Dover, 2008). The hybrid method displays social bookmarks in order of the most recent and the most frequent order. However, with the general ordering methods it is not possible to list relevant bookmarks at the top of bookmark lists for users (Bateman, Muller and Freyne, 2009), and users typically choose bookmarks from the top of bookmark lists (Keane, O'Brien and Smyth, 2008). One researcher found that users selected the top bookmark over 70% of the time, with the second bookmark being clicked only 10% of the time (Keane, O'Brien and Smyth, 2008). This shows the importance of displaying a relevant bookmark at the top of bookmark lists and the importance of display bookmarks in an order that is suitable for users.

How can pivot browsing help users find relevant bookmarks easily and quickly? Web search engines can check relevance based on web-scale measures, but social bookmarking services only produce small amounts of data on the scale of the web (Heymann, Koutrika and Garcia-Molina, February 2008), making it difficult to find relevant bookmarks in social bookmarking services (Bateman, Muller and Freyne, 2009). However, recent research has focused on providing personalisation to improve search results' relevance by monitoring user communities (Freyne, Smyth, Coyle, Balfe and Briggs, 2004), querying predefined groups (Liu, Yu and Meng, 2002), and monitoring search and browsing patterns to recommend and provide relevant information (Farzan,

Coyle, Freyne, Brusilovsky and Smyth, 2007). To improve social bookmark lists' relevance, one researcher focused on a personalised ordering algorithm. The personalised ordering algorithm's aim is to reduce the refinement steps needed and improve relevant bookmarks' display positions by paying attention to an individual's personal choices – this focuses on "an individual searcher's previous actions as an alternative to community-based reordering metrics" (Bateman, Muller and Freyne, 2009, p.92).

2.2.3 The ranking feature

Social bookmarking has lots of benefits, one of which is that it allows users to rank resources (Heymann, Koutrika and Garcia-Molina, February 2008). The ranking feature uses the number of users that have bookmarked a web page to measure the authoritativeness of the web page (Chen, Scripps and Tan, 2008). Voting or rating web pages is useful feedback for this feature (Bian, Liu, Agichtein and Zha, 2008a). Moreover, the ranking feature is the core of an effective search (Bian, Liu, Agichtein and Zha, 2008a). The number of votes for a web page can show the popularity of the web page, which can help with a web search (Bao, Xue, Wu, Yu, Fei and Su, 2007).

However, the quality of users' feedback needs to be considered. While social bookmark services are popular and any users can vote or rate bookmarks (Educause, May 2005), not all users' votes or rates are reliable (Bian, Liu, Agichtein and Zha, 2008a). A small portion of malevolent users try to "game the system" by selectively promoting (thumb up) or demoting (thumb down) bookmarks for profit or fun; these bad or fraudulent votes or rates are known as vote spam (Bian, Liu, Agichtein and Zha, 2008a).

In order to provide an effective ranking of resources for users, there have been some studies of vote spam. Social bookmarking services are one sort of online social media (Bian, Liu, Agichtein and Zha, 2008b) and some of this research has addressed social media's vote spam problem. One study discussed how to change a currently presented algorithm for ranking social media so that it would

recognise vote spam (Bian, Liu, Agichtein and Zha, 2008b); this study introduced a machine learning based ranking framework for social media (Bian, Liu, Agichtein and Zha, 2008a).

Furthermore, vote spam affects people's ability to trust social bookmarking services. There are bidirectional effects by trust and rating, and the bidirectional interaction consists in social booking services (Matsuo and Yamamoto, 2009). Other users' ratings of a bookmark have an effect on users' behaviour; whether another user will rate the same bookmark or not depends on trust (Matsuo and Yamamoto, 2009). How does one create trust between users? Friendships are built on trust, so users might exchange information online with their friends (Subramani and Rajagopalan, 2003). Moreover, users are influenced by people they trust (Forman, Ghose and Wiesenfeld, 2008) and even just one trust person (Leskovec, Adamic and Huberman, 2007), and trust is also transitive (Guha, Kumar, Raghavan and Tomkins, 2004). For example, user A trusts user B, and user B trusts user C, so user A can trust user C. Trust can affect ratings, and vice versa. Similar ratings also can induce trust among users (Golbeck, 2009; Ziegler and Golbeck, 2007). If vote spam exists in social bookmarking services, it will affect how much users trust these services and how much they use them.

2.2.4 Usability and functionality

As mentioned above, social bookmarking's main features have been analysed, and each feature's status quo has been summarised below:

Table 2-1: Summary of social bookmarking's main features

Features		Advantages	Disadvantages
Tag		● Describes the social bookmark in more than one domain ● Helps users to remember, manage, discover and share information	● Tag duplication ("Sloppy tags") ● No standard set of controlled vocabulary ● Low barriers to users
Filter	**Search**	● Social bookmarking data are high dynamics, attached metadata, available	● Small amounts of data on the scale of the web ● Tags cannot annotate

		temporal and sentiment information ● The annotated bookmark's tags can be a useful data source	resources such as URLs correctly ● "Sloppy tags" affect users' ability to discover useful resources ● Search results are usually not relevant
	Pivot Browsing	● Can explore, discover and refine bookmark lists easily after users click filter terms ● Is a simple and expedient method to find information ● Default ordering metrics display social bookmarks in order of the most recent and the most frequent order	● Multiple refinement steps ● Ordering method affects users' ability to find information ● General ordering methods do not list the relevance of bookmarks for users
Rank		● Uses the number of users who have bookmarked a web page to measure the authoritativeness of the web page ● Is core to an effective search in social bookmarking services	● Not all users' votes or rates are reliable and the users' feedback downgrades ● Vote spam problem ● Affects users' degree to trust

It is clear from the summary table that social bookmarking services provide some features that allow users to access bookmarks conveniently, but that they also have some defects. Some of these defects are the multiple refinement steps and the way the ordering method affects the pivot browsing feature, the way the vote spam affects the ranking feature, and the lack of a set tagging standard, all of which affect the search feature. All of these problems make the features hard to use, and thus affect social bookmarking usage.

These findings can be analysed using the usability and functionality evaluation criteria. Usability and functionality were added as a technology acceptance criterion by TAM (Technology Acceptance Model) (Davis, 1989), which is from the origin – the theory of reasoned action (Fishbein and Ajzen, 1975). Initially, usability and functionality were named PEOU (perceived ease of use) and PU (perceived usefulness) (Davis, 1989). TAM made PEOU and PU relatively distinct criteria (Hix and Schulman, 1991) and used them to map usability and functionality (Whitworth, Banuls, Sylla and Mahinda, 2008). Usability and functionality are also used as evaluation criteria by the WOSP (Web of System Performance) model. The WOSP model suggests eight evaluation criteria:

functionality, extendibility, connectivity, flexibility, usability, security, privacy, and reliability. The WOSP evaluation is more accurate and complete than the TAM evaluation for complex sociotechnical software (Whitworth, Banuls, Sylla and Mahinda, 2008).

What are usability and functionality? What is the relationship between usability and functionality? Usability is used to check whether a system is easy to use or not – if it is easy to learn and can be used to accomplish tasks easily and quickly (Whitworth, Banuls, Sylla and Mahinda, 2008). On the other hand, functionality is used to check whether a system is useful or not – whether it can improve productivity, performance and effectiveness (Whitworth, Banuls, Sylla and Mahinda, 2008). Moreover, the relationship between usability and functionality must be one of equivalence and tension (Whitworth, Banuls, Sylla and Mahinda, 2008). For example, if usability is improved, functionality will be reduced. If a system's usability and functionality are equal, then the system is mature.

Now, social bookmarking services' problems can be explained using the usability and functionality evaluation criteria. The functionality of the pivot browsing feature, for example, is good because it offers an expedient way of finding information. However, the multiple refinement steps and ordering method affect the pivot browsing feature, and these defects make the task of finding information difficult. Because usability and functionality are not equal and the functionality value is more than the usability value, these services are immature and this affects the services' usage.

Some researchers believe that users pay attention to social bookmarking service's usability and functionality. When evaluating a social bookmarking service, users decide whether the system is good or not based on eight criteria: ease of use, group features, page annotation, page caching, support, popularity and longevity, export options and multi-tool bookmarking (Stanford, 2007). Of these eight criteria, ease of use is usability, and group features, page annotation, page caching, support, popularity and longevity, export options, and multi-tool bookmarking are functionality. Another view is that users focus on

three major factors, namely features, interface and tools (Kirkpatrick, 2006). Of these factors, interface is usability, and features and tools are functionality.

Some researchers also believe that social bookmarking services' usability and functionality affect the systems' usage. On an idiographic social bookmarking service such as reddit.com, users pay attention to the system's interface, functions, features and submitting speed when using it (Florczak, 2007). From these, the interface and submitting speed are usability, and functions and features are functionality. However, the reddit.com interface is ugly, the functions and features are confusing, and the submitting speed is slow. For these reasons, users consider reddit.com to be messy and boring and do not want to use it.

2.2.5 Three relevant groups

The earlier analysis focused on social bookmarking services themselves. Now, the focus is changing to people, and different people's tasks on social bookmarking services will be analysed. Some of the factors that affect social bookmarking usage will be discussed.

There are three relevant groups, which face of Human-Computer Interaction and relate with social bookmarking services evaluation criteria (Grudin, 2005). These groups are the designers (who create social bookmarking services), the managers (who fund social bookmarking services), and the users (who use social bookmarking services) (Grudin, 2005).

2.2.5.1 The designers - interface factors

The designers need to know what users want from social bookmarking services (Grudin, 2005). How can these services meet users' demands? One survey was launched on the website pcpitstop.com in 2008, and was completed by 1,073 participants. The survey found that 18.2% of participants did not understand how social bookmarking services work (PCPitstop, August 01, 2008). In order to answer the aforementioned questions, the designers need to

know three things:

- What social bookmarking is, which features should be included (these details were discussed in previous chapters), and what the end users want (Whitworth, Banuls, Sylla and Mahinda, 2008).
- What sort of users will use the service. The target users and the users' experience (such as the users' skills/knowledge, cultural dimensions, habits and tasks) should be considered ("User Centered Design" – UCD). A design based on users' experience will create a successful and effective website (Chou, 2002; Ford and Gelderblom, 2003; Watrall and Siarto, 2009).
- How to let users liking to use a social bookmarking service. Firstly, we need to know how to measure users' performance. Speed, accuracy, training time and satisfaction can be used to measure users' performance (Bailey, 1996). To please users, designers need to make sure they can use features "efficiently, effectively, and satisfactorily" (named as "usability techniques") (Chou, 2002).

How to design an easy to use social bookmarking service? Firstly, web interfaces are one of the main factors. Below is a conceptual model of web interfaces:

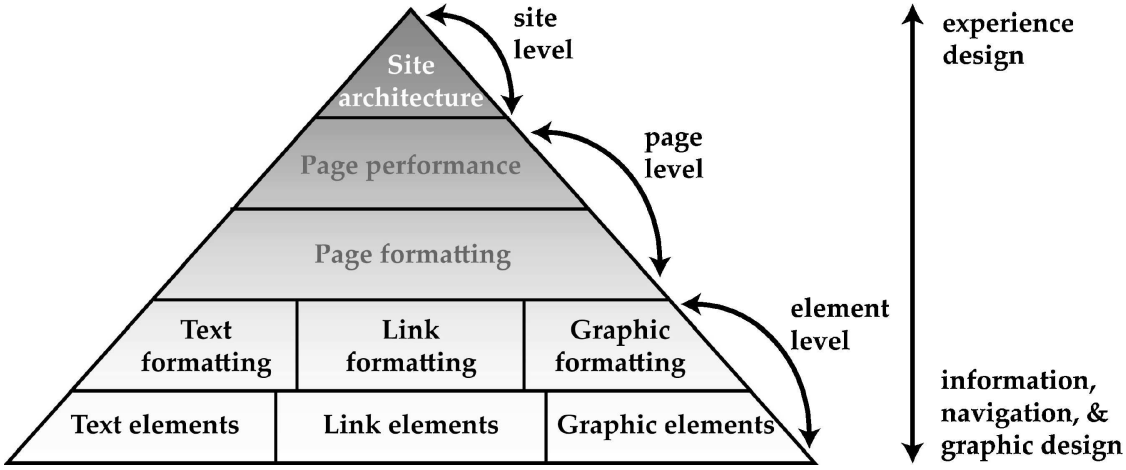


Figure 2-3: Conceptual model of web interfaces (Ivory and Megraw, 2005, p.468)

Looking at Figure 2-3, it is not very hard to find that:

- Information, navigation, and graphic design are at the basic level of web interface design and are comprised of text, links, and graphic design.

- Experience design like site architecture design is on the top level of web interface design.
- Web interface design is divided into three parts – the element level, page level and the site level; the element level is basic and the site level is complex.

Some of the details that are included in information, navigation and graphic design are listed below:

- Text:
  - Font Styles and Sizes:

    Using different font styles can affect users' feelings and emotions; it can also make text more readable (Watrall and Siarto, 2009). Some studies suggest using serif typefaces (e.g. Times New Roman), sans serif typefaces (e.g. Arial), or both; serif typefaces can be used for larger text (such as large headings) (Bernard and Mills, 2000; Bernard, Liao and Mills, 2001; Nielsen, 2000; Schriver, 1997; Watrall and Siarto, 2009). Moreover, sans serif typefaces are the most commonly used font style for good looking pages, and sans serif typefaces are more legible than serif typefaces online. Sans serif typefaces can be displayed in a smaller size more safely and properly than serif typefaces (Ivory and Megraw, 2005; Watrall and Siarto, 2009). The font sizes that are recommended are from 9pt to 14pt, and larger font sizes are suggested for older users (Ivory and Megraw, 2005).
- Links:
  - Length of Link Text:

    Some studies suggest using 2-4 words for link text (Nielsen, 2000; Ivory and Megraw, 2005) while others suggest using 7-12 useful words (Sawyer and Schroeder, 2000).
  - Number and Types of Links:

    Some studies suggest using minimum links, avoiding graphic, repeated or within-page links, and providing multiple links to the same content in different forms (such as text, text with a graphic, or graphics) (Sano, 1996; Flanders and Willis, 1998; Spool, Scanlon,

Schroeder, Snyder and DeAngelo, 1999; Spool, Klee and Schroeder, 2000; Nielsen, 2000; Sawyer and Schroeder, 2000; Scanlon and Schroeder, 2000). For example, the most popular "diggs" bullets draw users' attention, and link to the story on the website digg.com (Watrall and Siarto, 2009) (see Figure 2-4).

Figure 2-4: "diggs" Bullets (Digg, 2010)

- Graphics:
  - Number and Types of Graphics:

    In order to improve download speed, graphics should be minimised. Although some people have broadband connections (Madden and Rainie, 2003), most users still use low speed connections (Harwood and Rainie, 2004). Moreover, some types of graphics should be avoided, such as images containing text, navigation images and animated images (Flanders and Willis, 1998; Nielsen, 2000; Scanlon and Schroeder, 2000).
- Colour:

  Colour is "the unsung hero" of website design; a good colour palette can pull users into the site. Colour is as important as text, links/navigation and graphics (Watrall and Siarto, 2009, p.xii). Some studies suggest using few colours, browser-safe colours, adequate contrast colours and default link colours (Flanders and Willis, 1998; Kyrnin, 2006; Murch, 1985; Nielsen, 2000; Spool, Scanlon, Schroeder, Snyder and DeAngelo, 1999; Watrall and Siarto, 2009). A good web page tends to use up to three colours for headings, one to four high-contrast colours for body text and two to five colours for links (Ivory and Megraw, 2005). Different colours impact users' emotions differently (Watrall and Siarto, 2009; McNeil, 2008). For example, red is exciting, yellow is cheerful, purple is stately and blue is formal; the blue-and-green combo is a trusty standby – it looks great, it is safe and it is the most conservative and attractive colour combination (Watrall and Siarto, 2009; McNeil, 2008). How to use different colours and let

them work together well? Using the triadic colour scheme often works well, which is why it is one of the most commonly used colour schemes (other, less common schemes are monochromatic, analogous, complementary, and tetradic) (Watrall and Siarto, 2009). Firstly, designers should choose a base colour, and then they should use the triadic scheme to find two other colours (Watrall and Siarto, 2009). For example, if the base colour FF2823 (red) is chosen, the other two colours (yellow and blue) can be found using the scheme (see Figure 2-5).

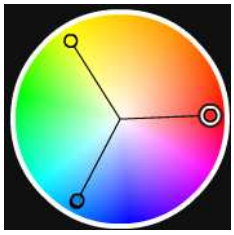


Figure 2-5: The triadic colour scheme (Kuler, 2010)

Knowing what users want from social bookmarking services and how to design an easy to use social bookmarking service helps to explain some of social bookmarking services' problems; it also helps reveal some of the factors that affect social bookmarking usage.

- Colour:

  The website digg.com's main colours are blue, green and red, and the website delicious.com's main colours are gray, blue and black (see Figure 2-6). As mentioned earlier, the blue-and-green combo is known to be attractive and the colour blue is formal. More users used the website digg.com (39,826,655) than the website delicious.com (1,179,562) in January 2010 (Compete, 2010) (see Figure 2-7). Colour might be a factor affects social bookmarking usage in this case.

- Redesign Web Interface:

  The website delicious.com was redesigned after the website name was changed from del.icio.us, and the new website was launched on July 31st, 2008 (Arrington, September 6, 2007; Delicious, July 31, 2008). The main changes related to:

  - Speed: a new infrastructure and platform makes every page faster and ensures that the new site is more responsive and

reliable (Delicious, July 31, 2008).

- Search: an improved search engine ensures it is faster, more powerful and more effective (Delicious, July 31, 2008).
- Design: a redesigned user interface ensures ease of use and provides more features (such as navigation, tag bar, bookmarks, sidebar, and action box) (Delicious, July 31, 2008; Arrington, September 6, 2007). Moreover, the new interface is easier to learn than the old version (Delicious, July 31, 2008).

After the website delicious.com was redesigned, the number of individual visitors increased from 207,503 (July, 2008) to 1,595,342 (August, 2008) and continued to grow (Compete, March, 2009). This finding suggests that the web interface affects social bookmarking usage.

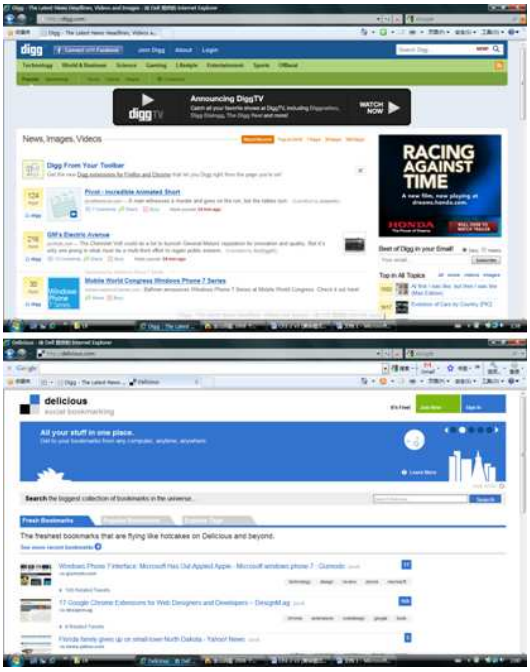


Figure 2-6: Compare digg.com and delicious.com's main colours

Figure 2-7: Compare digg.com and delicious.com's unique visitors (Compete, 2010)

Finally, the principles of interface design should be applied to design an easy to use social bookmarking service. The interface design should be as a vinculum between users and information (Beaird, 2007), and provide an easy way to let users retrieve their desired information (Sklar, 2009). Users do not want to spend a long time on scanning a page for some information they want. While 79% of online users usually or always scan for information on a page, only 16% of online users read each word on a page (Underwood, 2001). If users cannot find information they are looking for, they will close the page and open another site. In order to make sure an interface easy to use and help users find their desired information quickly, information should be made for easier on-screen reading by the following: break information into smaller pieces, head difference information, link difference information with hypertext, keep pages to one screen, so using the scroll bar is avoided (Sklar, 2009; Kyrnin, n.d.; Underwood, 2001; Ivory and Megraw, 2005).

2.2.5.2 The managers - social factors

Managers should know what makes users accept a new social bookmarking service (Grudin, 2005). What is a good way to make users accept a new social bookmarking service? A survey was launched on website pcpitstop.com in 2008, and 1,073 people took part. The survey found that 35.1% of participants did not see any value in social bookmarking services (PCPitstop, August 01, 2008). In order to put more value in a social bookmarking service, the social bookmarking service should be a high quality one that might make users accepts. However, it requires that users notice the new social bookmarking

service. If users have not noticed and used the new social bookmarking service, how can this be encouraged? As a manager, the second question should be considered. Sociology can help to answer this second question:

- The Hundredth-Monkey Effect:

  The Hundredth-Monkey Effect was published as a foreword (written by Lyall Watson) to the book “Rhythms of Vision: The Changing Patterns of Belief” in 1975 (Blair, 1975), and it was further popularised in the book “The Hundredth Monkey” (Jr., 1984). The Hundredth-Monkey Effect is from the following story: scientists observed the Macaca fuscata (the Japanese monkey) in the wild for over 30 years (from 1952), and observed one 18 month old female monkey (named Imo) washing sandy sweet potatoes in a stream to make the sweet potatoes more delicious; over a short period this skill spread over the whole island of Koshima, as the other monkeys learned to wash the sandy sweet potatoes; eventually even colonies of monkey on other islands and the mainland troop of monkeys at Takasakiyama also washed the sweet potatoes (Jr., n.d.). The first monkey created an ideological breakthrough, and the new awareness was communicated from mind to mind instantaneously once a certain critical number achieved the awareness (Blair, 1975; Jr., 1984; Jr., n.d.).

- The Tipping Point:

  The Tipping Point also mentions a certain critical number (or a critical point), and a previously rare phenomenon becoming dramatically and rapidly more common, and a little change in a system having a big effect (Gladwell, 2000). The Tipping Point was created by Morton Grodzins, and was popularised in daily life by Malcolm Gladwell’s book “The Tipping Point: How Little Things Can Make a Big Difference” (Gladwell, 2000). In this book, the three rules of epidemics are introduced:

  - The Law of the Few:

    This is the 80/20 principle, which is the idea that 80% of the work will be done by 20% of the participants; the participants play a critical role in word of mouth (the most important form of user communication) epidemics. The main communicators on

the web are Connector (named social glue, who know lots of people in different area), Mavens (named data banks, who accumulate knowledge from different area, and share and trade the knowledge), and Salesmen (persuaders, who persuade users to convince what the users heard) (Gladwell, 2000).

- The Stickiness Factor:
  This is a specific method of making a contagious message memorable, so the message sticks in users' memories and cannot be gotten rid of (Gladwell, 2000).
- The Power of Context:
  This shows that users are much more sensitive to their environment than they saw (Gladwell, 2000).

From these two terms (The Hundredth-Monkey Effect and The Tipping Point), managers should know how to make users accept a new social bookmarking service. Managers should find people to act as connectors, mavens and salesmen so that more people notice the new social bookmarking service. Meanwhile, managers should create a contagious message that sticks in users' minds. The power of context also should be considered.

Knowing how to make users accept a new social bookmarking service and what the managers need to do to popularise the service should help solve some of the services' problems and reveal some of the factors that affect social bookmarking usage. A social bookmark buttons usage survey was carried out on the website doshdosh.com in 2007 and 221 people took part. The survey found that there are lots of social bookmark buttons and some users do not know which is the best; also some users add a bookmark using several social bookmark buttons (DoshDosh, 2007). The survey suggested users stick to the best social bookmark button, but the question is which social bookmark button is the best? Managers need to ask connectors, mavens and salesmen to propagandise the new social bookmarking service, so that more people notice and come to trust the new social bookmarking service. The managers also need to find the new social bookmarking service's point of difference, and make

it memorable. Sociology might be a factor that affects social bookmarking usage.

2.2.5.3 The users - feedback factors

The users need to know how to get a social bookmarking service to do what they need (Grudin, 2005). How can users get a social bookmarking service to do what they need?

Several surveys have assessed whether users have problems using social bookmarking services. A social bookmark buttons usage survey was carried out on website doshdosh.com in 2007 and 221 people took part. The survey found that 19% of participants did not know what a social bookmark button was and about 45% of participants had never used one (DoshDosh, 2007). Another survey was launched on the website pcpitstop.com in 2008, which attracted 1,073 participants. This survey found that 46.7% of participants did not know social bookmarking services existed, and 86.6% of participants had not used an online social bookmarking service (PCPitstop, August 01, 2008). These results show that the problems of noticing a social bookmarking service exist and using the social bookmarking service among users.

How to help users notice and use a social bookmarking service to do what they need?

- Attractiveness:

  Attractiveness will cause users to notice social bookmarking services when they see them (Grudin, 2005). Attractive colours will attract users' attention (McNeil, 2008).

- Sociality and Sharing

  One of social bookmarking's characteristics is that it is social and users can share information online (Hines, 2009; Sontag, 2009; Chen, Scripps and Tan, 2008). To find information, users prefer to browse others' libraries (user page) to find useful new resources (Klaisubun, Kajondecha and Ishikawa, 2007). Moreover, the "Add Friends" and "Send" features of social bookmarking services also help users to get a social bookmarking service to do what they want. The "Add Friends"

feature of the website digg.com allows users to add friends from their email contact list (such as Hotmail, Gmail, and so on), and the “Send” feature of the website delicious.com allows users to send social bookmarks to friends (Digg, 2010; Delicious, August 7, 2009).

2.2.6 Culture

Culture might be one of the factors affecting social bookmarking usage. The website compete.com found that there were more users on the website digg.com than the website delicious.com in 2009, and the unique visitor numbers of the website digg.com were 36–37 times than that of delicious.com from March to April in 2009 (Compete, 2010). Moreover, another web analytics company (alexa.com) also found the same results. Over the past couple of years (from 2009 to 2010), the daily number of visitors to digg.com has been much higher than that of delicious.com (Alexa, 2010a).

However, the two websites’ usage numbers are different in the different countries. An online survey started on March 4th, 2009 and finished on April 29th, 2009 on the website livlarge.co.nz, found that 46.2% of New Zealand participants used the website delicious.com and 30.8% of New Zealand participants used the website digg.com (LivLarge, 2009). Moreover, a worldwide traffic rank can also show that different countries have different usage statistics. In Spain, the website delicious.com’s worldwide traffic rank was 452 and the website digg.com’s was 484 on February 20th, 2010 (Alexa, 2010b; Alexa, 2010a). The same usage phenomenon also happened in Japan. The worldwide traffic rank of the website delicious.com was 1195 and that of the website digg.com was 1268 on the same date (Alexa, 2010b; Alexa, 2010a). Based on these findings, culture might be a factor that affects social bookmarking usage.

2.3 Variables

After reviewing the literature on social bookmarking services' main features and analysing the relevant people related with social bookmarking services, some of the potentially significant factors that affect social bookmarking were found.

Relationship 1: easy/hard to learn, easy/hard to use, complete task time taken, and web interface design – these factors all affect the relationship between usability and use of social bookmarking:

Dependent Variable: use of social bookmarking
Independent Variable: usability
Moderating Variable: easy/hard to learn, easy/hard to use, complete task time taken, and web interface design

Relationship 2: useful/useless, productivity, performance, effectiveness, and features/tools – these factors all affect the relationship between functionality and use of social bookmarking:

Dependent Variable: use of social bookmarking
Independent Variable: functionality
Moderating Variable: useful/useless, productivity, performance, effectiveness, and features/tools

Relationship 3: font style, font size, link text length, link number, link type, graphic number, graphic type, and colour – these factors all affect the relationship between web interface design and use of social bookmarking:

Dependent Variable: use of social bookmarking
Independent Variable: web interface design
Moderating Variable: font style, font size, link text length, link number, link type, graphic number, graphic type, and colour

Relationship 4: colour, link type, social bookmark button, and share feature – these factors all affect the relationship between attractiveness and use of social bookmarking:

Dependent Variable: use of social bookmarking

Independent Variable: attractiveness

Moderating Variable: colour, link type, social bookmark button, and share feature

Relationship 5: the word of mouth epidemic, the power of context, and the stickiness message – these factors all affect the relationship between application in sociology and use of social bookmarking:

Dependent Variable: use of social bookmarking

Independent Variable: application in sociology

Moderating Variable: the word of mouth epidemic, the power of context, and the stickiness message

Relationship 6: culture, skills, knowledge, and habit – these factors all affect the relationship between the target user experiences and use of social bookmarking:

Dependent Variable: use of social bookmarking

Independent Variable: the target user experiences

Moderating Variable: culture, skills, knowledge, and habit

Relationship 7: share feature and share behaviour – both of these factors affect the relationship between stickiness and use of social bookmarking:

Dependent Variable: use of social bookmarking

Independent Variable: stickiness

Moderating Variable: share feature and share behaviour

Relationship 8: tag quality, bookmark quality, scale of the web, barriers to users, standard set of tags, search results quality, search method, and tags' focus on intent/content – these factors all affect the relationship between search by tags and use of social bookmarking:

Dependent Variable: use of social bookmarking

Independent Variable: search by tags

Moderating Variable: tag quality, bookmark quality, scale of the web, barriers to users, standard set of tags, search results

quality, search method, and tag's focus on intent/content

Relationship 9: rank quality, vote quality, trust, rank framework, and presented algorithm – these factors all affect the relationship between search by rank and use of social bookmarking:

Dependent Variable: use of social bookmarking
Independent Variable: search by rank
Moderating Variable: rank quality, vote quality, trust, rank framework, and presented algorithm

Relationship 10: refinement steps, order method, and bookmark quality – these factors all affect the relationship between view by pivot browsing and use of social bookmarking:

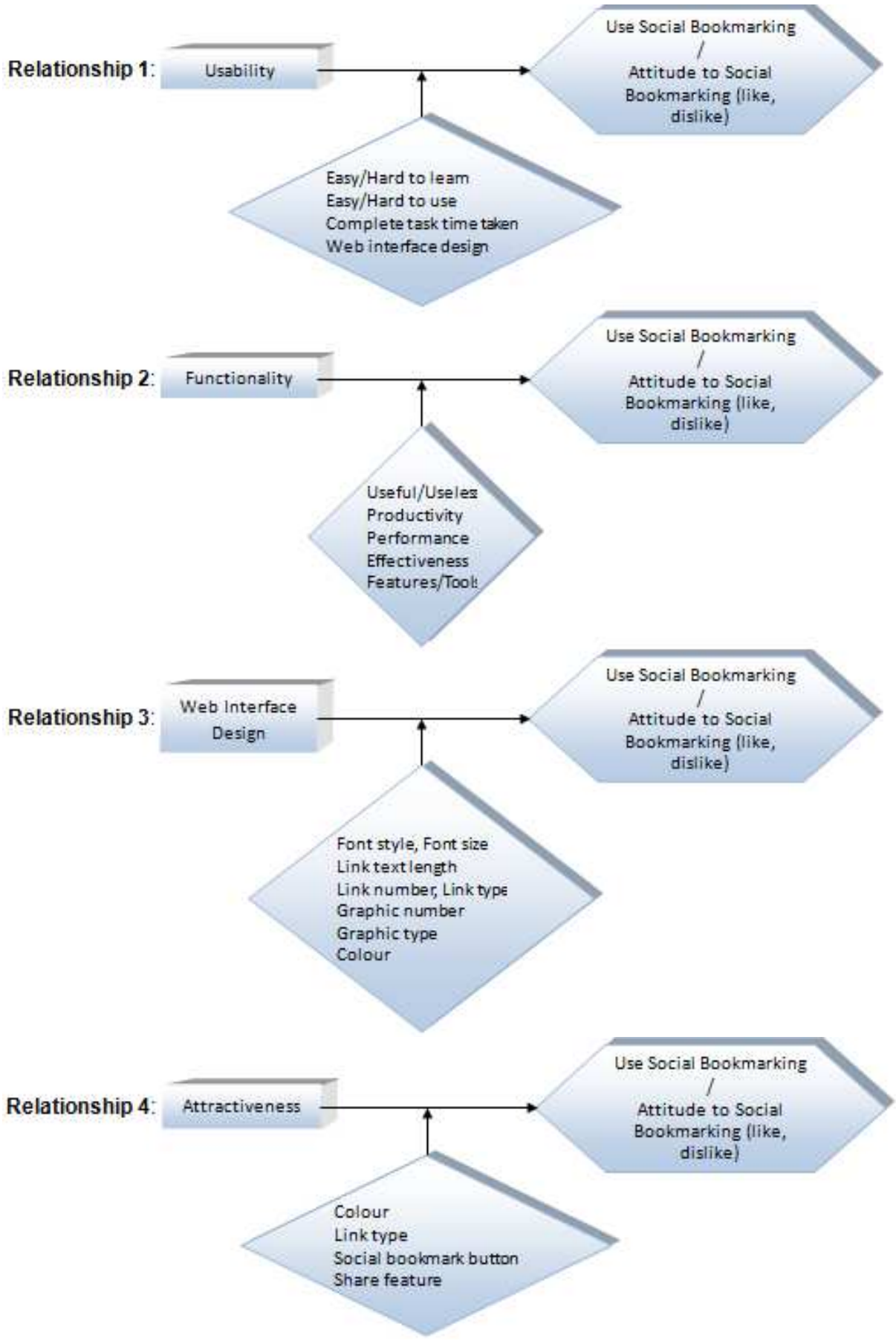
Dependent Variable: use of social bookmarking
Independent Variable: view by pivot browsing
Moderating Variable: refinement steps, order method, and bookmark quality

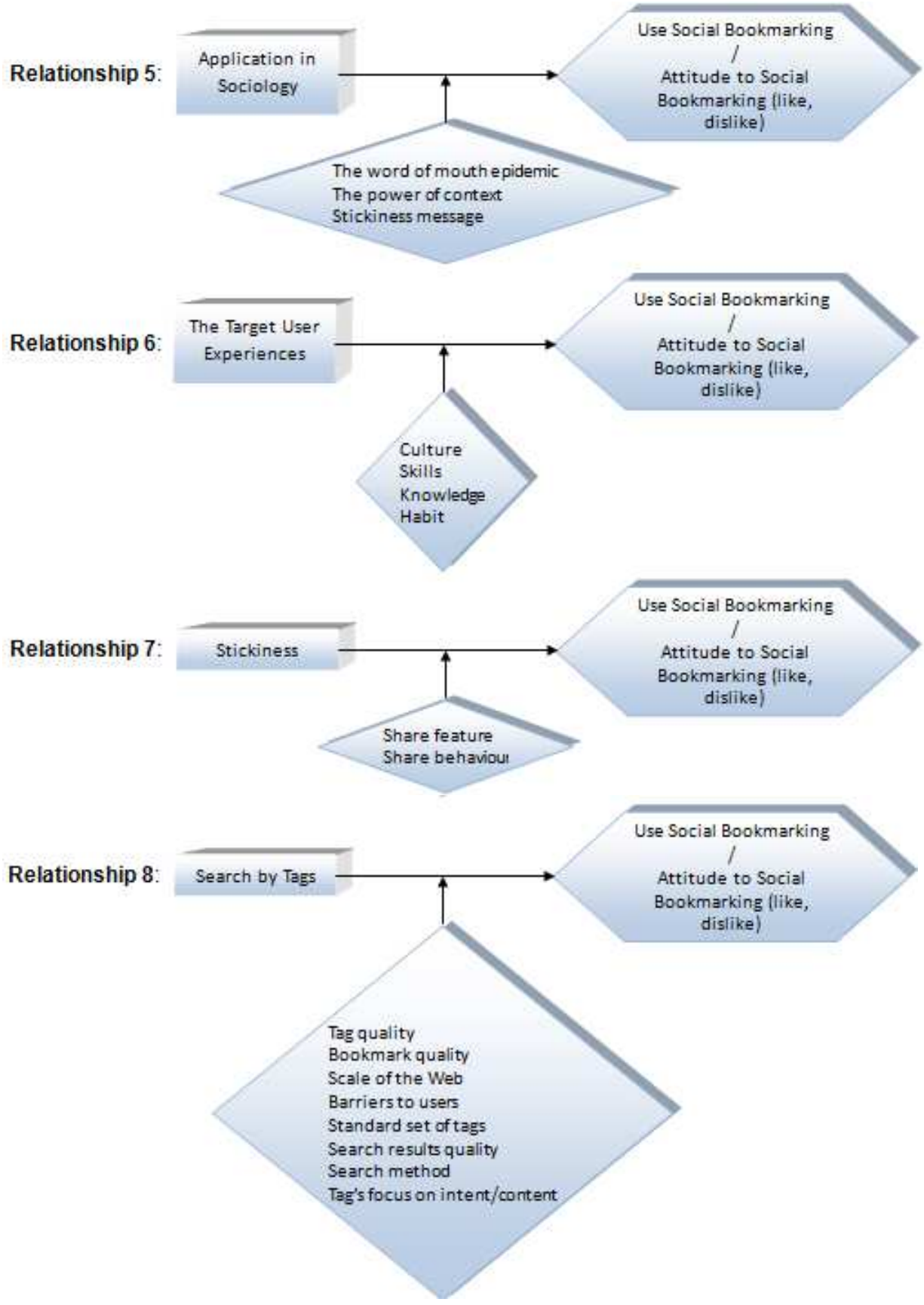
Relationship 11: tag quality, tag annotation, and vocabulary – these factors all affect the relationship between social navigation by content tags and use of social bookmarking

Dependent Variable: use of social bookmarking
Independent Variable: social navigation by content tags
Moderating Variable: tag quality, tag annotation, and vocabulary

Relationship 12: information about social others – this factor affects the relationship between social navigation by user tags and use of social bookmarking

Dependent Variable: use of social bookmarking
Independent Variable: social navigation by user tags
Moderating Variable: information about social others


Relationship 1:
Usability
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
Easy/Hard to learn
Easy/Hard to use
Complete task time taken
Web interface design
Relationship 2:
Functionality
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
Useful/Useless
Productivity
Performance
Effectiveness
Features/Tools
Relationship 3:
Web Interface Design
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
Font style, Font size
Link text length
Link number, Link type
Graphic number
Graphic type
Colour
Relationship 4:
Attractiveness
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
Colour
Link type
Social bookmark button
Share feature


Relationship 5:
Application in Sociology
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
The word of mouth epidemic
The power of context
Stickiness message
Relationship 6:
The Target User Experiences
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
Culture
Skills
Knowledge
Habit
Relationship 7:
Stickiness
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
Share feature
Share behaviou
Relationship 8:
Search by Tags
Use Social Bookmarking / Attitude to Social Bookmarking (like, dislike)
Tag quality
Bookmark quality
Scale of the Web
Barriers to users
Standard set of tags
Search results quality
Search method
Tag's focus on intent/content

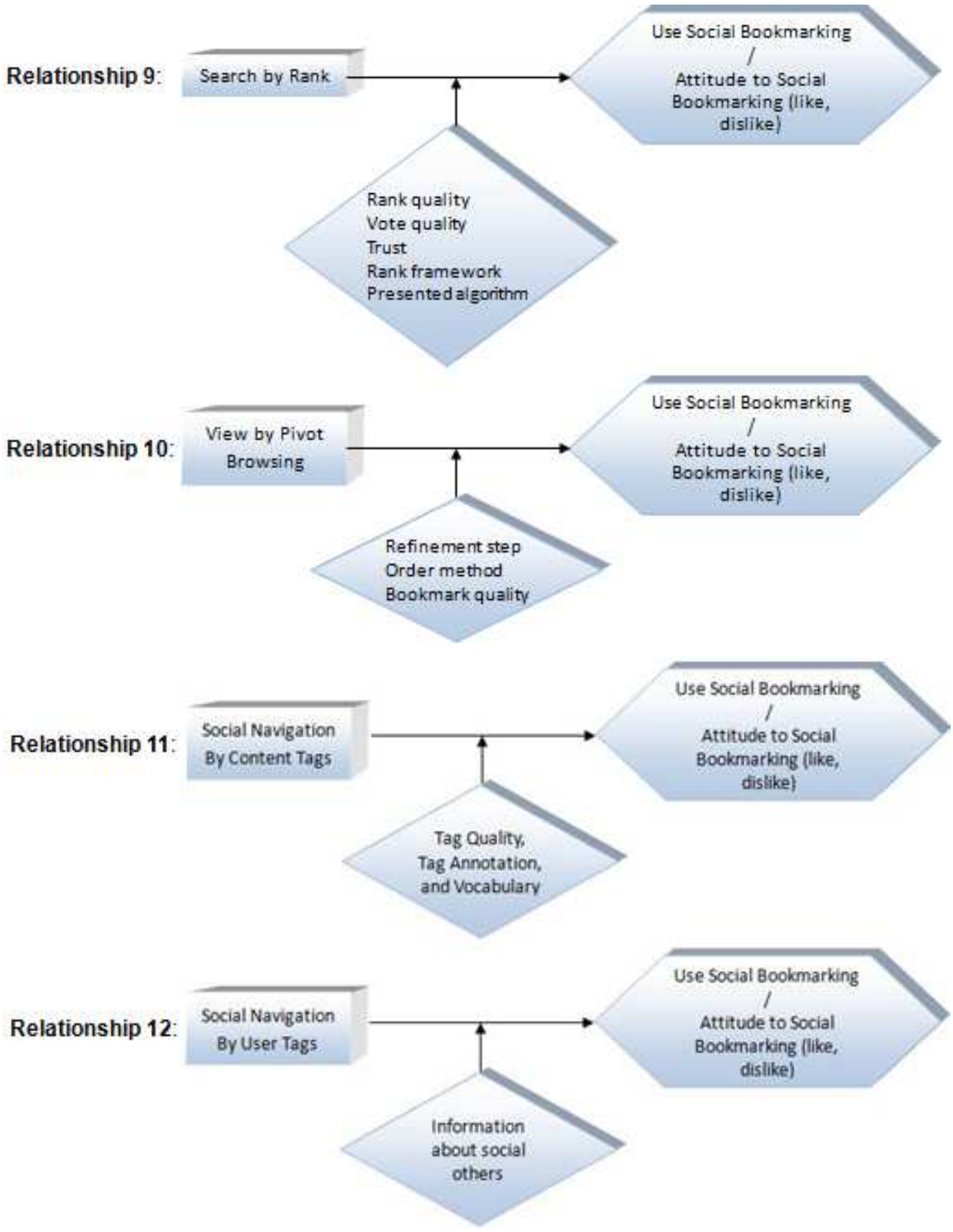


Figure 2-8: Variables diagrams

The factors are also analysed in certain usage stages (see Figure 2-9). Initially, users do not use a social bookmarking service, and then, after it, they begin using it. After discovering some of the disadvantages of the social bookmarking

service, the users stop using it. If the social bookmarking service was improved, these same users might use it again. If the improved social bookmarking service has problems, the users will stop using it again.

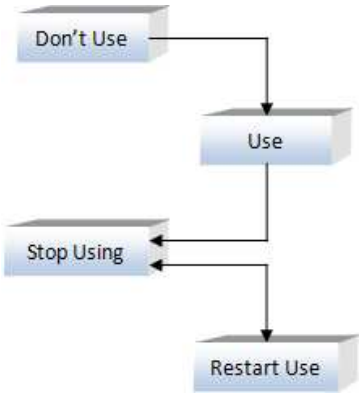


Figure 2-9: Usage stages

Factors that potentially affect social bookmarking usage are listed below:

Table 2-2: Possible factors by usage stages

	Don't Use	Use	Stop Using	Restart Use
1. Usability		●	●	●
2. Functionality		●	●	●
3. Web Interface Design	●	●	●	●
4. Attractiveness	●	●		
5. Application in Sociology	●	●		
6. The Target User Experiences	●	●		
7. Stickiness		●	●	●
8. Search by Tags		●	●	●
9. Search by Rank		●	●	●
10. View by Pivot Browsing		●	●	●
11. Social Navigation by Content Tags		●	●	●
12. Social Navigation by User Tags		●	●	●

The table reveals that web interface design, attractiveness, application in sociology, and the target user experiences are all factors that potentially affect social bookmarking usage and are also possible reasons why only a small number of people are using social bookmarking.

However, the group of people that do not use social bookmarking can be divided into three groups. The first is the group of people who do not know

about social bookmarking. The second is the people who know about social bookmarking but do not use it. In order to find and analyse the reasons why only a small number of people are using social bookmarking, both groups have to be considered. Moreover, the third group of people – those who know about social bookmarking, have used it and have stopped using it – also have to be considered.

2.4 Theoretical framework

For more people to know about and begin using social bookmarking, they need to hear about it from others – the word of mouth epidemic (application of sociology). If people are unable to hear about social bookmarking from others, what other ways might they find out about it? Social bookmarking itself could draw their attention (attractiveness). There are two ways to achieve this: one is through the service itself, the other is through the social bookmark buttons. If people do not know about social bookmarking and have no other people telling them, then there are fewer opportunities to use the service itself initially. However, people can still come into contact with social bookmarking if they like to browse the Internet and the social bookmark buttons are attractive. For example, if people read news on the website bbc.com, they might notice the social bookmark buttons under each news story. Social bookmark buttons would be their first introduction to social bookmarking. Social bookmark buttons are used as tool to investigate why only a small number of people are using social bookmarking.

There are lots of social bookmarking buttons (see Figure 1-2). Are these buttons the same or different? Social bookmarking services work slightly differently (BBC, 2009). Do these slight differences exist among social bookmark buttons also? How many of these differences exist? After the different social bookmark buttons' work processes were compared, some differences were found and these differences were not slight (see Appendix A). The best idea is to achieve the largest effect for the smallest effort (Clark and Wilkes-Gibbs, 1986; Sperber and Wilson, 1986): more than one extra required

click can stop people using a social bookmark button (Burkard, 2009). Social bookmark buttons' differences are summarised into two main categories: cognitive effort and social feedback:

Table 2-3: Cognitive effort and social feedback by social bookmark buttons (collected by July 16th, 2009 from bbc.co.uk)

	Cognitive Effort	Social Feedback
Digg 	● **Processing Steps** Bookmark → Login/Register → Feedback ● **Login and Register Entries** Many details need to be entered to register. ● **Bookmark Page** URL, Title, Description are entered automatically. Preview section is listed on the Bookmark page. ● **Re-bookmark Page** Easy to save a bookmark after one has clicked "Digg" number.	● **Feedback Page** More details on the feedback page. Users can rate others' comments.
Delicious 	● **Processing Steps** Login/Register → Bookmark → Feedback ● **Login and Register Layout** Login and Register are listed on separate pages. ● **Bookmark Page** URL and Title are entered automatically.	● **Feedback Page** No Feedback sometimes. Have to click the relative buttons to see more feedback details.
StumbleUpon 	● **Bookmark Page** Have to enter bookmark details twice.	● **Feedback Page** More details on the feedback page.
reddit 	● **Login and Register Layout** Login and Register are listed on the same page. ● **Login and Register Entries** Few details need to be entered to Register.	● **Feedback Page** More details on the feedback page.

For the purposes of this research, cognitive effort is defined as the number of clicks or required text box entries, and social feedback is defined as the amount of real-time information given to users. Cognitive effort and social feedback might be the factors that affect use of social bookmarking and why only a small number of people are using social bookmarking. If the best idea is to achieve the largest effect for the smallest effort, users might stop using a social

bookmark button (social bookmarking usage) if it requires lots of text box entries (cognitive effort) and no information is provided to users (social feedback). For example, the Digg social bookmark button includes lots of required text box entries and the Delicious social bookmark button does not give users feedback sometimes (see Table 2-3). If users enter lots of details (as for Digg) and get no feedback (as for Delicious), fewer people might continue to use social bookmarking. Cognitive effort might affect social bookmarking usage, or social feedback might affect social bookmarking usage, or both cognitive effort and social feedback might affect social bookmarking usage.

Cognitive and learning theories (Jarvis, Holford and Griffin, 2003; Biggs, 1993) were used in this research. People realise a new object going through four phases, such as hearing, olfaction, vision, and feeling. In order to let people, who have not used social bookmarking, to realise social bookmarking and use social bookmarking, the theories should be used to analysis at which phase users stop using social bookmarking.

2.5 Research question

Does the cognitive effort and social feedback of a social bookmark button affect the likelihood of using social bookmarking on the Internet?

- Does the cognitive effort involved in using a social bookmark button affect the likelihood of using social bookmarking on the Internet?
- Does the social feedback involved in using a social bookmark button affect the likelihood of using social bookmarking on the Internet?

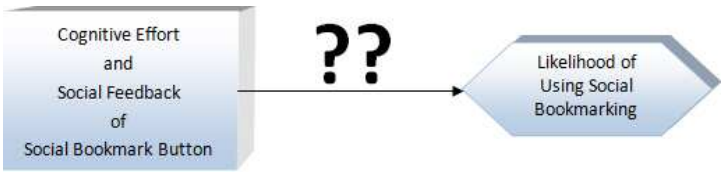


Figure 2-10: Research question variables diagram

2.6 Hypotheses

1. Social bookmark button's cognitive effort affects the likelihood of using social bookmarking on the Internet.
2. Social bookmark button's social feedback affects the likelihood of using social bookmarking on the Internet.

2.7 Research type

This research is a quantitative research (included qualitative responses to open-ended questions in a questionnaire). This experimental study on the effect of cognitive effort and social feedback on the likelihood of using social bookmarking developed in two phases.

Chapter 3: First Phase Study Method

3.1 A new type of social bookmark button – Bligg

This research investigated whether the cognitive effort required and social feedback offered by social bookmark buttons affect the likelihood of using social bookmarking or not. Using current and ready-made social bookmark buttons to compare cognitive effort and social feedback would be imprecise because each social bookmark button might be updated and the differences between them would be not very obvious. For this reason, an entirely new type of social bookmark button called "Bligg" was created to simulate social bookmark interaction after the differences among cognitive effort and social feedback were found (see Appendix A and Table 2-3). For the subjects for this research, they were recruits of social bookmarking. The recruits would not put their previous using experience and opinions into this research.

3.1.1 Processing order

Social bookmark buttons have four main processing steps – register, login, bookmark, and feedback – but the processing order is different for each. Digg's processing order for the first of these three is bookmark → login/register, but the processing order for Delicious is login/register → bookmark. For the login and register processing order, Digg and Delicious follow login → register, but StumbleUpon's processing order is register → login and reddit's login and register are listed on the same page. Which processing order is better and should be used? In order to ensure it was logical and every subject to go through login/register processing steps after bookmark processing step, the login/register and bookmarking processing order login/register → bookmark was used on Bligg. To ensure Bligg was convenient to use, the login and register processing order register → login was selected, and the register and login processing steps were separated.

Moreover, the register and login processing steps could be skipped if the subjects had already registered as new users and logged in. If a subject is using Bligg for the first time, the processing order is register → bookmark → feedback. If the subject has already created an account and logged in, the processing order is bookmark → feedback.

3.1.2 Each processing step's versions

In order to ensure that differences in cognitive effort and social feedback were obvious, Bligg's cognitive effort had two levels (low and high) and social feedback had three levels (none, low and high). The processing steps of register, login and bookmark were focused on cognitive effort, and the processing step feedback was focused on social feedback. Cognitive effort is defined as the number of clicks or required text box entries, and social feedback is defined as the amount of real-time information given to users. All the versions created depended on current and ready-made social bookmark buttons' reality and simulated social bookmark interaction (see Appendix B).

3.1.2.1 Register

Some text boxes, drop down selections and tick boxes are used to register for current and ready-made social bookmark buttons. Some social bookmark buttons require only a couple of text boxes to be filled, but some require users to fill several text boxes, select drop down selections, and check tick boxes. In order to make cognitive effort obvious, the two versions included the different number of clicks and required text box entries:

Low Cognitive Effort: Requiring Username, Email Address, Password, Re-type Password. (This is the reddit version, although it did not include Captcha and Remember Me, to keep it at low cognitive effort.)

High Cognitive Effort: Requiring Username, Email Address, Password, Re-type Password, First and Last Name, Gender, Country, Zip or Postal Code, Birthday, Captcha, and Term and Conditions. (This is the Digg version.)

In order to make Bligg seem real, the drop down selection's items (such as Gender, Country and Birthday) were the same as the current Digg social bookmark button, and all of captchas were copied from the Digg social bookmark button.

3.1.2.2 Login

Because current social bookmark buttons' logins all require the same text boxes to be filled, Bligg's login was the same for both versions:
Required text box entries: Username and Password
Un-required tick box: Remember Me

3.1.2.3 Bookmark

The processing step bookmark asks the user to provide the bookmark's details, such as its URL, title, description and topic; most social bookmark buttons include these details. However, some social bookmark buttons enter some details automatically, and some social bookmark buttons do not. This requires different amounts of cognitive effort from users. In order to make the differences obvious, two versions that included similar required text box entries were created, but the automatic conditions were different:
Low Cognitive Effort: Requiring URL, Title and Description. All were entered automatically. (This is the Delicious version, without the Tags and Do Not Share features. The Description text box was also changed, and was entered automatically as the Digg version. All the changes were made to ensure subjects expended less effort with this version.)
High Cognitive Effort: Requiring URL, Title, Description, Thumbnail, Topic and Captcha. Only URL was entered automatically. (This is the Digg version, with subjects having to enter and choose the bookmark's details. It is also similar to the reddit version. These changes ensured that the subjects spent more physical and mental energy on this version.)

To re-bookmark, nothing was changed and subjects had to do the same tasks as the first time, but the Bligg number was changed. For the first time bookmark, the Bligg number is one. If it is re-bookmark, the Bligg number will be two or more. This design ensured that every subject performed the same tasks and

expended the same amount of cognitive effort, whether it was their first bookmark or not. (This is similar to the Delicious and StumbleUpon versions, without the Popular Tags and Suggested Tags features.)

Bligg did not include a tag feature. In order to avoid “sloppy tags”, which would affect usage of Bligg and research results’ precision, a tag feature was omitted.

In order to make Bligg seem real, the Topic drop down selection’s items were all the same as the current Digg social bookmark button and all of captchas were based on Digg. The Char Left feature was created to look like the Digg and Delicious versions.

If the social feedback version is high, a Preview feature will be added into the processing step for each of the two different cognitive effort versions. The details of Preview were low social feedback (see details below).

3.1.2.4 Feedback

Social feedback is defined as the amount of information given to users. This information can be put into two categories:

- The new social bookmark information provided by the user who submitted it.
- Other social bookmarks’ information provided by other users.

An overview of the current and ready-made social bookmark buttons reveals that some buttons offer a lot of social feedback, some buttons offer only some basic information about the new submitted social bookmark, and some buttons offer no social feedback at all. After a user has submitted a new social bookmark, the popup window is closed and no feedback information is provided to users. The social feedback was divided into three levels, the details of which are listed below:

No Social Feedback: No information was given to users. (This is similar to the Delicious version, when Delicious users register or are already logged in.)

Low Social Feedback: Basic information about the newly submitted social bookmark is provided to users. This information included Title, Description,

Bligg Number, Submitted User's Username, Submitted Time, and Topic. (This is similar to the Digg version, when Digg users are logged in and the new bookmark is submitted for the first time. It is also similar to the reddit version.)
High Social Feedback: This version included all the low social feedback information and added more details about the newly submitted social bookmark (such as Thumbnail; Comment – Date, Comment, Username, Vote), and also provided other bookmarks' information to users (such as Related by Keyword – Bligg Number, Title; Related by Source – Bligg Number, Title; Topic in it – Bligg Number, Thumbnail, Topic; People Who Saved This Also Saved – Bligg Number, Thumbnail, Topic). (This is similar to the Digg version, when Digg users re-bookmark bookmarks.)

An add a Comment feature was included in the feedback processing step. Subjects could use this feature to add a comment about the newly submitted bookmark. This feature had two versions:
Low Cognitive Effort: Requiring Comment. (The reddit version.)
High Cognitive Effort: Requiring Comment and Captcha. (The StumbleUpon and Digg versions. Captchas were copied from the Digg social bookmark button.)

Six different Bligg buttons were created for low and high cognitive effort and social feedback with three levels: none, low and high:

Table 3-1: Bligg buttons by cognitive effort and social feedback

	High Cognitive Effort	Low Cognitive Effort
No Social Feedback	BLIGG1	BLIGG2
Low Social Feedback	BLIGG3	BLIGG4
High Social Feedback	BLIGG5	BLIGG6

3.1.3 Interface design

Bligg's interface design was based on previous research (see Chapter 2.2.5.1 The designers - interface factors), and followed the conceptual model of web interfaces (see Figure 2-3). The details are listed below, and the interface

screenshots are displayed in Appendix C.

3.1.3.1 Text

The Bligg font style was sans serif typeface – Arial, because it is the most common font style for good looking pages and is more legible and safe than serif typefaces. The heading sizes were 20-25px, and text sizes were 12-15px.

3.1.3.2 Link

As mentioned earlier, there were four processing steps – register, login, bookmark and feedback. Because subjects were recruits, the main processing steps were register, bookmark, and feedback. One text link “Login”/“Register” was added on the register and login page, so that subjects could navigate between the two processing step pages using the links. The length of the link text was one word, to make it simple and clear. On the register, login, and bookmark processing step pages, there were two buttons. One was the Cancel button, which could be used to cancel tasks and close the Bligg popup window. The other was the Next button, which could be used to navigate to the next processing step page. The Next button’s text changed depending on the different processing steps. On the feedback page, the text link “Close” was added. Subjects could use this to close the popup window after reading the feedback details.

3.1.3.3 Graphic

In order to improve download speed, the graphics were small; the largest was 4KB for the captcha in Bligg. There were no images containing text, navigation images, or animated images in Bligg. Most of the image formats were JPG and BMP.

3.1.3.4 Colour

Although the blue-green combo is a trusty standby, is great looking, safe, and the most conservative and attractive colour combination, the colour blue was predominantly used in Bligg because it is a formal colour and it encouraged people to take Bligg seriously. This aimed to improve the quality of the research results.

3.1.4 Database

Social bookmark buttons are added on web pages and allow users to bookmark their favourite web pages in an automatically opened popup window. Users do not need to open social bookmarking services in a new window or tab to bookmark web pages. Social bookmark buttons can transfer the web pages' details to the popup window and then save the details into the social bookmark buttons' database. Users can access the database using social bookmark buttons and social bookmarking services.

It was necessary to create a website for the Bligg social bookmark button. The website could be as a carrier, which allows adding Bligg on each web page in the website. The website's details and how to access database details are listed as below:

- **The Beatles mini website**

  Given that the website was intended to be used for research, the content needed to be interesting – options were news, images, videos and music. It was thought that news might be boring, images might be hard to control and videos might take a long time. For these reasons, music was selected. What sort of music should be selected? What songs should be added to the website? To ensure that every subject enjoyed the music and found the songs familiar, pop music and the Beatles' songs were selected. Ten songs were selected from the album "The Beatles' Most Favourite Songs", all of which were famous Beatles songs. Due to copyright, all of the songs were samples only and were played for just 40 seconds.

  How to design and create the website? Because all the songs were by the Beatles, the website was designed based on the Beatles official website – www.thebeatles.com (see Figure 3-1). The interface design (the layout, font styles and sizes, length of link text, number and types of links, number and types of graphics, and colour) was the same as the Beatles' official website, and pictures from the official website were used. Moreover, to ensure that

the website was simple and clear, the content was changed. Because the website was about the Beatles songs, no menu bar was added. When the website opened, the songs were listed. After the subject chose a song from the list, that song's web page was opened and the selected song was played automatically. The Stop/Play button could be used to stop/play the selected song. Meanwhile, the song's name, an introduction, the album's thumbnail, and the Bligg social bookmark button were displayed on the web page. The Beatles songs' introductions were copied from the website wikipedia.org, and album's thumbnails were found on the Beatles official website. The website's interface screenshots are displayed in Appendix D.

Figure 3-1: The Beatles official website screenshot (Thebeatles, 2010)

- **<u>Bookmark data display</u>**

  As mentioned earlier, there were four versions of the bookmark processing step page (see Appendix C). The details transferred to this page were different in the different versions:

  - In the low cognitive effort version, the selected song's URL, title, and description would be entered automatically. In the high cognitive effort version, the selected song's URL would be entered automatically and the selected song's album thumbnail would be displayed with the Beatles' "Past Masters" album thumbnail (from the Beatles official website).
  - If social feedback was high and the cognitive effort was low, the selected song's title and description and the submitted subject's

username, submitted time and topic would be listed in the preview section. If social feedback was high and the cognitive effort was high, just the submitted subject's username, submitted time and topic would be listed in the preview section. If the song's details were changed in the text boxes, the preview details would be changed at the same time.

- **Feedback data display**

  Although there were three levels of social feedback (none, low and high), just two of these levels were displayed (low and high). The social feedback was divided into submitted bookmark feedback and other bookmarks feedback.

  - Submitted Bookmark Feedback:

    The details were the same as those from the bookmark processing step page. If the submitted song's details changed on the bookmark page, the new details would be displayed on the feedback page. In order to make comments to appear real, the submitted song's comment details (such as comment, username and date) were taken from the website youtube.com in September, 2009. Each submitted song had 3 comments – a good comment, a normal comment and a bad comment. The good comment's voting number was 1, the normal comment's voting number was 0 and bad comment's voting number was -1. Subjects could vote on the comments. The comments were controlled feedback for subjects in this research.

  - Other Bookmarks Feedback:

    This feedback was Related by Keyword, Related by Source, Topic in it and People Who Saved This Also Saved. Because the website was about the Beatles songs, the "Topic in it" was changed into "Topic in Music". All the resources were from a Beatles song bookmark's feedback on the website digg.com and all the details were real and collected by September 10th, 2009.

  The feedback was controlled, real information and every subject was able to get the same quantity and quality of information from the feedback

processing step page. This ensures the quality of the results.

- **Database access**

  Subjects could bookmark the Beatles songs on an automatically opened popup window, and the Bligg button would then transfer song's details using JavaScript programming language. The data transfer details are listed in Figure 3-2.

  After a song was bookmarked, the details were saved into a .txt file using PHP programming language. Why use a .txt file and not a MySQL database online? Saving data into a .txt file made it easy to collect data correctly because the website was online and everyone could use it at anytime. Which details were saved? The details included the song ID; the newly submitted bookmark's date and time, the title, description, thumbnail, topic, submitted comment, register time taken, bookmark time taken, comment time taken; the submitted subject's username and user ID; Bligg's version number and each song's Bligg number.

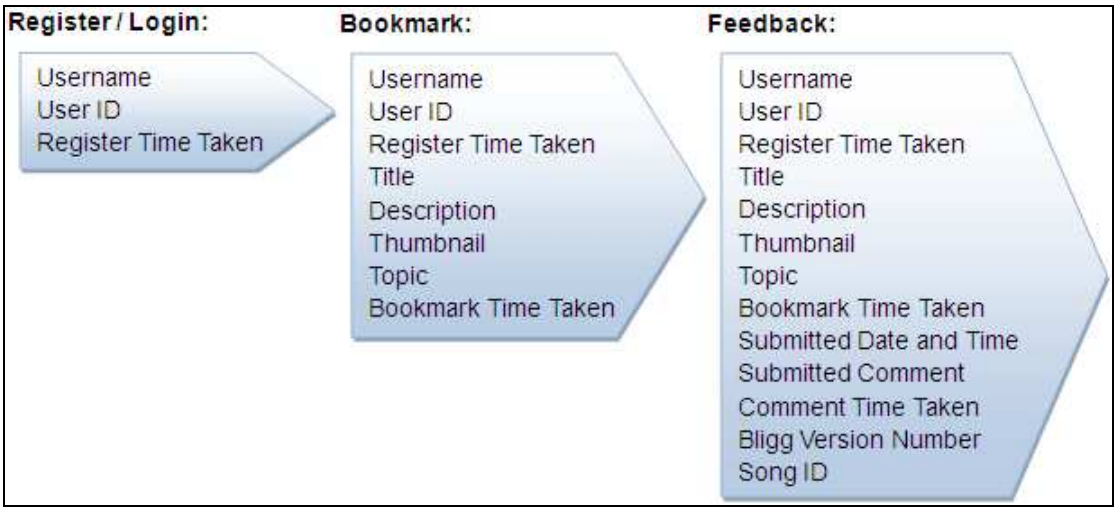


Figure 3-2: Data transfer details

3.2 Research design

Once the Bligg social bookmark button and the Beatles Mini website were created, the question was how should one use these two tools to find out whether cognitive effort and social feedback affect the likelihood of using social bookmarking or not?

Firstly, cognitive and learning theories were examined, following the usage stages. It was helpful to find out at which stage subjects lost their interest and chose not to use social bookmarking. The group of people that do not use social bookmarking can be divided into two groups: people who do not know about social bookmarking and so do not use it, and people who know about it but choose not to use it. In this analysis, the usage stages began with non-use of social bookmarking – the subjects were newcomers, who did not know about social bookmarking and did not use social bookmarking. People noticing a new object go through four phases – hearing, smelling, seeing, and feeling. In order to let social bookmarking newcomers to know about social bookmarking and induce them to use the Bligg social bookmark button, the research was divided into three phases – unknown social bookmarking, explaining and seeing social bookmarking and the Bligg social bookmark button, and using the Bligg social bookmark button. The details are listed below:

Table 3-2: Three phases following usage stages

	Do Not Know	**Know**
Do Not Use	Unknown Social Bookmarking	Explaining and Seeing Social Bookmarking and The Bligg Social Bookmark Button
Use		Using The Bligg Social Bookmark Button
Stop Using		Using The Bligg Social Bookmark Button
Restart Use		Using The Bligg Social Bookmark Button

How to design the research? In order to detect the stage at which subjects lost interest and chose not to use social bookmarking, the researcher analysed each phase. To ensure the research was valid, reliable and generalisable, data were gathered from precise quantitative studies (questionnaires). Two methods could have been used, the details of which are displayed below:

Table 3-3: Two optional research methods

	Method 1	**Method 2**
Description	All subjects go through the three phases.	The subjects are divided into 3 groups, and each group goes through each phase randomly.
Advantage	● Every subject's task might be same and the task time taken might be similar	● Takes only a short amount of time ● Might be valid and reliable

	• Might be orderly and systematic	
Disadvantage	• Takes a long time • Might be biased and spurious	• Every subject's task and task time taken might be different • Might be disorderly and unsystematic

After comparing the two methods and considering the methods' advantages and disadvantages, Method 1 was selected and applied. Although Method 1 tasks took a longer time, all subjects' tasks were the same. In order to let subjects use the Beatles Mini website and the Bligg social bookmark button easily and to avoid it taking a long time and having a bias, help descriptions were added into these two tools (see Appendix C and Appendix D). The help descriptions helped subjects realise how the Bligg social bookmark button works and shortened the time taken to do tasks, thus avoiding biased and spurious research results.

Secondly, six versions of the Bligg social bookmark button were used in the phase "using the Bligg social bookmark button". When subjects lost interest and chose not to use social bookmarking, the researcher was able to see whether cognitive effort or social feedback was the reason. This ensured the results' veracity and believability. After the experiment, the subjects' preferred Bligg version was found; this information could be helpful when developing current social bookmark buttons.

How to design the research using the six versions of the Bligg social bookmark button? As mentioned earlier, the six versions of Bligg were created based on two levels of cognitive effort and three levels of social feedback (see Table 3-1). In order to find the best version of Bligg buttons and shorten the time taken, each subject used two versions of the Bligg button, which offered the same amount of social feedback but required different amounts of cognitive effort. Moreover, the versions were randomly presented in a different order to avoid order bias. For example, one group might use Bligg 1 (high cognitive effort and no social feedback) first and Bligg 2 (low cognitive effort and no social feedback) next, while another group used the same Bligg buttons in the reverse order. To ensure that the research is valid, reliable and can be generalised, data was

gathered from questionnaires and the time taken was directly measured. The research method is listed below:

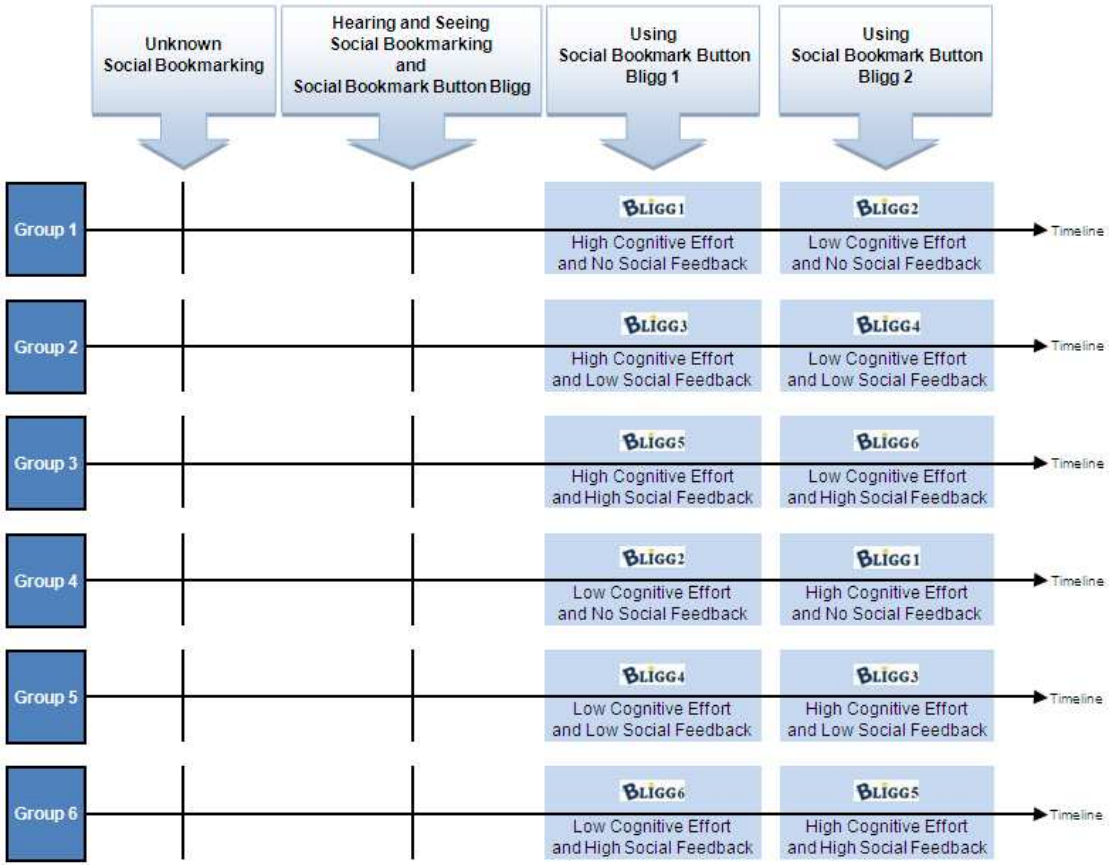


Figure 3-3: Research method design

Because of the research method design, each subjects had to use two versions of the Bligg social bookmark button. In order to help the subjects realise that they were using different Bligg buttons, the Beatles Mini website was changed a little bit. Both versions of the Beatles Mini website displayed five different songs (see Appendix D). This was more interesting than requiring subjects to bookmark the same songs using the different Bligg buttons. Moreover, each subject had to bookmark two different songs from the five songs using one version of the Bligg social bookmark button. For this research, each subject had to bookmark four songs in total. As mentioned earlier, the register and login processing steps could be skipped after subjects had already logged in once. When the subjects used the Bligg button for the first time, the process order was register → bookmark → feedback. When the subjects used the same version of the Bligg button again, the process order was bookmark → feedback.

Initially, all subjects were asked how interested they were in social bookmarking using a scale. After explaining about social bookmarking and seeing how the Bligg social bookmark button worked, all subjects were asked the same questions again to find out whether their opinions had changed or not. Next, subjects were asked to use two versions of the Bligg social bookmark button. After using each version, subjects answered the same questions again and some specific questions about how the Bligg social bookmark button was to use and which was their preferred version (based on cognitive effort and social feedback). Finally, one open-ended question was asked. Most of the questions in the questionnaire were on an interval scale and were asked in an unbiased way. The procedure plan details are discussed further in Chapter 3.5.

3.3 Subject requirement

As stated earlier, the population had to be newcomers to social bookmarking. The population had to not know, have heard about, seen or used social bookmarking, social bookmarking services or social bookmark buttons before but the population must be able to learn and use new things fairly easily and they must have computer skills and Internet experience. These requirements made collecting results for this research easier.

For these reasons, the research samples were taken from univerisites. Students find it easier to apply new things, have computer skills and Internet experience, and are expected to learn new things. It was thought that young students might be hard to control and organise, so the research samples were taken from universities. To ensure that the research samples were generalised and unbiased, they were selected randomly from Massey University in Auckland.

The research method was designed to analyse how certain things (such as cognitive effort and social feedback) affected the subjects' desire to use the Bligg social bookmark button. The sample size should be:
2 (cognitive effort) x 3 (social feedback) x 2 (use/not use) x 4 (phases)

= 48 (samples)

The research sample size must be more than 48. After considering the research method and the Bligg social bookmark button, a sample size of 60 was decided upon.

How to find sixty subjects from Massey University in Auckland? To avoid a biased approach, the sixty subjects were selected randomly from Massey University computer labs, in Auckland, New Zealand.

- First, find a student from Massey University in Auckland.
- Then, make sure the student fits the sample requirements.
- Next, ask the student to be a part of the research. If the student is interested in the research, offer more general research details and allow enough time for the student to read a "Survey Letter" (see Appendix E).
- After the student has finished reading "Survey Letter", make an appointment with the researcher. At that stage, the researcher gives the student a "Timetable" (see Appendix F), and asks the student to choose a date and enter their name and email address on the "Timetable" sheet. After the researcher checks the details on the "Timetable" sheet, the researcher ticks the chosen date on the "Survey Letter" and asked the student to keep the "Survey Letter". The "Survey Letter" reminds the student of the research time, date and location, and includes the researcher's contact details.
- Finally, suggest the student bring friends to participate in the research. This provides more subjects for the research and creates a social and friendly environment for the subjects themselves. The student writes the friend's name and email address on the "Timetable" sheet using a pencil, in case the friend changes the plan or the date. The student could also email the researcher the friend's details and chosen date. The researcher keeps the friend's details for one day.

After sixty subjects were found from within Massey University in Auckland, the subjects were divided into six groups randomly using the "Table of Random Numbers". Each group included ten subjects, who were invited to attend three main phases. The research location meant that only five subjects could

participate at the same time. Moreover, the research took place from 3pm to 4pm, after the subjects' class time. The procedure plan details are explained further in Chapter 3.5.

3.4 Questionnaire design

The Questionnaire (see Appendix H) was created based on the research method and the research question. The questionnaire's questions were easily understood, unambiguous, unbiased and inoffensive. Some questions had a dichotomous scale (nominal scale) and asked for basic, categorical, gross information and that could be calculated as a percentage. Some questions had an interval scale (like the Likert scale, numerical scales or semantic differential scale), which was easy to use, unbiased, exhaustive and sensitive. The interval scale is a more powerful scale than a nominal scale or an ordinal scale, and it gives an indication of the magnitude of the differences among the ranks. All of the interval scales had an unbalanced rating scale (10-point scale), which did not have a neutral point. This made them more accurate and sensitive in eliciting unbiased responses. Some questions were open-ended questions that collected qualitative responses. The details are described below:

Table 3-4: Questionnaire questions' details

Question	Description
Q1	This question included sub questions, and the sub questions were answered depending on the different steps (such as unknown, explaining and seeing, using one version of the Bligg button, and using another version of the Bligg button). The sub questions were about the likelihood of the subject using social bookmarking and how easy and useful each version of the button was. The sub questions told the researcher whether the subjects' opinions had changed or not and at which point the subjects lost their interest and did not want to use social bookmarking. They helped to ascertain whether cognitive effort or social feedback affect the likelihood of using social bookmarking. These sub questions used a 10-point Likert scale (interval scale).
Q2	This question included two questions, both of which were only answered after the two versions of the Bligg button had been used. The first question used a 10-point numerical scale (interval scale), and asked which version of Bligg buttons was better. The answers helped the researcher find the best version of the Bligg button based on cognitive effort and social feedback. The second question was an open-ended

	question that asked about some of the reasons that the subjects preferred one version to another. The researcher might find more factors that affect social bookmarking usage from this open-ended question.
Q3 ~ Q6	These questions included sub questions that were answered after the two versions of the Bligg button had been used. The sub questions were about the required cognitive effort on the submit bookmark page, register page and add a comment section. The answers explain which text boxes the subjects were willing to fill in, which text boxes the subjects were not willing to fill in, which automatic functions were very helpful and which were not helpful. The answers provided more details about cognitive effort and helped the researcher realise which text boxes were necessary for the correlating page/section and whether automatic text boxes were helpful or not. These findings were very helpful in terms of improving current social bookmark buttons. These sub questions used a dichotomous scale (nominal scale) or 10-point semantic differential scale (interval scale) that was able to compute the means and the standard deviations of the responses.
Q7	These questions included sub questions that were answered after the two versions of the Bligg button had been used. The sub questions were about the social feedback on the feedback page. The answers explained what information was very useful and what information was not useful, helping the researcher to realise how much information the subjects want. The findings were very helpful for current social bookmark button designers. They provided information on how to attract users and improve the buttons. These sub questions used a 10-point semantic differential scale (interval scale), and measured the magnitude of the differences in the preferences among the individuals.
Q8	This question was an open-ended question to get any general comments. The researcher might find more factors that affect the likelihood that people will use social bookmarking via this question.

3.5 Procedure plan

At the beginning of the research, there was a preparation phase for the researcher, in which the researcher made sure everything was ready. The researcher had to put one copy of the “Consent Form” (see Appendix G), one copy of the “Questionnaire”, one earphone for listening to songs and one pen for filling in questionnaires on the tables for each subject. Then, the researcher had to turn each computer on and open the Internet web browser and “Procedure Navigation Page” (see Appendix I). The “Procedure Navigation Page” was a webpage that was created to help subjects follow the procedure easily. The webpage could show the subjects what to do next – the Beatles Mini website could be opened from it. A green processing bar was added to the “Procedure Navigation Page” to show the subjects which stage they were at

and how many tasks were left.

To ensure the research results were authentic and effective, the researcher did not reveal any details to the subjects after the research. If the subjects had problems, they could ask the researcher questions; the researcher was not allowed to help the subjects with the tasks or the survey.

3.5.1 Unknown phase

Initially, the subjects were asked to sign a “Consent Form”, after which they were allowed to look at the “Procedure Navigation Page” on the already opened Internet web browser and answer “Question 1a and 1b for STEP I” following the procedure.

3.5.2 Explaining and seeing phase

After the subjects answered the questions, the researcher taught the subjects about social bookmarking, social bookmark buttons and the Bligg button with that aid of a PowerPoint. The subjects were then asked to answer “Question 1a and 1b for STEP II”.

3.5.3 Using phase

After the questions were answered and the subject had clicked the “Next” button on the “Procedure Navigation Page”, the “Try Out The First System” task was displayed. After the subjects clicked “Try Out The First System”, the Beatles Mini website was opened in a new tab. A popup notes window was opened at the same time, reminding the subjects to put on the earphone, listen to the songs and bookmark two songs using the Bligg button. When the subjects clicked the Bligg button to bookmark a song, the Bligg popup window was opened with another popup notes window, which told the subjects to register because it was their first time using this version of the Bligg button.

After the subjects went through the register, bookmark, and feedback pages (for some versions of Bligg buttons), the Bligg popup window was closed automatically or by clicking the “Close” button on the Bligg popup window. When the subjects bookmarked their second song using the same Bligg button, the register page did not appear and the bookmark page opened. After they bookmarked the second song, a popup note window was opened automatically, reminding the subjects to go back to “Procedure Navigation Page” to do the next task. After the subjects clicked the “Next” button on the “Procedure Navigation Page”, the next task was displayed – “Answer Question 1a to 1f for STEP III”.

After answering the questions, the subjects clicked the “Next” button on the “Procedure Navigation Page” and the task “Try Out The Second System” was displayed. The task details were the same as those for “Try Out The First System”, except that the songs and the button were different. After the subjects finished the tasks and clicked the “Next” button on the “Procedure Navigation Page”, the task “Answer Question 1a to 1f for STEP IV & Question 2” was displayed.

After answering the questions, the subjects clicked the “Next” button on the “Procedure Navigation Page” and the task “Answer Questionnaire: Part 2” was displayed. After they answered these questions, the questionnaire was complete and the research was finished.

3.6 Measurement method

The measurement method was reliable and valid in the way it detected and analysed the data from the questionnaires. The measurement method included two main steps – getting data and analysing data.

3.6.1 Getting data

The researcher got the data ready for analysis after it was collected in the questionnaires. In this phase, the sub jobs were editing data, handling blank responses, coding data, categorising data and creating a data file. When the researcher categorised data, the items had to be reversed so as to be in the same direction as the positively worded questions. Moreover, a row table was used to enter data into a data file.

3.6.2 Analysing data

The researcher analysed the data using SPSS analysis data software. In data analysis, there are two objectives: getting a feel for the data and testing the hypotheses developed for the research. When testing the hypotheses, t-test and ANOVA were used to analyse whether cognitive effort and social feedback affect the likelihood of using social bookmarking or not. T-test was used for Q1 and a mean table was used for Q3~Q7.

Chapter 4: First Phase Study Results

4.1 Getting data ready for analysis

After data were collected from subjects, the original data had to go through five steps (editing data, handling blank responses, coding data, categorising data, and entering data) before being analysed. SPSS analytical and statistical software was used to analyse the data.

4.1.1 Editing data

Data have to be edited, especially when the data are responses to open-ended questions. There were two open-ended questions in the questionnaire. The first was “Q2. Reasons? (Why do you prefer this system?)”, and the second was “Q8. Any general comments?”. Because the researchers checked completed questionnaires in the subjects’ presence, there were no legibility problems. These answers to these two questions are in Appendix J.

4.1.2 Handling blank responses

Because the researchers checked the completed questionnaires in the subjects' presence, all of questions were answered reasonably. This step was skipped.

4.1.3 Coding data

To analyse the data, responses had to be coded. Because most of the questions were answered on an interval scale, the answers to these questions were the data. However, Q3a, Q5a and Q6a (sub question – “Willing to do it?”) had nominal scales with “Yes” or “No” options; in this case “Yes” was coded as

1 and “No” was coded as 0.

4.1.4 Categorising data

There were six groups, and each version of the Bligg social bookmark button was compared twice in different orders (see Figure 3-3). There were three main groups comparing the six versions of the Bligg social bookmark button. In order to analyse the data, the order had to be the same. Questionnaire responses from Group 1, Group 2 and Group 3 were not changed, but questionnaire responses from Group 4, Group 5 and Group 6 were changed. For Group 4, Group 5 and Group 6, the answers to the STEP III sub questions were swapped with the answers to the STEP IV sub questions.

The answers to “Q2. Based on trying the two systems out, which system do you prefer?” also had to be changed. For Group 4, Group 5 and Group 6, the answers to Q2 were changed. If the answer was 1, the answer was made 10. The details are listed below:
1 → 10, 2→ 9, 3 → 8, 4 → 7, 5→ 6, 6 → 5, 7 → 4, 8 → 3, 9 → 2, 10 → 1

Because some answers were changed, the data were categorised into three groups – Group1, Group 2 and Group 3. Group 4 became Group 1, Group 5 became Group 2 and Group 6 became Group 3.

The answers to other questions using an interval scale were not changed because the lower number meant negative and the higher number meant positive.

4.1.5 Entering data

After being coded and categorised, these data had to be entered into SPSS for analysis. The raw data table’s columns were questions and the rows were subjects.

4.2 Data analysis

In data analysis, there are two objectives – getting a feel for the data and testing the hypotheses developed for the research. The results in this section can be used to interpret in the next section.

4.2.1 Feel for the data

Getting a feel for the data can offer preliminary ideas. The responses to the open-ended questions ("Q2. Reasons? (Why do you prefer this system?)" and "Q8. Any general comments?") could provide a feel for the data. The details are described below:

- **Simple and fast**

  One subject commented that "bookmarking is supposed to be simple (and) fast like first one (low cognitive effort and no social feedback)". How simple is it? "I just want to bookmark, why so many questions (to be answered)?", "shorter process for bookmarking", "shorter steps in key-in information for the songs", "sys2 (low cognitive effort and low social feedback) is easier, fewer click (and) fewer register info needed", "(not) too many details to fill in" and etc. How fast is it? "quicker", "less time spent on the registration", "the system saves a lot of time of typing and thinking about the description", etc.

  Did the questionnaires' results prove these points? Did the subjects prefer low cognitive effort over high cognitive effort? The results from "Q2. Based on trying the two systems out, which system do you prefer?" are below:

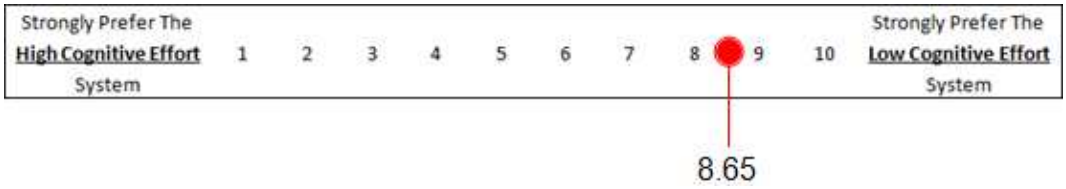


Figure 4-1: Mean preference for social bookmark buttons by cognitive effort (N=60)

The results suggest that subjects preferred the low cognitive effort system to the high cognitive effort system.

Did the subjects think that the details entered already were helpful? The results from "Q4. Is it helpful if the following details are entered already?" are below:

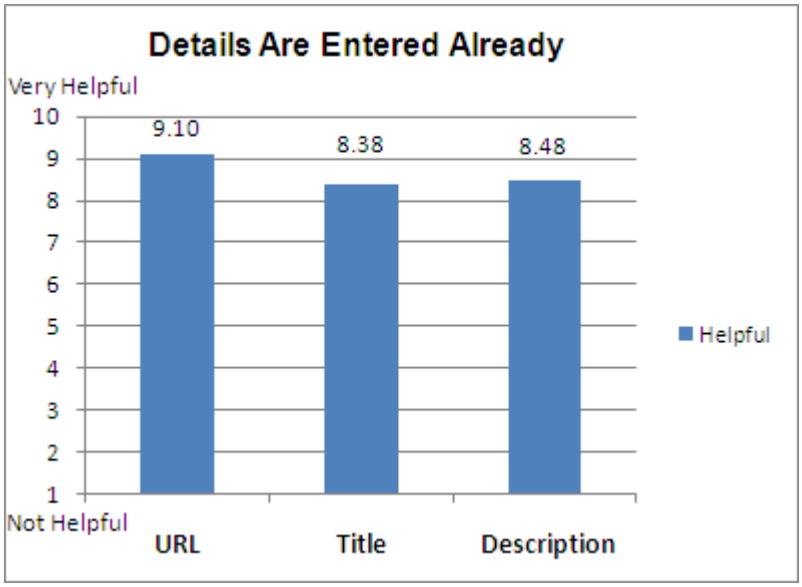


Figure 4-2: Mean helpfulness by details entered already (N=60)

It appears that the subjects thought details entered already were very helpful and that having the URL entered already was the most helpful.

Which details were the subjects willing to enter? How much effort to enter each detail for the subjects? The answers to these questions can be found in the responses to "Q3. What do you think about social bookmark submission?", "Q5. What do you think about social bookmarking registration?", and "Q6. What do you think about adding a comment?". The details are displayed below:

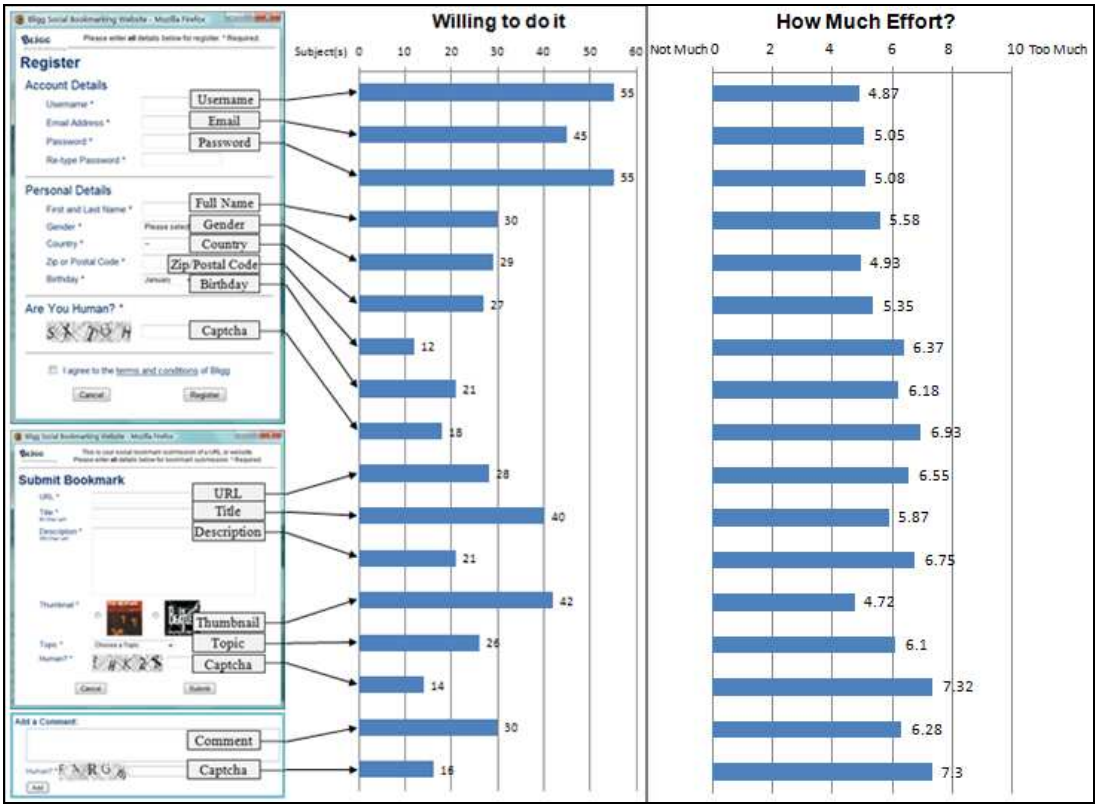


Figure 4-3: Mean willing and effort to enter the details (N=60)

The results suggested how willing subjects were to satisfy various social bookmark requests. Username, Password, Email, Thumbnail and Title were generally accepted; having to give Full Name, Comment, Gender, URL and Country were reported as more onerous; subjects were least willing to give Postal Code and Birthday details or fill in the Captcha form. The same number were willing as were un-willing to fill in Full Name and Comment. Moreover, the subjects did not put much effort into Thumbnail, Username and Gender, but they especially felt that Captcha's required a high level of effort.

Did the low cognitive effort system take less time than the high cognitive effort system? Because the research measured the time taken and saved these details into the database, the time taken can be analysed using the database.

Table 4-1: Mean task time taken in milliseconds by cognitive effort (N=60)

	Registration	Bookmark	Comment
The High Cognitive Effort System	92618.47	59424.98	33991.45

The Low Cognitive Effort System	31587.23	5920.08	24139.80

As mentioned in Chapter 3, each subject used the different Bligg buttons two times; the table shows the mean time taken for the different levels of cognitive effort. The results show that the high cognitive effort case took a significantly longer amount of time to complete: nearly ten times as long for the bookmark page, three times as long for the registration page, and 1.5 times as long for the comment section.

- **Annoying captchas**

  One subject stated “Test human is annoying”. The “test human” is captchas; many of the subjects mentioned this, finding it “ridiculously annoying”.

  Did the results prove that the subjects did not like captchas? Were the subjects willing to do captchas? How much effort was it for them to do captchas? These answers can be found in the responses to “Q3. What do you think about social bookmark submission?”, “Q5. What do you think about social bookmarking registration?” and “Q6. What do you think about adding a comment?”. The details are displayed in Figure 4-3; captchas were found to be one of the tasks subjects were most un-willing to complete.

- **Feedback on same topic**

  One subject wrote that “Informational links about the topic would have been helpful” after using the high social feedback Bligg buttons.

  Did the questionnaires’ results prove that the topic links were helpful? The answers to “Q7. What do you think about social bookmarking feedback?” are displayed below:

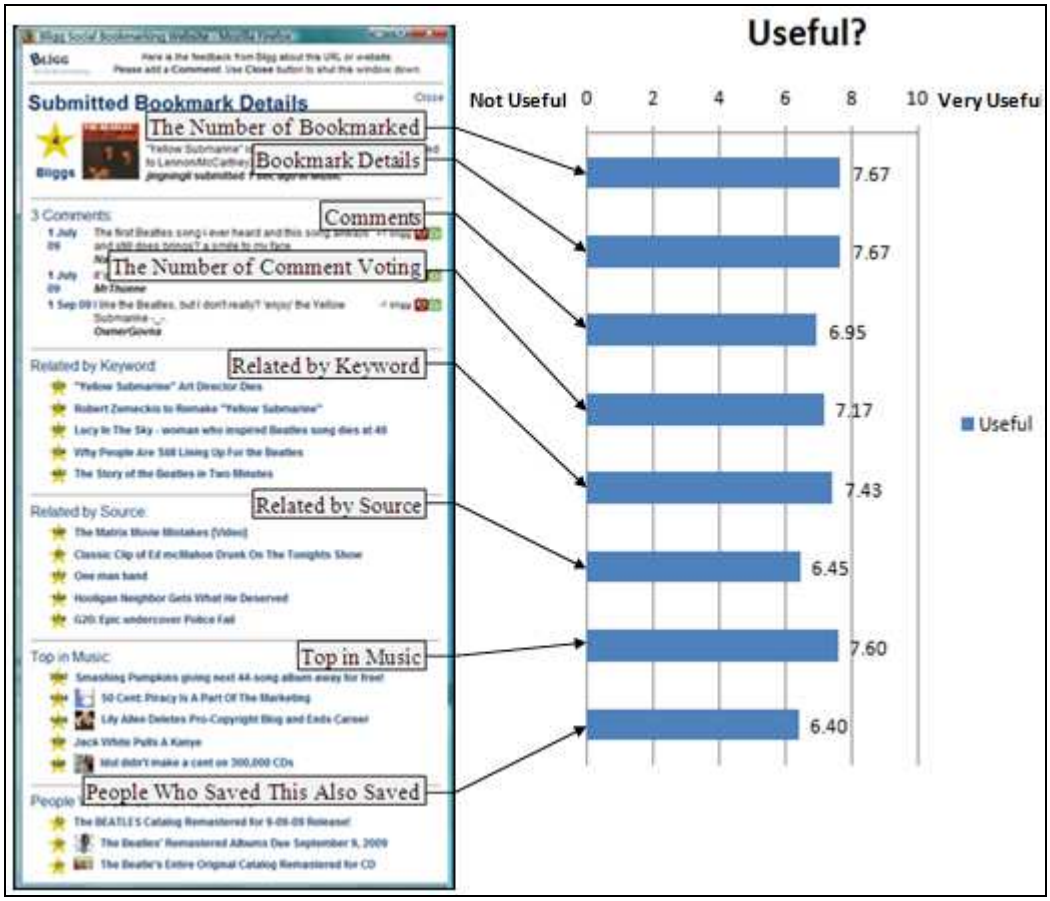


Figure 4-4: Mean usefulness of social feedback (N=60)

For the social feedback given, the results show that the most useful feedbacks were “The Number of Bookmarked”, “Bookmark Details”, and “Top in Music”. “Top in Music” relates to “informational links about the topic”. Subjects were less interested in “Related by Source” or “People Who Saved This Also Saved”.

4.2.2 Hypothesis testing

Hypothesis testing is achieved by choosing the appropriate menus from the SPSS software programs to test each of the hypotheses using relevant statistical tests. The results of these tests can determine whether or not the hypotheses are substantiated. This study’s hypotheses are:

- Social bookmark button’s cognitive effort affects the likelihood of using social bookmarking on the Internet.
- Social bookmark button’s social feedback affects the likelihood of using social bookmarking on the Internet.

Were these hypotheses proved? Firstly, the questionnaire responses were used to find out at which stage the subjects lost interest and no longer wanted to use social bookmarking. The researcher hoped that the subjects would change their opinions after using the Bligg social bookmark button. The below table shows the results:

Table 4-2: Likelihood of using social bookmarking by usage stages

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
STEP I Before Tutorial: I Would Like To Use Social Bookmarking In The Future	Between Groups	11.150	5	2.230	.389	.854
	Within Groups	309.700	54	5.735		
	Total	320.850	59			
STEP I Before Tutorial: I Think I Will Use Social Bookmarking In The Future	Between Groups	22.933	5	4.587	.917	.477
	Within Groups	270.000	54	5.000		
	Total	292.933	59			
STEP II After Tutorial: I Would Like To Use Social Bookmarking In The Future	Between Groups	24.400	5	4.880	1.208	.318
	Within Groups	218.200	54	4.041		
	Total	242.600	59			
STEP II After Tutoiral: I Think I Will Use Social Bookmarking In The Future	Between Groups	18.750	5	3.750	.979	.439
	Within Groups	206.900	54	3.831		
	Total	225.650	59			
STEP III After First System: I Would Like To Use Social Bookmarking In The Future	Between Groups	44.483	5	8.897	1.636	.166
	Within Groups	293.700	54	5.439		
	Total	338.183	59			
STEP III After First System: I Think I Will Use Social Bookmarking In The Future	Between Groups	70.883	5	14.177	2.603	.035
	Within Groups	294.100	54	5.446		
	Total	364.983	59			
STEP IV After Second System: I Would Like To Use Social Bookmarking In The Future	Between Groups	149.483	5	29.897	5.631	.000
	Within Groups	286.700	54	5.309		
	Total	436.183	59			
STEP IV After Second System: I Think I Will Use Social Bookmarking In The Future	Between Groups	118.333	5	23.667	4.386	.002
	Within Groups	291.400	54	5.396		
	Total	409.733	59			

Table 4-2 shows that the subjects did not change their opinions during the first two stages (unknown social bookmarking, and explaining and seeing social bookmarking and the Bligg social bookmark button), and the six groups of subjects had non-significant differences with respect to attitude to social bookmarking (p=0.85; p=0.48; p=0.32; p=0.44), so before without being exposed to the interface, there were no effects. However, the subjects started to change their opinions after using the first version of the Bligg social bookmark button (p=0.17; p=0.04); this change was even more obvious after they had used the second version of the button (p=0.00; p=0.00).

Did the subjects become more likely to use the Bligg social bookmark button after they had used the two different versions? Because the differences between the two versions were clear, the researcher hoped that the subjects would change their opinions after using both versions. The table below displays the results:

Table 4-3: Likelihood of using the Bligg social bookmark button by Bligg buttons

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
STEP III After First System: I Will Use This System In The Future	Between Groups	83.483	5	16.697	4.304	.002
	Within Groups	209.500	54	3.880		
	Total	292.983	59			
STEP III: After First System: I Would Recommend This System To A Friend	Between Groups	53.550	5	10.710	2.053	.086
	Within Groups	281.700	54	5.217		
	Total	335.250	59			
STEP IV After Second System: I Will Use This System In The Future	Between Groups	203.333	5	40.667	10.796	.000
	Within Groups	203.400	54	3.767		
	Total	406.733	59			
STEP IV After Second System: I Would Recommend This System To A Friend	Between Groups	245.733	5	49.147	13.953	.000
	Within Groups	190.200	54	3.522		
	Total	435.933	59			

Table 4-3 proves that the subjects changed their opinions after having used both versions of the Bligg button.

Did the subjects have the different opinions on Bligg buttons' ease of use and usefulness?

Table 4-4: Bligg buttons' ease of use and usefulness by Bligg buttons

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
STEP III After First System: This System Is Easy To Use	Between Groups	249.800	5	49.960	14.007	.000
	Within Groups	192.600	54	3.567		
	Total	442.400	59			
STEP III After First System: This System is Useful	Between Groups	367.000	5	73.400	33.308	.000
	Within Groups	119.000	54	2.204		
	Total	486.000	59			
STEP IV After Second System: This System Is Easy To Use	Between Groups	399.533	5	79.907	27.947	.000
	Within Groups	154.400	54	2.859		
	Total	553.933	59			
STEP IV After Second System: This System Is Useful	Between Groups	329.800	5	65.960	38.632	.000
	Within Groups	92.200	54	1.707		
	Total	422.000	59			

The results show that subjects felt that there were clear differences in ease of use and usefulness among the different versions. Were these differences based on Bligg buttons' cognitive effort and social feedback?

Table 4-5: Mean easy to use social bookmark buttons by cognitive effort and social feedback (N=60)

	No Social Feedback	**Low Social Feedback**	**High Social Feedback**
Low Cognitive Effort	8.25	8.05	7.85
High Cognitive Effort	4.00	3.50	3.05

Table 4-6: Mean usefulness of social bookmark buttons by cognitive effort and social feedback (N=60)

	No Social Feedback	**Low Social Feedback**	**High Social Feedback**
Low Cognitive Effort	2.30	5.70	8.45
High Cognitive Effort	1.90	4.40	7.25

The subjects thought that the buttons requiring low cognitive effort were easier to use than those requiring high cognitive effort and that buttons offering less social feedback were easier to use than those offering more (see Table 4-5). However, the subjects also thought that the buttons offering more social feedback were more useful than those offering less (see Table 4-6).

It is clear subjects' opinions on social bookmarking usage and Bligg button usage were changed by the different Bligg buttons. Moreover, the Bligg buttons' ease of use and usefulness were different depending on the relative levels of cognitive effort and social feedback. Did these change based on Bligg buttons' cognitive effort and social feedback?

Table 4-7: Mean like to use and will use social bookmarking by cognitive effort and social feedback (N=60)

- **Like To Use:**

	No Social Feedback	**Low Social Feedback**	**High Social Feedback**
Low Cognitive Effort	8.35	7.80	7.65
High Cognitive Effort	5.85	6.15	5.00

- **Will Use:**

	No Social Feedback	**Low Social Feedback**	**High Social Feedback**
Low Cognitive Effort	8.25	7.70	7.40
High Cognitive Effort	5.65	5.75	4.90

Table 4-8: Mean will use and would recommend social bookmark button by cognitive effort and social feedback (N=60)

- **Will Use:**

	None Social Feedback	**Low Social Feedback**	**High Social Feedback**
Low Cognitive Effort	8.05	7.65	6.85
High Cognitive Effort	5.20	4.90	4.10

- **Would Recommend:**

	None Social Feedback	**Low Social Feedback**	**High Social Feedback**
Low Cognitive Effort	7.65	7.65	6.50
High Cognitive Effort	4.95	4.70	3.90

Table 4-7 shows the mean intended social bookmarking usage by cognitive

effort and social feedback, and the subjects would like to use “Low Cognitive Effort” social bookmarking more than “High Cognitive Effort” social bookmarking in the future. For “Low Cognitive Effort” buttons, the more social feedback offered, the less likely it is that people will use social bookmarking. For “High Cognitive Effort” buttons, the likelihood of using “Low Social Feedback” social bookmarking was higher than the other two sorts of social feedback, but the subjects preferred less social feedback. For both low and high cognitive effort, less social feedback (which appears to be the whole point of social bookmarking) makes subjects more likely to use the button. Table 4-8 shows that the subjects preferred to less cognitive effort and less social feedback and would recommend this sort of social bookmark button to a friend.

Next, it was necessary to find out and prove whether the Bligg button’s cognitive effort and social feedback affected subjects’ likelihood of using social bookmarking or not, and prove the hypotheses. The researcher thought that social bookmark buttons’ cognitive effort affected the likelihood of using social bookmarking; this assumption was proved.

Hypothesis 1: Social bookmark button’s cognitive effort affects the likelihood of using social bookmarking on the Internet. (Significant)

Table 4-9: Likelihood of using social bookmarking by social bookmark button's cognitive effort

Group Statistics

	Cognitive Effort	N	Mean	Std. Deviation	Std. Error Mean
I Would Like To Use Social Bookmarking In The Future	Low Cognitive Effort	60	7.9333	1.56082	.20150
	High Cognitive Effort	60	5.6667	2.84436	.36721
I Think I Will Use Social Bookmarking In The Future	Low Cognitive Effort	60	7.7833	1.63740	.21139
	High Cognitive Effort	60	5.4333	2.77010	.35762

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
I Would Like To Use Social Bookmarking In The Future	Equal variances assumed	27.289	.000	5.412	118	.000	2.26667	.41886
	Equal variances not assumed			5.412	91.578	.000	2.26667	.41886
I Think I Will Use Social Bookmarking In The Future	Equal variances assumed	25.695	.000	5.657	118	.000	2.35000	.41542
	Equal variances not assumed			5.657	95.743	.000	2.35000	.41542

As Table 4-9 shows, cognitive effort had a significant effect on social bookmark intention to use (paired t-test, $p<0.001$). Social bookmark button’s cognitive effort was significant in terms of how likely people were to use social bookmarking in the future ($F=27.29$, $df=118$), and was also significant for will

use social bookmarking in the future (F=25.70, df=118). This proves that social bookmark button's cognitive effort affects the likelihood that people will use social bookmarking on the Internet. Subjects paid attention to how much effort they spent when they were using the Bligg social bookmark button. This was expected.

Hypothesis 2: Social bookmark button's social feedback affects the likelihood of using social bookmarking on the Internet. (Not Significant)

Table 4-10: Likelihood of using social bookmarking by social bookmark button's social feedback

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
I Would Like To Use Social Bookmarking In The Future	Between Groups	13.850	2	6.925	1.064	.348
	Within Groups	761.350	117	6.507		
	Total	775.200	119			
I Think I Will Use Social Bookmarking In The Future	Between Groups	13.617	2	6.808	1.044	.355
	Within Groups	762.975	117	6.521		
	Total	776.592	119			

From the results of Hypothesis 2, the different levels of social feedback had no significant effect on social bookmark intention to use (ANOVA, p=0.35; p=0.36).

4.3 Interpretation of results

One subject said "bookmarking is supposed to be simple (and) fast like first one (low cognitive effort and no social feedback)"; subjects wanted everything to be easy and simple, to save them time. Subjects did not want to enter lots of details to register and bookmark, and hated annoying captchas. Subjects paid attention to the amount of cognitive effort required of them. Subjects commented: "I just want to bookmark, why so many questions (to be answered)?" and "shorter process for bookmarking".

Social bookmark button's social feedback does not affect the likelihood of using social bookmarking on the Internet. This was problematic, as social feedback was the primary reason proposed that subjects used social bookmarking in the first place. If social feedback level did not affect usage, what did? Certainly it was expected that less effort would increase the likelihood of future usage, but

minimal effort alone is hardly a good reason to use social bookmarking in the first place. For both low and high cognitive effort, buttons offering less social feedback, which is apparently the whole point of social bookmarking, attracted the subjects (see Table 4-7). Moreover, the results of the mean easy to use social bookmark buttons show similar findings (see Table 4-5). The subjects preferred less cognitive effort and less social feedback and would recommend this sort of social bookmark button to a friend (see Table 4-8). However, the subjects thought buttons offering more social feedback were more useful than those offering less (see Table 4-6).

How to explain this strange finding? The subjects knew that buttons offering more social feedback were more useful, but they preferred those with less because they were easier to use. Is social feedback not important in terms of social bookmarking usage? Or is social feedback affected by other critical factors, meaning that it does not work for social bookmarking usage? Table 4-7 offers an answer. There is a slight positive increase from no social feedback to low social feedback with the high cognitive effort button. If the subjects do not use social bookmarking for social feedback, then why do they prefer low social feedback to no social feedback?

On re-analysing the screens presented in the six cases it became apparent that increasing social feedback may also have increased cognitive effort, as then subjects had to read more – the high social feedback page was longer than the low social feedback page. The top most useful feedback “Top in Music” was listed on the bottom of the feedback page. If the subjects wanted to read “Top in Music”, they had to scroll down to read more information on the high social feedback page. This confounding of cognitive effort and amount of social feedback may have caused the non-significant effect on intention to use social bookmarking. If more social feedback increased likelihood of future use and more cognitive effort decreased it, the two effects could have cancelled out. It was decided to repeat the study to eliminate this confounding.

Chapter 5: Second Phase Study Method

5.1 Pilot studies

In order to make sure the second study could prove reading screen effort and confounded effort (forcing subjects to read social feedback they find un-interesting) is critical to whether or not social feedback is useful; two pilot studies were done to achieve this – increasing feedback without also increasing cognitive effort (i.e. giving more feedback for the same reading effort).

5.1.1 First pilot study

In the first pilot study, three sorts of Bligg buttons were created. They were "Low Cognitive Effort and No Social Feedback", "Low Cognitive Effort and No Choice of Social Feedback", and "Low Cognitive Effort and Choice of Social Feedback" (see Appendix K). Using low cognitive effort version ensured that the subjects did not put too much effort on Bligg button. Moreover, processing steps "Register" and "Login" were skipped for less the subjects' effort puting. Considering and proving reading screen effort is a critical factor in whether social feedback works on social bookmarking usage, the three sorts of feedback pages had the same reading length, images and layout.

When a subject clicked one sort of Bligg button, the Bookmark page would be opened firstly. Subjects did not need to enter any details into the Bookmark page because all details were entered already. After clicking the "Submit" button from the Bookmark page, the feedback page would be opened. For no social feedback version, there were "Thanks for bookmarked this song" information displayed, but no social feedback included. For no choice of social feedback version, Bligg number, song title, song description, first submitted user's username, submitted time and topic were list. For choice of social feedback version, it covered no choice of social feedback's details, and also included one link "See other bookmarks in Pop Music". After clicked the link,

five more social bookmarks were listed on a popup window.

In the first pilot study, three subjects were asked to try two different sorts of Bligg buttons, and they were asked to speak aloud when they were using the Bligg Buttons. Their voice was recorded for protocol analysis, and the analysis details were list in Appendix L. From the analysis, the researcher found that the subjects liked more social feedback and the link from choice of social feedback. However, the subjects still paid more attention on Bookmark page (such as changing bookmark's details), and one subject did not realise the difference from no choice of social feedback and choice social feedback.

5.1.2 Second pilot study

From the first pilot study's findings, the researcher improved Bligg button – skipped Bookmark page, added one more link "See other bookmarks related by Keyword" into choice of social feedback version, and changed no choice of social feedback version into "Song information social feedback" and "Bligg number social feedback" versions. For song information social feedback, it included song title, song description, first submitted user's username, submitted time and topic. For Bligg number social feedback, it covered all details of song information social feedback, and also included Bligg number. These changes could make sure the subjects paid attention to social feedback and the links, and also could analyse the different sorts of social feedback more accurately. Considering reading screen effort, the four versions of feedback pages had the same reading length, images and layout.

In the second pilot study, three subjects were asked to try two different sorts of Bligg buttons, and they were asked to speak aloud when they were using the Bligg Buttons. Their voices were recorded for protocol analysis, and the analysis details were list in Appendix M. From the analysis, the researcher found that the subjects paid much more attention on social feedback and the links, and the four sorts of social feedback usages were totally different.

To ensure the subjects found it easy to follow the study and did not lose steps, procedure webpage, song list webpage, song details webpage and Bligg buttons were used and checked using cognitive walkthrough. The results showed that this study was easy to follow and use, and the details are listed in Appendix N.

5.2 Last social bookmark button – Bligg

Depending on the second pilot study's results, the last versions of Bligg buttons were used for the second study. More details are described in next chapters.

5.2.1 Processing order

In order to prove that reading screen effort and confounded effort are critical to whether social feedback works for social bookmarking usage, the last Bligg social bookmark button just had one processing step – feedback. After the subjects clicked the Bligg button, they did not have to register or login or enter details to bookmark – the feedback page would just open. This allowed subjects to pay attention to the feedback and saved time.

5.2.2 Feedback versions

Because reading screen effort and confounded effort are critical to whether or not social feedback affects social bookmarking usage, four types of social feedback versions were created. In each case, the amount of social feedback cumulated, but the reading length was the same. Images and layout were also the same.

- **No social feedback**
  No social feedback was provided to subjects and "Thanks for using Bligg button" was displayed. (This mirrors when Digg users log in and the new bookmark is submitted for the first time.)

- **Song information social feedback**

  Subjects could read song information (Title and Description), which was written by the first user to submit the bookmark. The first user's bookmark details (Username, Topic and Submitted Time) were also displayed. (This mirrors when Digg users log in and the new bookmark is submitted for the first time.)

- **Song information social feedback plus Bligg number social feedback**

  This version included the above version's details, and also included the Bligg number – this shows how many other Bligg users bookmarked this song. (This mirrors when Digg users log in and the new bookmark is submitted for the first time.)

- **Song information social feedback, Bligg number social feedback plus choice of social feedback**

  This version included the above version's details, and also included two links ("See other bookmarks in Pop Music" and "See other bookmarks related by Keyword"), which could show subjects more social bookmarks. The subjects were not forced to read the linked social feedback, but could do so if they wanted to. (This is similar to the Digg version when Digg users log in and the new bookmark is submitted for the first time.)

5.2.3 Interface design

The last Bligg button's interface did not change – the first study interface was used. The interface screenshots are displayed in Appendix O.

5.2.4 Database

For the last Bligg button, the Beatles mini website was used and the only change was that ten songs were listed on the song list page. This change is

due to the changed research method (see Chapter 5.3).

For social feedback, the details created by the researcher were based on the Digg version. The social bookmark resources used for the links were from a Beatles song bookmark on the website digg.com; all the details were real and collected by September 10th, 2009.

Database access was similar to the first study – JavaScript programming language was used to transfer details and save them into a .txt file using PHP programming language. In the end, the saved details included the submitted data and time, the song ID, the Bligg version number, username, title, description, thumbnail, feedback time taken, clicked link type and linked feedback time taken.

5.3 Research design

The research method was similar to the first study, which included three phases (such as unknown social bookmarking, explaining and seeing social bookmarking and the Bligg social bookmark button, and using the Bligg social bookmark button) and investigations were carried out after each phase. It detected at which stage subjects lost interest and stopped using social bookmarking. Although the first study found that the subjects changed their opinions on social bookmarking after using the Bligg social bookmark button, these three phases were applied for letting the subjects to realise social bookmarking well, and to get the second study subjects to the same stage as the first study subjects were at. This was to keep the research consistent.

For this study, every subject had to go through the three phases and try the four versions of the Bligg social bookmark button in a random order. This experiment was repeated measures and the research data were collected from questionnaires and the time taken for each version of Bligg button was measured. The aim was to find out which sort of social feedback affects the subjects' social bookmarking usage. Because each subject had to use four

versions of the Bligg button, ten songs were listed on the song list page. This gave the subjects more choices.

5.4 Subject requirement

Twenty-four subjects (newcomers to social bookmarking) were found from within Massey University in Auckland. This was to keep the research consistent. Because there were twenty-four different random orders to try the four versions of Bligg buttons, the sample size was twenty-four. This was a limited sample – the research samples should be selected from other universities as well for future studies.

5.5 Questionnaire design

The questionnaire (see Appendix P) was similar to the first study's questionnaire. The questions were understandable, unambiguous, unbiased and inoffensive. In order to get an indication of the magnitude of the difference recorded, interval scales were used. The interval scale was designed to be easy to use, unbiased, exhaustive and sensitive; all of the interval scales used an unbalanced rating scale (10-point scale) that did not have a neutral point. This was better at eliciting unbiased responses. Some questions were open-ended, so as to collect qualitative responses. Because the second study's questionnaire was similar to the first, just those questions that were different questions are described below:

Table 5-1: Questionnaire questions' details

Question	Description
Q2	This question includes two questions, both of which were answered after the four versions had been used. The first question used a 10-point semantic differential scale (interval scale), and asked the subject's preference. The answers could show each version of Bligg buttons' preference point, and found that how much the subjects preferred each version of social feedback. The second question was open-ended and aimed to ascertain some of the reasons that subjects preferred one version to another. The researcher might find more factors that affect the likelihood of the user using social bookmarking from the open-ended questions.

Q3	This question included sub questions, which were answered after the four versions of the Bligg button had been used. The sub questions were about each social feedback's usefulness and attractiveness. These sub questions used a 10-point semantic differential scale (interval scale) that computed the standard deviations of the responses. The answers would suggest which kind of social feedback the subjects found useful and which kind of social feedback the subjects liked to use. The findings were very helpful in improving current social bookmark buttons' social feedback.
Q4	This question included sub questions, which were answered after the four versions of the Bligg button had been used. The sub questions were about being willing to click and make an effort with the links. These sub questions used a 10-point semantic differential scale (interval scale) that computed the standard deviations of the responses. The answers would show how willing the subjects were to click the links for more social feedback and how much effort the subjects wanted to expend. The findings highlighted the subjects' opinions on choice of social feedback and improving social feedback.

5.6 Procedure plan and measurement method

The details of the procedure plan and measurement method were the same as that of the first study (see Chapter 3.5 and Chapter 3.6).

Chapter 6: Second Phase Study Results

6.1 Getting data ready for analysis

The same method was used as for the first study.

6.1.1 Editing data

For the second study's questionnaire, two open-ended questions needed to be edited. The first was "Q2. Reasons? (How much do you prefer them?)", and the second was "Q8. Any general comments?". Because the researchers checked the completed questionnaires in subjects' presence, all of answers were written clearly. The answers to these two questions are listed in Appendix Q.

6.1.2 Handling blank responses

Because the researchers checked the completed questionnaires in the subjects' presence, all of questions were answered reasonably. This step was skipped.

6.1.3 Coding data

In order to analyse data, responses had to be coded. Because most of the questions had an interval scale, the answers to these questions were the data (no coding data). No nominal scales were included in the questionnaire.

6.1.4 Categorising data

In the second study, every subject tried the four versions of the Bligg button in a different order, so "Q1. Answer the following questions based on your

experience, or what you just saw or tried out:" STEP III, STEP IV, STEP V and STEP VI had to make sure on the order of "No social feedback" → "Song information social feedback" → "Song information social feedback Plus Bligg number social feedback" → "Song information social feedback, Bligg number social feedback Plus choice of social feedback". For the same reason, answers to "Q2. Based on trying the four systems out, how much do you prefer them?" had to be in order, from less social feedback to more social feedback.

For other questions with an interval scale, the answers were not changed because the lower number was negative and the higher number was positive.

6.1.5 Entering data

After coding and categorising data, these data had to be entered into SPSS for analysis. The raw data table's columns were questions and rows were subjects.

6.2 Data analysis

In data analysis, there are two objectives – getting a feel for the data and testing the hypotheses developed for the research. The results from this section can be used to interpret in the next section.

6.2.1 Feel for the data

Getting a feel for the data can give one preliminary ideas. From the questionnaire's responses, the responses to the open-ended questions "Q2. Reasons? (How much do you prefer them?)" and "Q5. Any general comments?" could give one a feel for the data. The details are described below:

- **Useful and interesting information**

One subject answered "... the more information the better...", and all of the subjects liked the 4th system (song information social feedback, Bligg number social feedback plus choice of social feedback), because "the 4th system gave

me more information" and "... is a very interesting system as well as good information involved". Moreover, one subject stated that "this system will be more useful than the others" and "...will prefer to use it (in the future)".

Did the results prove these points? Did the subjects prefer more social feedback? Did the subjects like more social feedback? Was more social feedback more useful? The answers are below:

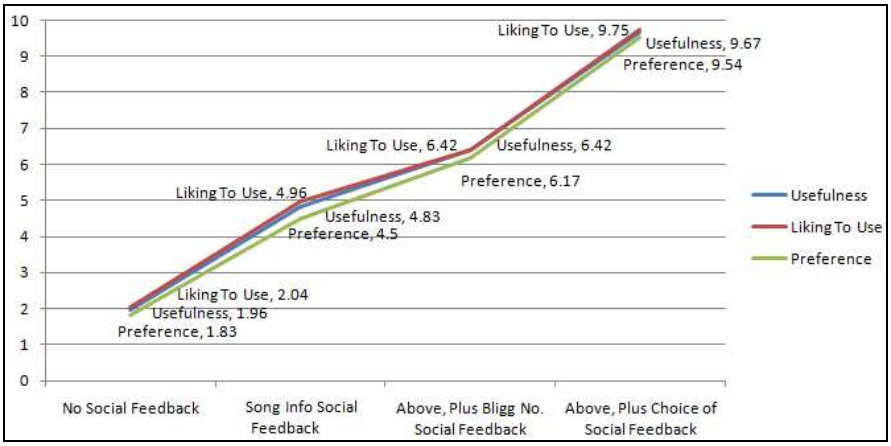


Figure 6-1: Mean usefulness, liking to use and preference for social bookmark buttons by social feedback (N=24)

The results clearly show that the subjects thought more social feedback were more useful and they liked to use this sort of social feedback. Moreover, the subjects' opinions were definite. For example, the mean like to use social bookmark buttons by social feedback:

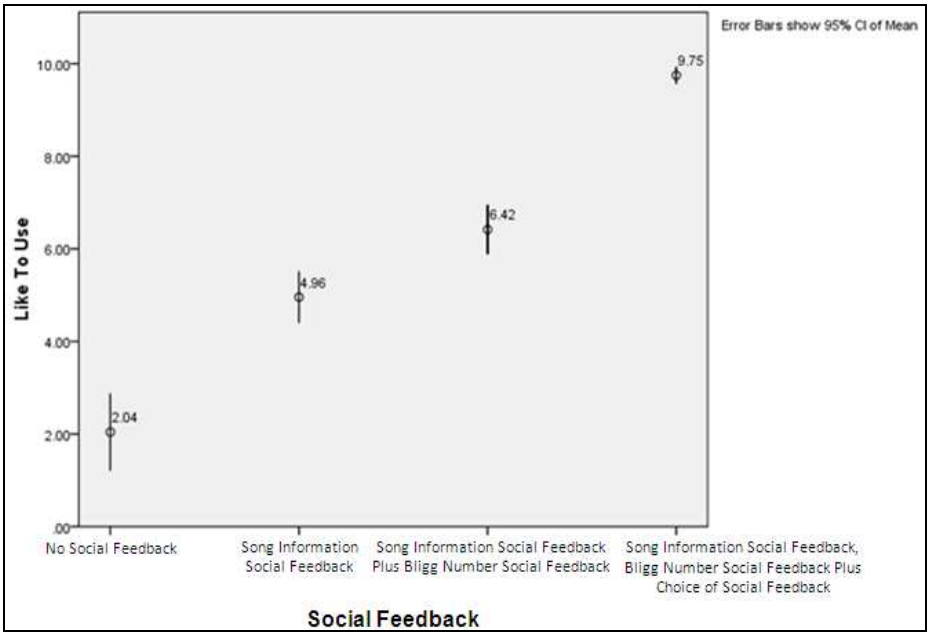


Figure 6-2: Mean like to use social bookmark buttons by social feedback (N=24)

Each social feedback's range of like to use social bookmark buttons was short, which showed that the subjects had similar opinions on the different sorts of social feedback.

- **Useful links**

The subjects who preferred more social feedback had another reason – the useful links. One subject mentioned "I prefer to use the 4th system (song information social feedback, Bligg number social feedback plus choice of social feedback) because of the wonderful links and also user can find out more songs they like"; other subjects agreed: "(the 4th system) had other options in the bottom – as a quick link to see other bookmarks"; "(I) would use the 4th system in the future because there are recommend links down the bottom".

The subjects preferred the system with more social feedback because of the useful links; did this affect link usage? Were the subjects willing to click the links for more social feedback? How much effort did the subjects think to expend clicking the links? Did all of the subjects click the links? The results are below:

Table 6-1: Mean willing and effort to click the links by gender (N=24)

Gender	Willing to Click the Links	Effort to Click the Links
Male	8.83	2.33
Female	8.08	2.67

The questionnaire's results show that all of the subjects were willing to click the links and that they did not think it was too much effort to click the links. The male subjects were more willing to click the links than the female subjects, and they considered it to be less of an effort to click the links than did the female subjects.

In reality, did every subject click the links for more social feedback? The answer was in the database, because all the link click records were saved into it. For the link choices in the final social feedback level, 71% of the subjects clicked the links for more social feedback. 82% of the subjects clicked the link "See other bookmarks in Pop Music" and 18% of the subjects clicked the link "See other bookmarks related by Keywords". Moreover, more male subjects clicked the links than female subjects.

- **Ease of use and time taken**

The research found that "71% of subjects clicked the links for more social feedback"; however did the extra time taken make the subjects think the social feedback system was hard to use? The answer is no. The details are listed below:

Table 6-2: Mean time taken in milliseconds by social feedback (N=24)

		Time Taken	
No Social Feedback		14300.13	
Song Information Social Feedback		9192.44	
Above, Plus Bligg Number Social Feedback		11267.50	
Above, Plus Choice of Social Feedback	**Feedback Page**	12519.72	26205.72
	Links Page	13686.00	

From this table, it is not hard to see that the subjects took about two to three times longer with the choice of social feedback system than the other systems. However, the longer time taken did not affect the subjects' opinions on how easy it was to use this system:

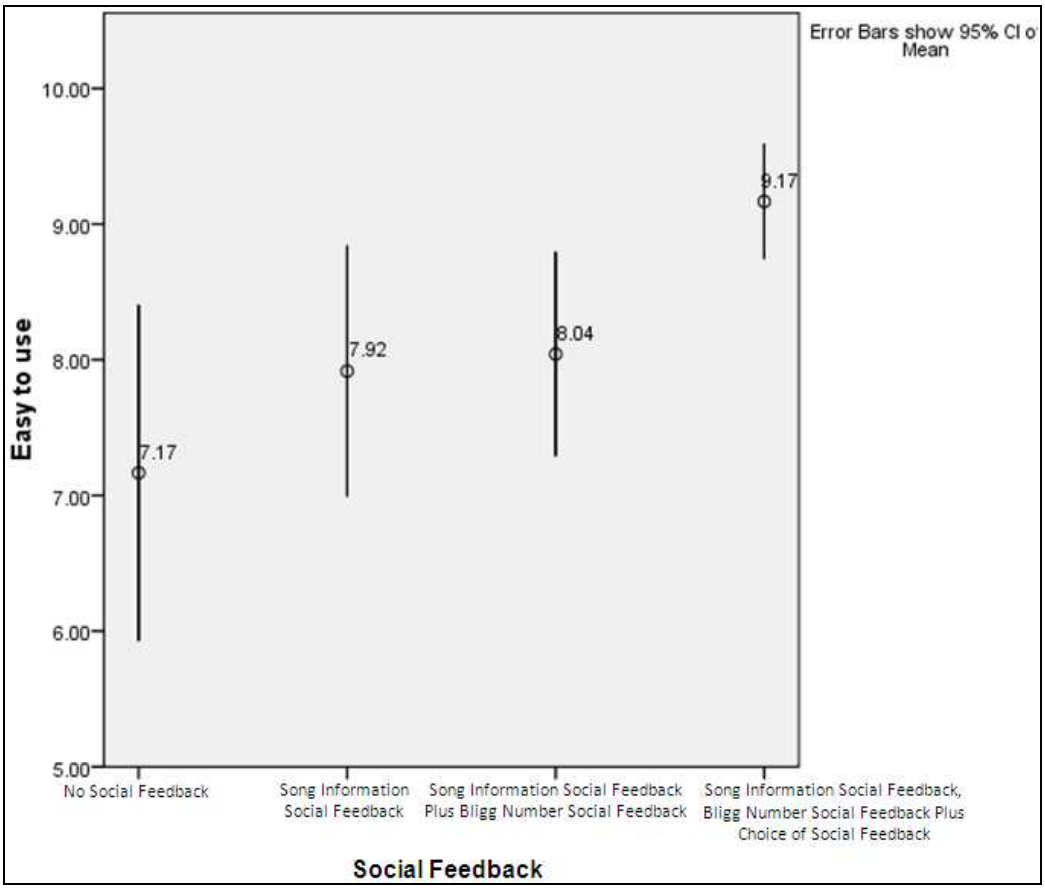


Figure 6-3: Mean ease of use Bligg buttons by social feedback (N=24)

The subjects thought the choice of social bookmark system was the easiest to use. This proves that the links were easy to use and that the subjects did not think a system was easy to use based on the time it took.

6.2.2 Hypothesis testing

For the second study, the hypothesis was:

- Social bookmark button's social feedback affects the likelihood of using social bookmarking on the Internet.

Was the hypothesis proved? First, let's look at the mean of social bookmarking and social bookmark button usage by social feedback.

Table 6-3: Mean like to use and will use social bookmarking by social feedback (N=24)

- **Like To Use:**

No Social Feedback	Song Information Social Feedback	Left, Plus Bligg Number Social Feedback	Left, Plus Choice of Social Feedback
1.88	4.63	6.21	9.46

- **Will Use:**

No Social Feedback	Song Information Social Feedback	Left, Plus Bligg Number Social Feedback	Left, Plus Choice of Social Feedback
1.96	4.54	6.25	9.42

Table 6-4: Mean will use and would recommend social bookmark button by social feedback (N=24)

- **Will Use:**

No Social Feedback	Song Information Social Feedback	Left, Plus Bligg Number Social Feedback	Left, Plus Choice of Social Feedback
2.00	4.54	6.33	9.38

- **Would Recommend:**

No Social Feedback	Song Information Social Feedback	Left, Plus Bligg Number Social Feedback	Left, Plus Choice of Social Feedback
2.13	4.67	6.29	9.33

These tables show that the subjects would like to use the more social feedback system in the future and that the more social feedback system affects social bookmarking usage.

Because the different Bligg buttons were created based on social feedback, did the social bookmark button's social feedback affect the likelihood of using social bookmarking?

Next, we needed to prove whether Bligg button's social feedback affected the likelihood of using social bookmarking or not, and prove the hypothesis. The researcher thought that the social bookmark button's social feedback affected the likelihood of using social bookmarking; this assumption was proved.

Hypothesis: Social bookmark button's social feedback affects the likelihood of using social bookmarking on the Internet. (Significant)

Table 6-5: Likelihood of using social bookmarking by social bookmark button's social feedback

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
I Would Like To Use Social Bookmarking In The Future	Between Groups	721.667	3	240.556	139.923	.000
	Within Groups	158.167	92	1.719		
	Total	879.833	95			
I Think I Will Use Social Bookmarking In The Future	Between Groups	704.583	3	234.861	114.173	.000
	Within Groups	189.250	92	2.057		
	Total	893.833	95			

Once cognitive effort was controlled for, social feedback had a significant effect on the likelihood of using and intention to use social bookmarking in the future (ANOVA, $p<0.001$ for both criteria). Table 6.5 shows that social bookmark button's social feedback is significant for like to use social bookmarking in the future ($F=139.92$, $df=3$), and also was significant for will use social bookmarking in the future ($F=114.17$, $df=3$). This proves that social bookmark button's social feedback affects the likelihood of using social bookmarking on the Internet. The subjects paid attention to how much social feedback they got when they were using the Bligg social bookmark button.

6.3 Interpretation of results

One subject said "the more information the better". Subjects preferred to get more interesting and useful information from others. However, more social

feedback did not mean more social bookmarking usage. The results of the first study and this study, show that reading screen effort and confounded effort were proved as critical factors affecting social feedback works on social bookmarking usage.

Based on these two studies, a social bookmark button should include the following:

Table 6-6: Social bookmark button details

	Details	Notes
Registration	Username, Email Address, Password	Re-type Password and Terms and Conditions can exist for logic.
Bookmark	URL, Title, Description, Thumbnail	URL, Title, and Description can be entered automatically.
Comment	Comment	An un-required entry.
Feedback	The Number of Bookmarked, Bookmark Details, Top in Music (Same Topic Bookmarks), Related by Keyword	Page length should be controlled (not too long). Top in Music (Same Topic Bookmarks) and Related by Keyword can be made links.

This research suggests that a good registration page would be similar to Reddit; a good bookmark page would be similar to that of Digg; a good comment section would be like Reddit's; a good feedback page would be similar to that of Digg. Generally, a good social bookmark button requires low cognitive effort and offers a large amount of social feedback. The social feedback page should not too long and some social feedback should only be able to be read after having clicked related links.

Chapter 7: Discussion

7.1 Conclusions

These results suggest that the reading effort users are willing to put into social bookmark feedback is less than many designers suppose and may well be limited to a single screen with no scroll downs. In particular, users had little time for captchas (having to respond to “are you human” requests). Increasing feedback length, which increased cognitive reading effort, had no significant effect. It seemed that users did not even value the feedback upon which social bookmarking is based.

However when the amount of feedback was kept to a constant single screen size, then increasing the social bookmark feedback did increase the likelihood that people would use the button. This suggests that perhaps one reason for people’s relatively slow uptake of social bookmarking, compared to say social networking, may be that its social feedback is not cognitively efficient, i.e. users will not value social feedback that is too hard to get, or conversely, they want social feedback but will not put a lot of effort into getting it. In sum, reasonable cognitive effort is a critical enabling factor for the effect of the social feedback social bookmarks provide.

7.2 Future potential

Future research should address further this critical issue of how social and cognitive interface factors interact in socio-technical system success.

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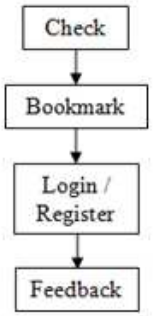
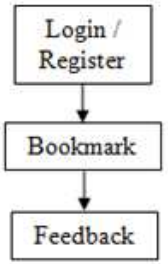
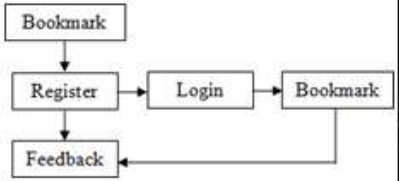
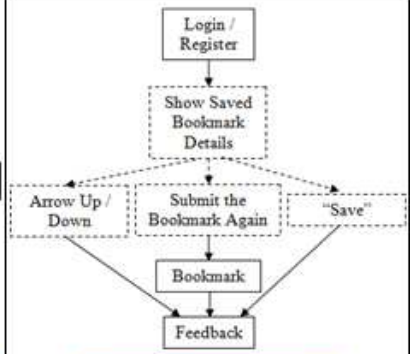
Appendix A: Comparing Social Bookmark Buttons

	Digg	Delicious	StumbleUpon	reddit
Processing Steps				
Login and Register Layout	 From **Login** page to **Register** page (same window)	 From **Login** page to **Register** page (different window)	 **Login** section is displayed on **Register** page	 **Register** and **Login** at the same page
Required Entries for Register	Username, Email, Password, Retype Password, Birthday, CAPTCHA, Terms and Conditions. (First and Last Name, Zip / Postal Code, Gender, Country)	First Name, Last Name, Email, Username, Password, Retype Password, CAPTCHA, Terms of Service.	Email, Username, Password, Birthday, CAPTCHA. (Gender, Show user reviews on search results, Let friends find me by email)	Username, Password, Retype Password, CAPTCHA.(Email, Remember Me)
Additional Steps for Register	Check Email, Verify New Account, Profile.	Add Button, Import Existing Bookmarks.	Download Toolbar, Select Interests & Stumble, Web Toolbar.	No
If can logout or not	Can	Cannot if no feedback	Can	Can
Notes		CAPTCHA is hard to see for Register!		When Register, Email is not required. However, it is required when get password back! It is so tricky!

Collected by 16th July 2009 from bbc.co.uk

	Digg	Delicious	StumbleUpon	reddit
Required for Bookmark	Require: Topic, CAPTCHA. Story Title, Description are entered automatically. Thumbnail is chosen.	Require: Title**. (Notes, Tags, Do Not Share) URL, Story Title are entered automatically.	Require: Category, CAPTCHA***. (Review & Comment)	Require: Story Title****, CAPTCHA. (Suggest Title, Text) Story Title, URL, Topic are entered automatically.
Descriptions and Comments*	**Bookmark:** • **Required** "Description" • **Not Required** "Comments" **Feedback:** • **Show** "Description" "Comments" • **Enter** "Comments" **Re-Bookmark:** • **Action** Click "Digg" button. Use 1st person's "Description". Enter own "Comments".	**Bookmark:** • **Not Required** "Notes" **Feedback:** • **Show** "Notes" • **Enter** "Notes" **Re-Bookmark:** • **Action** As 1st bookmark, but added "Popular Tags". Enter own "Notes".	**Bookmark:** • **Not Required** "Review & Comment" **Feedback:** • **Show** "Review & Comment" • **Enter** "Review & Comment" **Re-Bookmark:** • **Action** As 1st bookmark, but added "Suggested Tags". Enter own "Review & Comment".	**Bookmark:** • **Not Required** "Text" "Comments **Feedback:** • **Show** "Text" "Comments" • **Enter** "Comments" **Re-Bookmark:** • **Action** Click "Vote" button. Use 1st person's "Text". Enter own "Comments".
Notes			When Bookmark, "Topic" is not required. However, "Topic" is required! "Bookmark" twice if login! (System doesn't remember the 1st entry details!)	User cannot submit story very fast ("you are trying to submit too fast. try again in 5 minute.")

*: Description also is called as Text, and Comments also is called as Notes, Review.

**: Just for some cases.

***: As users already logged in.

****: As a story has been bookmarked and other users want to submit the story again.

Collected by 16th July 2009 from bbc.co.uk

Note:

Digg "Processing Steps" from massey.ac.nz is different: Login / Register → Bookmark → Feedback (Collected by 16th July 2009).

	Digg	Delicious	StumbleUpon	reddit
Feedback Interface				
Feedback Details	• Story title (URL) • Brief URL • Story description • Story thumb image • How many people bookmarked the story • 1st person bookmarked the story: username, bookmarked time, photo • Who bookmarked the story (click to see) • Comments • Top in the story's Topic • People who bookmarked the story also bookmarked • Related by Keyword • Related by Source	• Story title (URL) • Full URL • Story description (can be omitted) • How many people bookmarked the story • Bookmarked the story date • Story tags (can be omitted) • Who bookmarked the story (click to see) • Comments (click to see)	• Story title (URL) • Story thumb image • 1st person bookmarked the story: username, bookmarked time and date, photo • How many people bookmarked the story • Review & Comment (can be omitted) • Story tags (can be omitted) • People who bookmarked the story: Photo • Others' Reviews and Comments (can be omitted) • Related sites about the story's Topic	• Story title (URL) • Brief URL • How many people bookmarked the story • Bookmarked time and username • 1st person bookmarked the story: username, bookmarked time and date • How many up and down votes • Comments
Notes	**If** a story is bookmarked at 1st time and users register, there is no feedback and just go to the homepage (digg.com). **If** a story is bookmarked at 1st time and users login, the feedback includes: - Story Title (URL) - Story Description - How many people bookmarked the story - 1st person bookmarked the story: Username, Time, Topic	No Feedback as users Register or already Logged in.		

Collected by 16th July 2009 from bbc.co.uk

Appendix B: Different Versions of Cognitive Effort and Social Feedback

Low Cognitive Effort	High Cognitive Effort
● **Register:** It's reddit version, but didn't include CAPTCHA and Remember Me. ● **Login:** It's Digg, Delicious, reddit, and StumbleUpon version. ● **Bookmark:** It's Delicious version, but didn't include Tags and Do Not Share features. Text box Description was entered automatically as Digg version. **Re-Bookmark:** It's Delicious and StumbleUpon version, but no Popular Tags and Suggested Tags features. ● **Comment (High Social Feedback):** It's reddit version.	● **Register:** It's Digg version. (Gender, Country, Birthday drop down selections' items were as same as the current social bookmark button Digg.) ● **Login:** It's Digg, Delicious, reddit, and StumbleUpon version. ● **Bookmark:** It's Digg version, but all details had to be entered except URL. Also similar as reddit version. **Re-Bookmark:** It's Delicious and StumbleUpon version, but no Popular Tags and Suggested Tags features. (Topic drop down selection's items were as same as the current social bookmark button Digg, and Char Left feature was created according as Digg and Delicious version.) ● **Comment (High Social Feedback):** It's StumbleUpon and Digg version.

Note:
All of CAPTCHA were found from current social bookmark button Digg.

Collected by 16th July 2009 from bbc.co.uk and massey.ac.nz

None Social Feedback	Low Social Feedback	High Social Feedback
● **Feedback:** It's Delicious version when Delicious users register or already logged in. ● **Preview (Bookmark):** None.	● **Feedback:** It's Digg version when Digg users logged in and the new bookmark is submitted for the first time. It's also similar as reddit version. ● **Preview (Bookmark):** None.	● **Feedback:** It's Digg version when Digg users re-bookmark bookmarks. ● **Preview (Bookmark):** It's Digg version, and the details were low social feedback. (For two different cognitive effort versions)

Collected by 16th July 2009 from bbc.co.uk and massey.ac.nz

Appendix C: Bligg Buttons Interface Screenshots – First Study

	Low Cognitive Effort	High Cognitive Effort
Register		
Login		

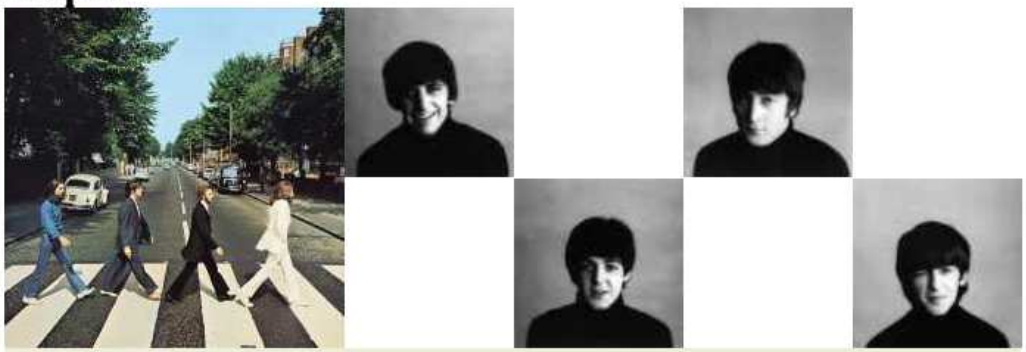
		Low Cognitive Effort	High Cognitive Effort
Bookmark	None and Low Social Feedback		
	High Social Feedback		

		Low Cognitive Effort	High Cognitive Effort
Feedback	Low Social Feedback		
	High Social Feedback		

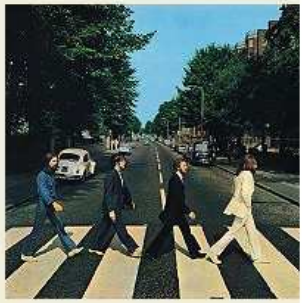
Appendix D: The Beatles Mini Website Interface Screenshots

THE BEATLES

Use "THE BEATLES" logo for going back to the song list page.



HERE COMES THE SUN



Here Comes the Sun is a song by George Harrison from The Beatles' 1969 album Abbey Road. The song, one of Harrison's best-known Beatles contributions alongside Something, originated from a song-writing collaboration between Harrison and close friend Eric Clapton called Badge, recorded by Clapton's group Cream, and featuring an arpeggiated guitar riff that is similar to the one that forms the bridge of Here Comes the Sun. 1969 was a difficult year for Harrison: he was arrested for marijuana possession, he had his tonsils removed, and he had temporarily quit the band. The song was written while Harrison was away from all of these troubles.

BLIGG1

Appendix E: Survey Letter

Institute of Information and Mathematical Sciences

Massey University in Auckland

New Zealand

Trying Out Social Bookmarking

Hi, my name is **Jingning Li** and I am researching social bookmarking for Master of Information Sciences.

Are you interested to learn about social bookmarking? It is used by more than 55 million people around the world. For this research, you will be put of a group of five people and bookmark some songs. You also will get to learn how social bookmarking works. Then you answer few questions on how you feel about it.

Your responses will be kept *strictly* confidential, and no personal data about you will be stored.

Thank you for your time.

Cordially,
Jingning Li
liji_822@hotmail.com
Social Bookmarking Project

Booked Time:

	Monday 26 Oct	Tuesday 27 Oct	Wednesday 28 Oct	Thursday 29 Oct	Friday 30 Oct
3:00 pm – 4:00 pm					

Location: QA2-13 – Postgraduate Lab

Appendix F: Timetable

Timetable

	Monday 26 Oct	Tuesday 27 Oct	Wednesday 28 Oct	Thursday 29 Oct	Friday 30 Oct
3:00 pm – 4:00 pm	Name: Email: Name: Email: Name: Email: Name: Email: Name: Email:	Name: Email: Name: Email: Name: Email: Name: Email: Name: Email:	Name: Email: Name: Email: Name: Email: Name: Email: Name: Email:	Name: Email: Name: Email: Name: Email: Name: Email: Name: Email:	Name: Email: Name: Email: Name: Email: Name: Email: Name: Email:

Appendix G: Consent Form

Trying Out Social Bookmarking

Consent Form

This research investigates social bookmarking. You will be asked to try out two types of social bookmarking buttons for a new system called Bligg that I have developed, and then asked to give feedback afterwards.

No names or any other personal data will be recorded in the research.

Participation in this research is entirely voluntary and you are free to withdraw from the research at any time.

I agree to help with the research.

_____
Name

_____
Signature

____/____/_____
Date

Thank you!

Jingning Li (liji_822@hotmail.com)

Appendix H: First Study Questionnaire

Trying Out Social Bookmarking _____

Questionnaire: Part 1

This research investigates your attitudes to social bookmarking as you learn more and try it out. *Please answer the following questions honestly.*

Q1. Answer the following questions based on your experience, or what you just saw or tried out:

Enter one number from 1 to10.
(1 Strongly Disagree -- 10 Strongly Agree)

Questions	STEP I Before Tutorial	STEP II After Tutorial	STEP III After First System	STEP IV After Second System
1a. I would like to use social bookmarking in the future.				
1b. I think I will use social bookmarking in the future.				
1c. I will use this system in the future. (The one you just tried.)				
1d. I would recommend this system to a friend. (The one you just tried.)				
1e. This system is easy to use. (The one you just tried.)				
1f. This system is useful. (The one you just tried.)				

Q2. Based on trying the two systems out, which system do you prefer?

Circle one number from 1 to10.

Strongly Prefer The First System	1	2	3	4	5	6	7	8	9	10	Strongly Prefer The Second System

Reasons?

_____

_____

_____

_____

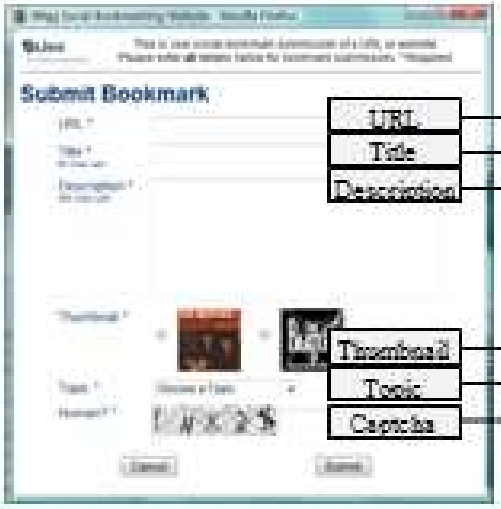
1

Questionnaire: Part 2

Tell us about the social bookmarking steps you just did.

Submitting a Social Bookmark:

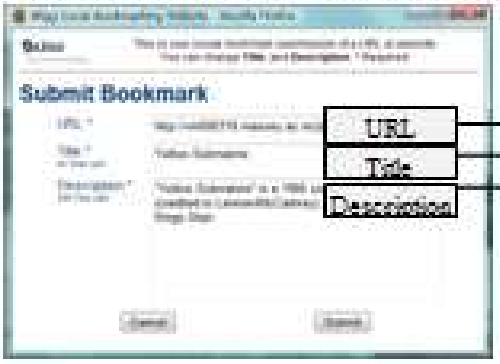
Q3. What do you think about social bookmark submission?



Circle your answers for 3a and 3b.

	3a. Willing to do it?	3b. How much effort? 1 Not Much - - - - - - Too Much 10
URL	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Title	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Description	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Thumbnail	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Topic	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Captcha	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Q4. Is it helpful if the following details are entered already?



Circle your answers.

	1 Not Helpful - Very Helpful 10
URL	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Title	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Description	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Registration:

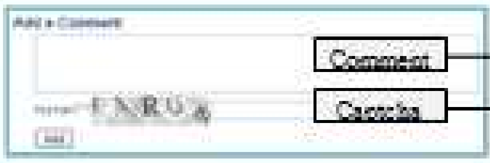
Q5. What do you think about social bookmarking registration?

Circle your answers for 5a and 5b.

	5a. Willing to do it?	5b. How much effort? 1 Not Much ------ Too Much 10
Username	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Email	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Password	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Full Name	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Gender	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Country	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Zip/Postal Code	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Birthday	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Captcha	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Adding a Comment:

Q6. What do you think about adding a comment?



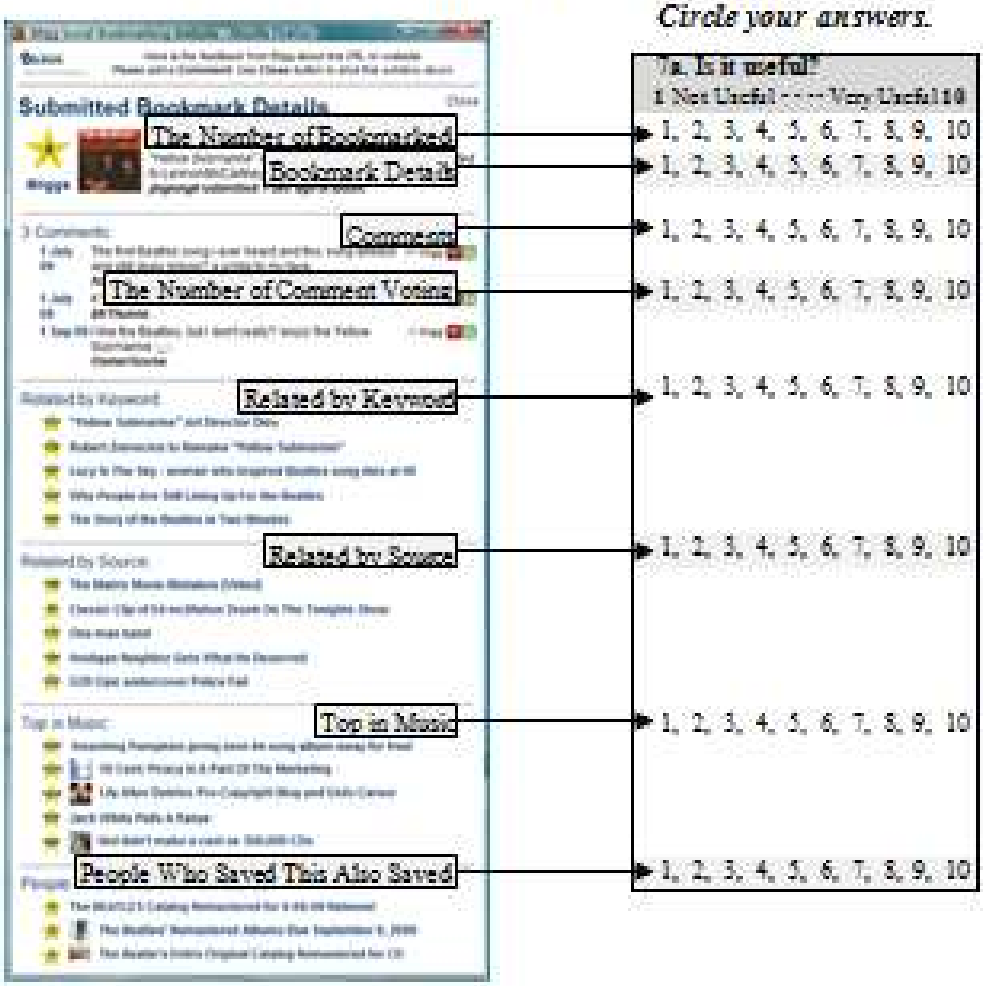
Circle your answers for 6a and 6b.

	6a. Willing to do it?	6b. How much effort? 1 Not Much ------ Too Much 10
Comment	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Captcha	Yes No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Feedback:

Q7. What do you think about social bookmarking feedback?

Circle your answers.



Q8. Any general comments?

_____

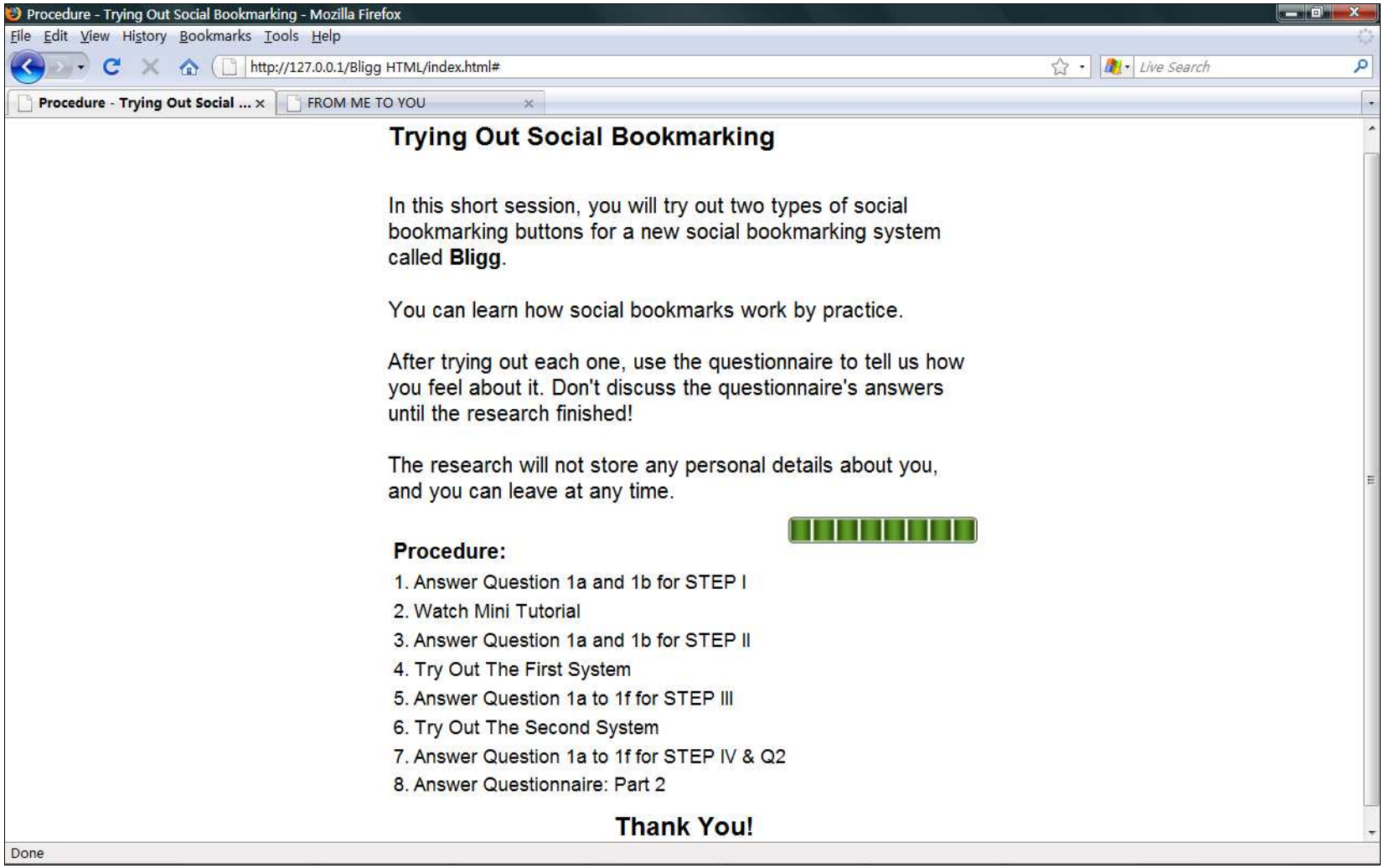
_____

_____

_____

THANK YOU FOR YOUR TIME!

Appendix I: Procedure Navigation Page



Appendix J: Open-Ended Questions Response – First Study

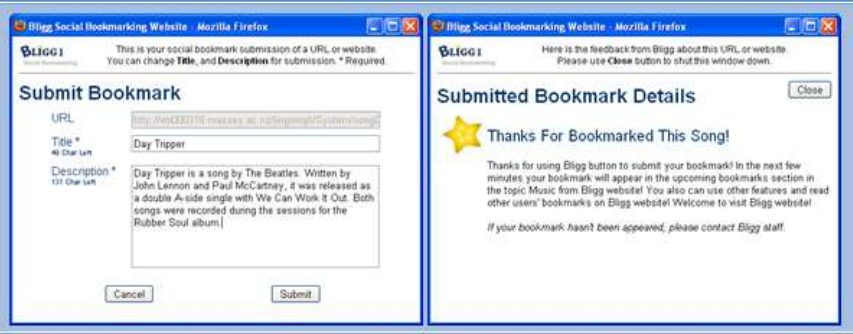
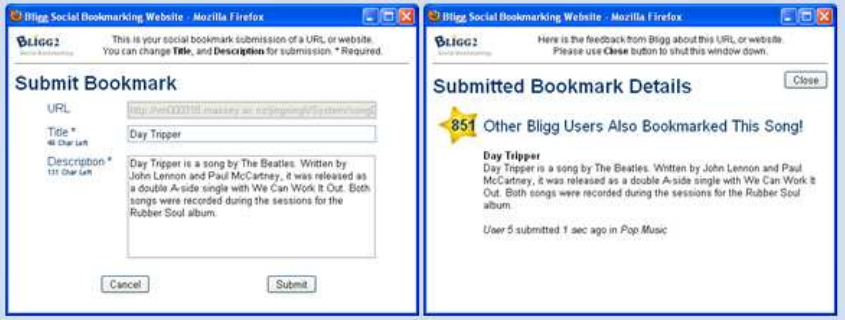
Q2. Reasons?	
G1: Hi EF & No FB vs. Lo EF & No FB	(System 2) Shorter steps in key-in information for the songs.
	It was easy to use same as the first system, plus the details were not supposed to be entered either, as a result, it was convenient to use the second system. I would definitely recommend the second system.
	(System 2) Easy, clear, don't need to type too much.
	2nd is easier to use and gives more information to task.
	(System 2) Easier to use – shorter process for bookmarking.
	(System 2) Less time spent on the registration page, less invasive questions. Also, auto populating the title and description is a nice touch.
	(System 2) Easy to use the useful.
	(System 2) It was easier to use and I didn't have to fill out much details when registering.
	(System 2) Ease to use.
	(System 2) Not too many details to enter.
G2: Hi EF & Lo FB vs. Lo EF & Lo FB	(System 2) Easy to use.
	(System 2) Easier to use and quicker.
	(System 2) Details are already filled-in so do not have to spend time completing the blanks but be able to edit these if necessary.
	The second one seems to be easier and straight forward. People who would listen to it can easily get to know about the song because of its detailed introduction. For people who want to share it with others, the system saves a lot of time of typing and thinking about the description.
	Sys2 is easier, fewer clicks fewer register info needed.
	(System 2) Automation of description more streamlined signup process.
	(System 2) This system is good because it's easy to use.
	(System 2) Easy to use, save time.
	(System 1) Test human is annoying.
	(System 2) Easy to use.
G3: Hi EF & Hi FB vs. Lo EF & Hi FB	The first one has so many restrictive attitudes like checking whether the maker is humans every time is annoying.
	(System 2) Quicker
	I prefer the second one because it does the description part for me, while I don't have to do it myself.
	The second system automatically fills in the title of the song and the description.
	Reduced time to sign up and the information is intelligently picked up by the second system rather than having manually entering the information.
	(System 2) Easier by use less hassle in registration.
	(System 2) Seems to be easier to use.
	(System 2) It just needs to put small details, easy to finish.
	(System 1) Too many details to enter.
	(System 1) Hard to enter all details.

G4: Lo EF & No FB vs. Hi EF & No FB	(System 2) It has more details and more like a good music bookmarking system. But, I don't want type in the symbols for every time.
	(System 1) Easy
	(System 1) It is much simpler and easier to use. The second system is very complicated with a lot of questions. Very time consuming. Bookmarking is supposed to be simple fast like first one.
	It was faster and less information was needed therefore preferred the first system.
	The first system provides me an opportunity to feel softer and beautiful music.
	I can't really differentiate one to the other. Both are similar from my view point.
	(System 1) Simple, and easy to use.
	(System 1) Easy to use and there is not many details to fill in.
	(System 1) East to use.
	(System 1) Simple.
G5: Lo EF & Lo FB vs. Hi EF & Lo FB	(System 1) Easy to use. No typing required after registration.
	(System 1) Easier to use, convenience.
	(System 1) Easy to be used.
	Registration process was easy to use so that bookmarking can be done quickly as the first system do. On the other hand, second system has long list of details required for registration.
	The first system is less complicated.
	(System 1) A lot easier to use.
	(System 1) User friendly, basically when people are bookmarking and certain page / content. They know what detail are use for already, therefore asking for details in the second system is pretty much unnecessary.
	I prefer second system because I feel the second system is more formal than first one.
	The reason is first system is easily to use and very simple, but the second system is more complicated and have a lot of steps and security questions which is not preferred in this kind of applications.
	(System 1) Easier.
G6: Lo EF & Hi FB vs. Hi EF & Hi FB	There are too many details to fill in for the second system.
	(System 1) Easier to use, quicker to register in.
	The first one was the easiest to use, and for a first time that means a lot, so being able to navigate and do functions is important. However the second system gave more options to use. But the "are you human" is an annoying thing to use in some instances. But overall the first was very easy to use.
	(System 2) It took very long. Machine check again and again was very annoying.
	Cuz too many questions in second one in order to bookmark a page.
	(System 1) Much easier to use.
	Second system too much human testing and other system have msg boxes instead of text by comment box.
	Auto-spam passwords in the second system were ridiculously annoying.
	(System 1) Simple.
	(System 1) Easy to use.

Q8 Any general comments?	
G1: Hi EF & No FB vs. Lo EF & No FB	The social bookmarking system designed by Jingning was quite creative, I especially liked the second system which was quite easy for me to go through the system. Well done Jingning! You have put a good effort on your project.
	2nd system is very good. First is a bit long. Good job!!!
	I feel that the autological use of a "topic" field could be better served with a "tag" field see: http://www.shirky.com/writings/ontologg_overrated.html
G2: Hi EF & Lo FB vs. Lo EF & Lo FB	I like the second system more. It might be better if there is some space for people to write their own comments if they want.
	It's good idea to have social bookmarking.
G3: Hi EF & Hi FB vs. Lo EF & Hi FB	Some comment filled would be nice, report on comment. Also the human checking should not be case sensitive (too much effort to do the case sensitive typing).
	Annoying that it comes up as extra window. Feels like a popup ad Would prefer integrated drop down well.
	Although the second system allow description be automatically generated, and save work, however I rather it ask my opinion first of whether I want to type my own one or not.
	I enjoyed the second program much more than first I hated putting in captcha.
	That's a good software to listen music, should be popularized.
G4: Lo EF & No FB vs. Hi EF & No FB	Not easy, and attentiveness in the procedure to do this social bookmark.
	Good system to use would be better of access web worldwide.
	New, good, easily use system.
	Very good for people who interested in social bookmarking and have more time to use this service. I will recommend it to my friends who are interested in music.
G5: Lo EF & Lo FB vs. Hi EF & Lo FB	Good system to use because registration of first system was easy.
	Comments to be optional. The social bookmark to be linked to any website. I can choose which does not have bookmark and I can use it.
G6: Lo EF & Hi FB vs. Hi EF & Hi FB	As standalone software, I don't think it will appeal much to me and maybe the general public. If it was embed into web browsers, which could work well. I think facebook have a similar feature embed in it. Just probably with less extra features.
	Informational links about the topic would have been helpful, e.g. Wiki, official website, Yahoo music etc.
	It was interesting to learn about social bookmarking. I have seen the bookmarks on website and never known what it was or able and know I do. It was well put together but still should be made easier for newbies.
	Adding comment should be optional.
	This is very good system but second system to much questions. I just want to bookmark, why so many questions???
	Will be a good way for bookmarking if it can be easier to use.
	Stop using popup message box that cause page to lock. Maybe use highlight in red what needs to be filled out.

Note: High: Hi; Low: Lo; Cognitive Effort: EF; Social Feedback: FB

Appendix K: Updated Bligg Button Screenshots – First Pilot Study

Bligg Button Versions	Interface Screenshots
Low Cognitive Effort & No Social Feedback	
Low Cognitive Effort & No Choice of Social Feedback	
Low Cognitive Effort & Choice of Social Feedback	

Appendix L: Protocol Analysis Results– First Pilot Study

	No Social Feedback	No Choice of Social Feedback	Choice of Social Feedback
Looking At	• One popup window is opened. • Ok... "You have to bookmark one more song using this system" • Ok, so now the popup window shows that "... you bookmarked two songs, and go back to the page and do next task..." • This is the introduction about this song • Ok, there is a popup • "You have bookmarked two songs..."	• "Please put on your earphone, click each song below and listen them, and pick two songs and social bookmark them using Bligg" • This is my number 716... • There are 878 people bookmarked this song • Oh, 859 people bookmarked this song • There are something about how many people like this song	• Hmmm, I see • Oh, I see... words limited numbers • Oh, there is one more link about other pop music • Hmmm, more websites links
Thinking	• Ok, I don't want to change the details... Hmmm, that's ok • Go to the website to check the results, but it doesn't give the link • Ok, I don't want to change it • That's it? Ok!	• I want to change something • So 715 people also bookmarked this song... Good!	• This time I want to change the details • Same job but different songs • I didn't see this link from the last system • Hmmm, the same link is there • Ah, so many people picked up this song
Doing	• I am bookmarking this song • I clicked the "Bligg 1" button • Ok, I clicked the "Submit" button • Hmmm, click "Close" button • Ok, I clicked the "Bligg 1" button again • Ok, click the "Submit" • Ok, click the "Close" button • Ok, go back • Ok, I changed the description • Ok, click "Close" button	• Ok, I clicked the "Bligg 2" button • Click "Submit" button • Ok, I clicked the "Close" button • Ok, I clicked the "Bligg 2" button again • I changed the description, and clicked "Submit" button • Ok, I closed • Ok, clicked the button	• Ok, clicked one song and will bookmark it • Ok, no changing • Picked up another song • Ok, submit • Ok, I clicked one link • Clicked the "Close" button • Changed the description • Ok, bookmark another song • Changed the description
Feeling	• Wow, that's good... URL, Title, and Description are entered already • Hmmm, didn't show me something... Just thanks for bookmarking this song • Ok, the same results • Oh, I don't need to type title and description • There is no feedback about the bookmark... • There are lots of words... nothing... I don't want to read it • Hmmm, there is no different	• Hmmm, that's same... details are entered already • Ah, that's cool! It gives me some information • Just display the bookmark details... not too much • I like it • It's really look good	• That's great • Ok, that's cool • Great... ok • Cool • I can get more information about other bookmarks • Ok, that's great

Appendix M: Protocol Analysis Results– Second Pilot Study

	No Social Feedback	Song Information Social Feedback	Left, Plus Bligg No. Social Feedback	Left, Plus Choice of Social Feedback
Looking At	• "Thanks for using Bligg button! In next few minutes your bookmark will appear in the upcoming bookmark section in the topic Pop Music from Bligg website... Welcome to visit Bligg website!"	• Ok, "Please put on your earphone... listen songs... bookmark two songs..." • Hmmm, more information about the bookmark	• Show me more information about the bookmark • Oh, also show me who bookmarked this song at the first time • Hmmm, it also shows me lots of people bookmarked this song	• Hmmm, it shows me something • It shows me much more information • There are 857 people also bookmarked this song • The first one submitted this bookmark 1 hour and 3 minutes ago • Oh, more links for this system • "See other bookmarks in Pop Music" • Hmmm, more bookmarks are displayed • There are 707 people also bookmarked this song
Thinking	• Ok, let me to go to the website, but no link for it • Hmmm, if the feedback likes this, I don't want to use it • I want to see the bookmark details	• Ok, bookmark this song • Oh, I see... somebody bookmarked this song before me • If I know five people bookmarked this song, I will know it's a very good song • If show lots people bookmarked this song, it will be very good		• Hmmm, just about 1 hour and 857 people also bookmarked this song • This time I will click "See other bookmarks related by Keyword" • There are more information, so I prefer to use this one
Doing	• Ok, I clicked "Bligg 1"	• Clicked the "Bligg" button		• Ok, click "Bligg 4" • Ok, clicked it
Feeling	• Not useful information • Ah? The information is nothing about the bookmark • Nah, I won't use this one • Hmmm, ok... Not too much feedback... Just for using Bligg button • Ok, the same feedback... Ok • It's easy to use, but it's not useful for me	• Ok, it's good to know who bookmarked this song, but it's not very important... • I don't want to know who bookmarked this song at the first time... I want to know how many people also bookmarked this song... • This one is good because it has more useful information than another one	• Hmmm, this is better • Hmmm, I don't care who bookmarked this song at the first time • It's better than the first system • That's cool, and it's useful information for me	• Oh, it's good • Hmmm, that's great! • This is interesting • That's so cool! • That's great! I like it! • I like this information because it shows me more interesting information • Ok, the information is similar • Oh, that's good • Hmmm, that's cool! I like it! • It's useful... I like this system so much!

Appendix N: Cognitive Walkthrough– Second Pilot Study

Cognitive Walkthrough – Analysis Phase

Step 1

Initial screen is Procedure webpage (See Figure 1).

Figure 1: Procedure Webpage

Actions:

1. Click link "Answer Question 1a and 1b for STEP I" from webpage "Procedure"
2. Click button "Ok" from popup window "Please answer question 1a and 1b for STEP I!"
3. Click button "Next" from webpage "Procedure"
4. Click link "Watch Mini Tutorial" from webpage "Procedure"
5. Choose choice item "Open with..." and click button "OK" from popup window "Opening SOCIAL BOOKMARKING.ppsx"
6. Click left mouse button to watch PowerPoint "Social Bookmarking"
7. Click button "Next" from webpage "Procedure"
8. Click link "Answer Question 1a and 1b for STEP II" from webpage "Procedure"
9. Click button "OK" from popup window "Please answer question 1a and 1b for STEP II!"
10. Click button "Next" from webpage "Procedure"
11. Click link "Try Out 4 Systems and Answer the Related Questions" from webpage "Procedure"

System Responses:

1. Popup window "Please answer question 1a and 1b for STEP I!" appears
2. Popup window "Please answer question 1a and 1b for STEP I!" closes, and button "Next" appears on webpage "Procedure"
3. Link "Watch Mini Tutorial" appears on webpage "Procedure"
4. Popup window "Opening SOCIAL BOOKMARKING.ppsx" appears
5. PowerPoint "Social Bookmarking" appears on a new window
6. PowerPoint "Social Bookmarking" shows by pages and is closed in the end, and button "Next" appears on webpage "Procedure"
7. Link "Answer Question 1a and 1b for STEP II" appears on webpage "Procedure"

8. Popup window "Please answer question 1a and 1b for STEP II!" appears
9. Popup window "Please answer question 1a and 1b for STEP II!" closes, and button "Next" appears on webpage "Procedure"
10. Link "Try Out 4 Systems and Answer the Related Questions" appears on webpage "Procedure"
11. Webpage "Song List" is opened on a new tab, and popup window "Please put on your earphone!..." appears

- **Effect-to-Goal (EG) Problems**

  EG1. Does the system response contains a prompt or cue that suggests any new goals?

  Yes. After one goal is achieved, a new goal will be suggested using button "Next" and task links.

  EG2. Are there any other new goals that users will form given their current goals by the system state or their background knowledge?

  No. Webpage "Procedure" shows users what have to do now and what will do next step by step.

  EG3. Is it obvious from the system response that one of the current goals has been accomplished?

  Yes. After one of the current goals has been accomplished, one green square will be added into the processing bar, and button "Next" will appear.

  EG4. Are there any current goals that have not been accomplished, but might appear to have been based on the system response?

  No. Every goal can be accomplished easily.

- **Goal-to-Action (GA) Problems**

  GA1. What label or description is associated with the correct action?

  The "Next" button and next task links are associated with the correct action.

  GA2. Is it obvious that the action (and the label and description linked to the action) is possible choice to accomplish the one of the current goals for this step?

  Yes, click button "Next" or task links is a possible choice to accomplish the current goals for this step.

  GA3. Are there other actions that might seem appropriate to some current goals?

  No. Just one action is for one current goal.

- **Action-to-Effect (AE) Problems**

  AE1. If there is a time-out in the interface at this step, does it allow time for the user to select the appropriate action?

  Yes, it allows time for the user to select the appropriate action.

  AE2. Will users try to quit or backup because they cannot see any progress towards some current goals?

  No. The current interface will guide the users to go forward to the next step and to achieve their goals.

Step 2

Following screen is Song List webpage (See Figure 2).

Figure 2: Song List Webpage

Actions:

1. Click button "Ok" from popup widow "Please put on your earphone!..."
2. Click the 1st song "HERE COMES THE SUN" from webpage "Song List"

System Responses:

1. Popup window "Please put on your earphone!..." closes
2. Webpage "Song Details" is opened on the same tab, and song "HERE COMES THE SUN" is played automatically

- **Effect-to-Goal (EG) Problems**

  EG1. Does the system response contains a prompt or cue that suggests any new goals?

  Yes. The new goal is suggested by a popup window.

  EG2. Are there any other new goals that users will form given their current goals by the system state or their background knowledge?

  No.

  EG3. Is it obvious from the system response that one of the current goals has been accomplished?

  Yes. The next webpage "Song Details" opened on the same tab could be the system response that one of the current goals has been accomplished.

  EG4. Are there any current goals that have not been accomplished, but might appear to have been based on the system response?

  No. The current goals are easy to be accomplished.

- **Goal-to-Action (GA) Problems**

  GA1. What label or description is associated with the correct action?

  The popup window's content shows the correct action, and song links are associated with the correct action.

  GA2. Is it obvious that the action (and the label and description linked to the action) is possible choice to accomplish the one of the current goals for this step?

Yes. Click one of songs is a possible choice to accomplish the current goal for this step.

GA3. Are there other actions that might seem appropriate to some current goals?

No. There are no other actions that might seem appropriate to some current goals.

- **Action-to-Effect (AE) Problems**

  AE1. If there is a time-out in the interface at this step, does it allow time for the user to select the appropriate action?

  Yes, it allows time for the user to select the appropriate action.

  AE2. Will users try to quit or backup because they cannot see any progress towards some current goals?

  No. The current interface will guide the users to go forward to the next step and to achieve their goals.

Step 3

Following screen is Song Details webpage (See Figure 3).

Figure 3: Song Details Webpage

Actions:

1. Click image button to stop playing the song "HERE COMES THE SUN" from webpage "Song Details"
2. Click Bligg button from webpage "Song Details"
3. Click button "Close" from popup window "Submitted Bookmark Details"
4. Click button "OK" from popup window "What do you think about social bookmarking and this system?..."
5. Click button "OK" from popup window "Use "THE BEATLES" logo for going back to the song list page,..."
6. Click image button from webpage "Song Details"

System Responses:

1. Song "HERE COMES THE SUN" is stopped and image button is changed into image button on webpage "Song Details"
2. Popup window "Submitted Bookmark Details" appears
3. Popup window "What do you think about social bookmarking and this system?..." appears
4. Popup window "What do you think about social bookmarking and this system?..." closes, and popup window "Use "THE BEATLES" logo for going back to the song list page,..." appears
5. Popup window "Use "THE BEATLES" logo for going back to the song list page..." closes, and popup window "Submitted Bookmark Details" closes
6. Webpage "Song List" is opened on the same tab

- **Effect-to-Goal (EG) Problems**

  EG1. Does the system response contains a prompt or cue that suggests any new goals?

  Yes. The Bligg button suggests the new goal – bookmarking this song, and popup windows suggest more new goals.

  EG2. Are there any other new goals that users will form given their current goals by the system state or their background knowledge?

Yes. If users don't want to bookmark this song, they can click logo "THE BEATLES" to go back webpage "Song List", and choose another song to bookmark.

EG3. Is it obvious from the system response that one of the current goals has been accomplished?

Yes. After users click Bligg button, one popup window will be opened. The popup window is the system response.

EG4. Are there any current goals that have not been accomplished, but might appear to have been based on the system response?

Yes. Popup windows might appear to have been based on the system response.

- **Goal-to-Action (GA) Problems**

GA1. What label or description is associated with the correct action?

Popup window shows the correct action, and Bligg button and button "OK" from popup windows are associated with the correct action.

GA2. Is it obvious that the action (and the label and description linked to the action) is possible choice to accomplish the one of the current goals for this step?

Yes. Click Bligg button is a possible choice to accomplish the current goal for this step.

GA3. Are there other actions that might seem appropriate to some current goals?

Yes. If users don't want to bookmark this song, they can click logo "THE BEATLES" to go back webpage "Song List", and choose another song to bookmark.

- **Action-to-Effect (AE) Problems**

AE1. If there is a time-out in the interface at this step, does it allow time for the user to select the appropriate action?

Yes, it allows time for the user to select the appropriate action.

AE2. Will users try to quit or backup because they cannot see any progress towards some current goals?

No. The current interface will guide the users to go forward to the next step and to achieve their goals.

Step 4

Repeat Step 2 and Step 3 for three more times in order to bookmark three more songs using three different versions of Bligg button.

In the end,

System Responses:

1. Popup window "You have bookmarked 4 songs using this system!..." appears replacing popup window "Use "THE BEATLES" logo for going back to the song list page..."
2. Popup window "You have bookmarked 4 songs using this system!..." closes, popup window "Submitted Bookmark Details" closes, and webpage "Procedure" appears.

Actions:

1. Click button "OK" from popup window "You have bookmarked 4 songs using this system!..."

Step 5

Following screen is Procedure webpage (See Figure 4).

Figure 4: Procedure Webpage

Actions:

1. Click button "Next" from webpage "Procedure"
2. Click link "Answer "Questionnaire: Part 2"" from webpage "Procedure"
3. Click button "OK" from popup window "Please answer Questionnaire: Part 2!"
4. Click button "Next" from webpage "Procedure"

System Responses:

1. Link "Answer "Questionnaire: Part 2"" appears on webpage "Procedure"
2. Popup window "Please answer Questionnaire: Part 2!" appears
3. Popup window "Please answer Questionnaire: Part 2!" closes, and button "Next" appears on webpage "Procedure"
4. Text "Thank You!" appears on webpage "Procedure"

- **Effect-to-Goal (EG) Problems**

  EG1. Does the system response contains a prompt or cue that suggests any new goals?

  Yes. After one goal is achieved, a new goal will be suggested by button "Next" and task links.

  EG2. Are there any other new goals that users will form given their current goals by the system state or their background knowledge?

  No. Webpage "Procedure" shows users what have to do now and what will do next step by step.

  EG3. Is it obvious from the system response that one of the current goals has been accomplished?

  Yes. After one of the current goals has been accomplished, one green square will be added into the processing bar, and button "Next" will appear.

  EG4. Are there any current goals that have not been accomplished, but might appear to have been based on the system response?

  No. Every goal can be accomplished easily.

- **Goal-to-Action (GA) Problems**

  GA1. What label or description is associated with the correct action?

The "Next" button and next task links are associated with the correct action.

GA2. Is it obvious that the action (and the label and description linked to the action) is possible choice to accomplish the one of the current goals for this step?

Yes. Click button "Next" or task links is possible choice to accomplish the one of the current goals for this step.

GA3. Are there other actions that might seem appropriate to some current goals?

No. Just one action is for one current goal.

- **Action-to-Effect (AE) Problems**

AE1. If there is a time-out in the interface at this step, does it allow time for the user to select the appropriate action?

Yes, it allows time for the user to select the appropriate action.

AE2. Will users try to quit or backup because they cannot see any progress towards some current goals?

No. The current interface will guide the users to go forward to the next step and to achieve their goals. After all goals are achieved, text "Thank You!" will show users the experiment is finished.

Appendix O: Bligg Button Interface Screenshots – Second Study

No Social Feedback	Song Information Social Feedback	Song Information Social Feedback Plus Bligg Number Social Feedback	Song Information Social Feedback Bligg Number Social Feedback Plus Choice of Social Feedback
			

Appendix P: Second Study Questionnaire

Trying Out Social Bookmarking _____

Questionnaire: Part 1

This research investigates your attitudes to social bookmarking as you learn more and try it out. ***Please answer the following questions honestly.***

Q1. Answer the following questions based on your experience, or what you just saw or tried out:

Enter one number from 1 to10.
(**1** Strongly Disagree -- **10** Strongly Agree)

Questions	STEP I Before Tutorial	STEP II After Tutorial	STEP III After 1st System	STEP IV After 2nd System	STEP V After 3rd System	STEP VI After 4th System
1a. I would like to use social bookmarking in the future.						
1b. I think I will use social bookmarking in the future.						
1c. I will use this system in the future. (The one you just tried.)						
1d. I would recommend this system to a friend. (The one you just tried.)						
1e. This system is easy to use. (The one you just tried.)						
1f. This system is useful. (The one you just tried.)						

Q2. Based on trying the four systems out, how much do you prefer them?

Enter one number from 1 to10.
(**1** Not Strongly Prefer -- **10** Very Strongly Prefer)

1st System	2nd System	3rd System	4th System

Reasons?

_____

_____

_____

1

Questionnaire: Part 2

Tell us about the social bookmarking steps you just did.

Feedback:

Q3. What do you think about social bookmarking feedback?

Circle your answers.

	3a. Is it useful? 1 Not Useful ----Very Useful 10	3b. How much do you like the feedback? 1 Not Much ---- Very Much 10
	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Q4. What do you think about social bookmarking feedback link?

Circle your answers.

4a. How much willing to click the link for feedback? 1 Not Much ---- Very Much 10	4b. How much effort to click the link for more feedback? 1 Not Much ---- Very Much 10
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Q5. Any general comments?

_____

_____

_____

_____

THANK YOU FOR YOUR TIME!

3

Appendix Q: Open-Ended Questions Response – Second Study

Q2. Reasons?
1st system was simple, which was good. 2nd and 3rd I felt the information wasn't necessary, but 4th there was a good amount - I liked the links.
The 4th system gave me more information / options.
The 4th system has a more insightful user interface as it shows other information I am interested in. System 1 has an over simplified appearance that does not have information I am interested in although it leading me to the Bligg website.
The 4th system, which gave more information and can be used easily.
After trying use it, and keep trying, I think I will prefer to use it (The 4th system).
I prefer to use the 4th system because of the wonderful links and also user can find out more songs they like. This system will be more useful than the others.
4th system is more comprehensive and gives out other information, which is interesting to visit the website on which content is posted.
I liked the option to search for related bookmarks in Bligg 4. All options where roughly requirement in usefulness (as in case of use). However if I did not already know what social bookmarking and Bligg was it might not be obvious.
The 4th system is easier, has a good description of the songs I bookmarked and also lets you know other Bligg users, who have bookmarked it (popularity of the song). Had other options in the bottom (as a quick link to see other bookmarks).
The 4th system provides users more detailed information, which includes the history of the song, other bookmarking songs etc.
The 4th system is a very interesting system as well as good information involved. Sound quality is good enough and instructions are easy to follow.
The 4th system was a bit overwhelming, had the links. The information about songs in system 2nd, 3rd, 4th were rewritten (I read that on the main page already). The similarity and explanation of what this does in system 1 was very welcome. I liked the "Number of people who have social bookmarked this" function of system 4.
System 4 would be used in the future because there are recommend links down the bottom!
The 4th system gave user more information and gave the opportunity to see other songs within the genre. I think that the more options given the more information the better.

Q5. Any general comments?
Having a look at page 2 of the questionnaire, I realised that the 1st system didn't have any useful information on it. The 4th system is the best!
Bligg 4 seems to be the best in terms of giving feedback. It alerts you to how many other people liked the song and points you forwards other songs you might like.
(4th System) The bookmarks with more detail that allowed the user get more information, which also gives more feedback.
System 4 is good as it is more inviting and is useful in discovering users to the assigned website.
I hardly used bookmarks. I feel I am much aware of it and will be interested to try them out more including Bligg.
The design of the page is not very interesting, so needs to be more attractive. However, I like the Bligg 4 because there were more useful information in it.
The more information the better other than that it uses very simple and easy to use.

Statement from the Nature of the Massey University Ethics Committee

The experiments were awarded by Sylvia V Rumball (Professor) Chair, Human Ethics Chairs' Committee and Assistant to the Vice-Chancellor (Research Ethics) on 27th October 2009.