

Portfolio simulation with social bookmarking in higher education

Eric Zhi Feng Liu and Yu Fang Chang

Abstract—This study examined the feasibility of the integration of social bookmarking and portfolios through a case study on an introduction to an instructional media course at a research university in Taiwan. The instructional aims of this case study emphasize the use of information technology in learning; the collection, selection, evaluation, and sharing of information; discussions with peers; learning from peer feedback; construction of learning communities; and knowledge construction. In this case study, a questionnaire was used to evaluate students' perceptions towards the learning activities. Statistical analyses confirmed that students were satisfied with this course and had high self-efficacy while using the social bookmarking application. Students collected a total of 4962 web pages, and the first three tags that the students used in the top 10 web pages were news, education, and health.

Keywords—peer assessment, portfolio, portfolio assessment, social bookmarking, Web 2.0

I. INTRODUCTION

The management of portfolios is a means of accumulating assignments of students with the purpose of understanding the learning process of a particular student or group [1], [2]. The assessment of portfolios through peers and self-reflection enhances a student's critical thinking and motivation to learn, thus making it a good alternative assessment method to evaluate college students [3]. In previous studies [1], [2], [4], the process of portfolio assessment focused on an individual or a group. However, the combination of portfolio assessment and social bookmarking under a multi-user networked learning environment has seldom been explored.

For example, Liu, Lin, and Yuan [1] designed a web-based learning portfolio system that provides students with certain functions to submit their assignments, collect them, and evaluate and browse the assignments of other students. Liu [2] designed a personal and group-based learning portfolio system that adds certain functions that make it possible to provide assignments to students in group, to create discussion forums for team members, etc. However, Liu [2] did not consider the connection between portfolios and social bookmarking.

Social bookmarking via a web-based system enables students to manage their bookmarks of web pages [5], share their bookmarks with other students on the Internet (inside or

outside school), share their viewpoints about particular web pages with others, and cooperatively recommend interesting web pages to others. Most social bookmarking systems allow students to organize their bookmarks with tags instead of traditional file folders [5]. Students can easily search for the required web pages via the tags.

Similarly, the management of social bookmarking as portfolios is a means of accumulating the knowledge of students on the Internet with the purpose of understanding the learning process of a particular student or group. The assessment of social bookmarking as portfolios through peers on the Internet and self-reflection enhances a student's critical thinking, motivation to learn, and communication skills, thus making it a good alternative assessment method of evaluating students. Therefore, social bookmarking can be successfully integrated with portfolios in order to encourage students' learning and assessment.

The advantages of integrating social bookmarking and portfolios are as follows: using the Internet, students can obtain information they have a personal interest in; moreover, they can comment on the information on the Internet, share their comments with others on the Internet, share their personal information with others, and communicate with others through comments on a particular bookmark. Therefore, we would like to demonstrate how social bookmarking can be used to create portfolios in a course and the results of students' usage of social bookmarking as portfolios.

II. LITERATURE REVIEW

A. Networked Learning

Von Glasersfeld [6] advocated constructivism and held that the acquisition of knowledge is actively constructed by learners. Therefore, the student-centered learning paradigm becomes the desired learning environment, one in which the relationship between teachers and students is recast as learning with teachers rather than learning from teachers. Nowadays, learning technology also treats network technology as a learning partnership, with the paradigm becoming one of learning with technology rather than learning from technology [7]. Some theoretical aspects of networked learning and the basic concepts of integrating information technology into teaching are described below.

The Internet has had a positive impact on learning [7]-[10]. Its characteristics include the following:

- 1) Learning tools: To treat the computer network as a learning tool that builds knowledge and promotes collaborative learning, and shift the emphasis to learning with the computer rather than learning from the computer

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- 2) Connectivity: To provide wide connectivity through networks and e-mail in order to achieve interactivity among classmates, teachers, parents, and domain experts
- 3) Student-centeredness: To encourage learners to participate actively in learning with the teacher as the facilitator. The teacher plays the role of a tutor who provides motivation and learning support, while the student is an active thinker as well as the key player in the learning activity.
- 4) Knowledge sharing: To share, broaden, and expand the delivery of information and promote innovation.
- 5) Unboundedness: To enable learners to not only benefit from learning in a classroom but also from learning from the knowledge available on the Internet

Information technology is a tool for building knowledge and a medium for practical learning. It is also a platform for collaborative learning and a medium for displaying learning performance through social bookmarking, as in the portfolio mechanism.

B. Portfolio

Paulson, Paulson, and Meyer [11] stated that a portfolio is a purposeful collection of a student's work that indicates his/her progression of achievement; it also reveals different aspects of an individual's growth and development over the course of time. Shores and Cathy [12] classified portfolios into three types: Private portfolio, learning portfolio, and pass-along portfolio. Russell and Butcher [13] have analyzed the use of portfolios in educational technology courses and indicated their advantages. For example, portfolios are more interesting for students to learn to use.

Traditionally, the teacher assessed the performance of students; however, with the advent of the concept of student-centered learning [7], this traditional method of performance assessment has given way to multiple modes of assessment. An assessment method should not only reflect the authenticity of the learning portfolio but also provide feedback regarding the metacognitive thinking induced by the assessment [14], [15]. From the viewpoint of social constructivism, peer assessment can be regarded as a valuable method of assessment. By definition, students are learners; however, they can divest themselves of this passive role and assume the role of a teacher in assessing their classmates' work [1], [2]. Topping [16] claimed that under real social conditions, peer assessment acts as a type of collaborative process of knowledge construction among peers. After completing an assessment, the students—in their capacity as assessors—comment on the work of their fellow classmates. Further, these assessors assign scores to their classmates' performance and make comments. Accordingly, the assesseees are at liberty to modify their work. If the assesseees do not find the scores or comments acceptable, they are free to post objections. This process can be repeated as often as required. The objective is to closely involve students in improving the quality of their work.

According to Topping [16] and Liu, Lin, Chiu, and Yuan [15], peer assessment possesses the following advantages: First, it encourages students to practice higher-order thinking.

While assessing the work of a peer, students focus on reviewing and providing constructive suggestions. The process requires the participants—both the assessors and assesseees—to communicate their insights. By applying the principle of self-regulated learning [17], the assesseees can modify their reviewed work. Second, this modification of the reviewed work promotes active learning. In a group, students not only focus on the work reviewed by their peers but also act as judges through the peer assessment mechanism. After the completion of the assessment, modifications are undertaken with due consideration to peer comments and suggestions. Students are obliged to be entirely responsible for their own work. Third, this sense of responsibility promotes learning motivation. In order to avoid embarrassment while presenting the work for peer assessment, there is a pressure to pay closer attention to the work. Fourth, this pressure stimulates a sense of willingness to provide and receive criticism.

However, as stated by [14], the process of peer assessment also possesses some disadvantages. Students might be burdened by additional workloads. Moreover, post-assessment modification might lead to anxiety. Assessors might also not act responsibly all the time. This might lead them to make errors in scoring that have serious repercussions. In order to maintain harmony among peers, it is necessary to refrain from making comments that can be interpreted as character judgments. Furthermore, the professional expertise of the assessor is open to question. In particular, this flexibility with regard to the expertise of the assessor is followed in the case of students who may be considered to be low scorers and below average in terms of learning achievement. Some critics of this approach observe that such below average students are not adequately equipped to engage in the role of a judge.

In previous studies [2]-[4], researchers have implemented some networked learning portfolio systems composed of several distinct functions—with one focusing on peer assessment and another on portfolio assessment. The functions designed to facilitate peer assessment include the online submission of assignments, online marking, and the ability to view suggestions from peers. At the end of a semester, portfolio assessment allows students to select their best assignment. However, the integration of social bookmarking with portfolios has not been considered.

C. Social Bookmarking

Nowadays, there are an increasing number of technologies that support information sharing or the publication of personal ideas—for instance, blogs, wikis, and podcasts [18]. The success of these tools also heralded the beginning of a new era with the introduction of web 2.0. These tools can not only be used for browsing but also for writing, creating, and sharing [19]. Richardson [20] mentions that social bookmarking tools can also be considered as a technology of web 2.0. Briefly speaking, the idea of social bookmarking implies that each of us has some friends, and the social web enables us to easily remain connected to our friends and find new ones through them. This type of connection makes it possible for us to find

more interesting information, more teachers, and more learning.

The pilot of shared online bookmarks can be traced back to the launch of it List [5] in 1996. In recent years, many social bookmarking services have developed on the Internet (for example, Backflip, Blink, Clip2, ClickMarks, HotLinks, delicious, Furl, Hemidemi, and FunP). With the rapid increase in these social tools, the vision of teaching and learning became rather different from the traditional one. In the traditional perspective of teaching and learning, students complete their homework in isolation, with limited resources and minimal conversation and interaction with others. In contrast, students can now complete their homework more interactively and share their ideas with more people outside the classroom.

As mentioned above, in this study, we attempted to use the social bookmarking application, Hemidemi, in order to enable students to share their collections. As a platform, social bookmarking applications include the following functions:

1. **Storage:** To record what users have done and collected. Apart from storing web pages collected by users, social bookmarking applications also store discussions. We find a similarity between social bookmarking applications and portfolios with respect to storage.
2. **Search:** By using the tool 'tag', users can provide more than one classification to a website or hyperlink. In social bookmarking applications, we can search the content more precisely by using this tool. We can also search the content by clicking on tags in the 'tag cloud'.
3. **Interaction:** Users can post comments for others or exchange ideas. In this case, the interaction involves a wider connection with people from all over the world. Thus, people do not need to reside in the same place or join the same community, and they are not limited by gender, age, or occupation. They only need to read the information or, perhaps, post a comment.
4. **Community:** Social bookmarking applications allow users to create communities based on their interests or requirements. Since users come together because of the same interests, they might be more willing to share information with each other.
5. **Present:** As a networked platform, social bookmarking can be presented in different forms—for instance, using tags, a collection of personal web pages (similar to portfolios), community portfolios, or discussions. As per their requirements, users can select any of the different forms of presentation.

III. IMPLEMENTATION

A. Social Bookmarking as Portfolio

A portfolio is a type of document purposefully collected by a student, and it can also present the progress and achievements of a student [11]. Owing to the convenience of the Internet, previous studies have already attempted to construct a networked learning portfolio system, and have achieved some good results [1], [2], [4]. Sharing is the central idea of both portfolios and social bookmarking applications. By using social bookmarking applications, we can not only easily store

information but also share and interact with others having the same interests. Thus, in this study, we attempted to integrate these two ideas; in others words, we attempted to use social bookmarking as a portfolio for students of the course.

B. Delicious

Delicious (<http://del.icio.us/>) was developed by Joshua Schachter in 2004. Unlike the tool 'my favorites', people who use delicious can share bookmarks with others, interact with others, and also browse others' bookmarks [21]. One point that deserves to be mentioned is the idea of using tags. Using this method, we can apply more than one tag to one particular website or link. Fig. 1 presents the tag cloud provided by delicious. By using the tag cloud, we can find out what is currently popular and also identify some interesting contents.

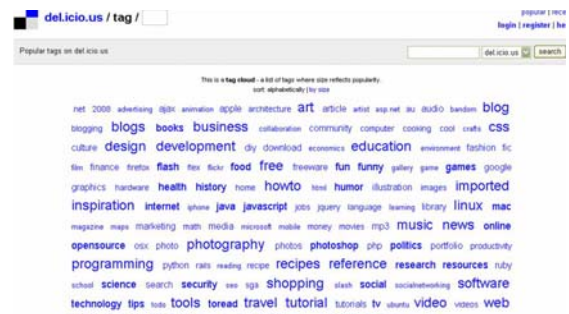


Fig. 1 tag cloud in delicious
(Snapshot captured from: <http://del.icio.us/>)

You can use delicious by following the given steps. First, you need to register a new account in delicious (Fig. 2), fill each blank carefully (Fig. 3), and check the verification mail (Fig. 4). You can then begin to add feeds (Fig. 5) or return to the home page (Fig. 6). As seen in Fig. 7, the home page contains many popular bookmarks that can be collated. You can also click on related tags to find other information.

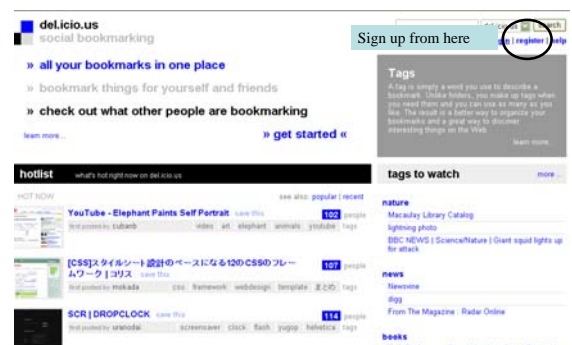


Fig. 2 register a new account

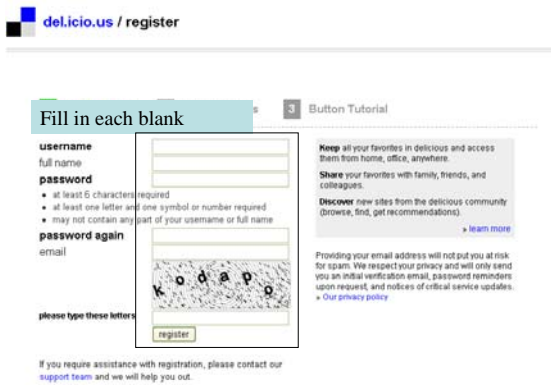


Fig. 3 fill in each blank

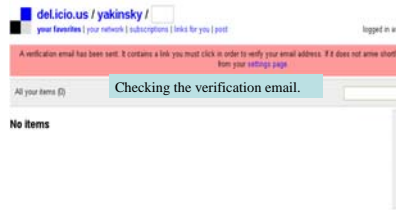


Fig. 4 check e-mail

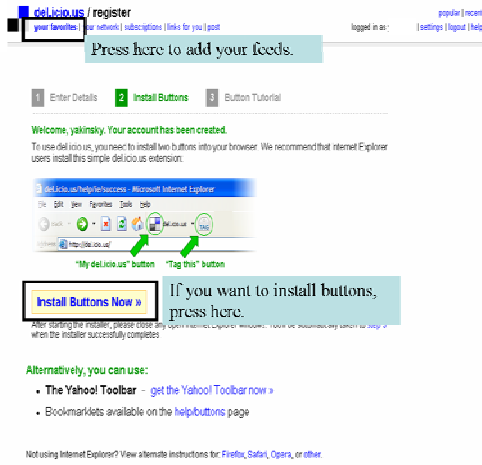


Fig. 5 begin to add feeds

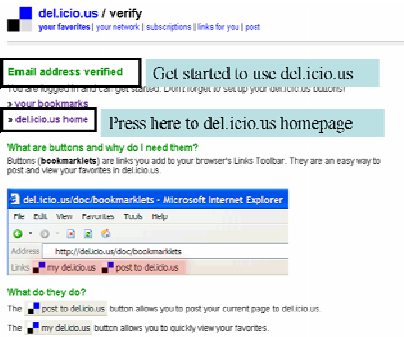


Fig. 6 return to the main page



Fig. 7 home page of delicious

You can create your own network through the following steps. First, if you are interested in an article, click on the topic to read the content, or click on the author to obtain more information (Fig. 8) and add the person to your network of friends (Fig. 9). When you click on the author, you will be directed to the page that includes all his/her collected web pages as well as those collected by his/her network of friends (Fig. 10). This idea is similar to that in portfolios.



Fig. 8 list of popular bookmarks in delicious

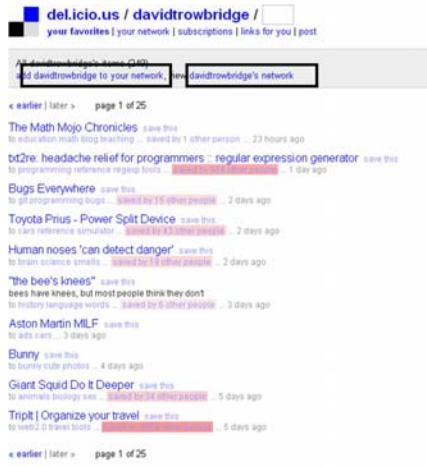


Fig. 9 add this user to your network of friends



Fig. 10 social bookmarking application as portfolio

C. Hemidemi

Hemidemi (<http://www.hemidemi.com>) is a social bookmarking application in Taiwan, and its home page is shown in Fig. 11. Hemidemi also provides a personal interface, as shown in Fig. 12. Similar to delicious, Hemidemi also provides tags for users to define their own bookmarks. In addition, Hemidemi provides the function of creating communities. Users can interact via the bookmarking application and thus share information with others having similar interests.



Fig. 11 home page of Hemidemi (Snapshot captured from <http://www.hemidemi.com/home>)



Fig. 12 personal interface

A new community can be created by following these steps: First, click on the 'group' button in the home page (Fig. 13). Of the subcategories that appear, such as 'all groups' and 'group main page', click on 'new group' (Fig. 14). After filling each blank (Fig. 15) carefully, send out the information. After the information is verified, a group can be created. Instead of creating a community yourself, you can also join a community created by others (Fig. 16). For example, if you are interested in a reading community, you can see the information, community members, and latest bookmarks in the community's home page. Moreover, bookmarks collected by community members and the tags and discussions generated by them can be easily viewed on the home page. As members collect bookmarks in the community, they also generate some content in it. Generally speaking, we can also define this type of social bookmark as a portfolio.



Fig. 13 enter the group (or community) page



Fig. 16 page of communities (or groups)



Fig. 14 group (or community) page



Fig. 15 fill in the blanks (description of a certain group)

IV. DATA COLLECTION

A. Participants

In this study, we attempted to combine portfolios and social bookmarking under a multi-user networked learning environment. As mentioned above, in this study, we used the social bookmarking application, Hemidemi (<http://www.hemidemi.com/home>), to enable students to share their collections. The samples in this study were 28 students who joined the introduction and application of instructional media course at a research university in Taiwan.

B. Course Group in Hemidemi

Hemidemi allows users to create communities based on their interests; therefore, we created a community called 'introduction and application of instructional media'. Although this course community was created for course students, with the permission of the community leader, those who were not pursuing the course could also join our community. Therefore, there were 38 members in our course community, although only 28 students had enrolled for the course.

C. Course Tasks

The requirements of this class were as follows: (1) based on their interests, every student had to collect at least 20 web pages every week; (2) these web pages were to be added to the course-based community in Hemidemi; and (3) based on the web pages they collected, the students had to prepare a 2000-word report.

D. Procedure

In this section, we describe the procedure for achieving the tasks included in the course.

- Instructors are introduced to the idea of social bookmarking applications and Hemidemi—the main tool that will be used during the class. (It took half an hour to complete this process in the first class.)
- Instructors demonstrate how Hemidemi is to be used, including registering for a Hemidemi account. (It took an hour to complete this process in the first class.)
- Students practise in the class. If they encounter any

problem while practising, they can approach the instructors directly and get it solved immediately. (It took half an hour to complete this process in the first class.)

- After class, students need to collect at least 20 web pages based on their interests.
- Students were required to share the bookmarks they collected during a week. Students can also learn from others through sharing. (It took two hours to complete the sharing process, in which each student had the opportunity to share their ideas with classmates. This made them more confident with respect to achieving the course requirements.)
- Students had to constantly collect web pages every week until they completed a 2000-word report (in Chinese).

V. EVALUATION

A. The Number of Students Who Joined This Course

A total of 28 students joined this class, and 21 usable questionnaires were obtained. We observed that most students were unfamiliar with social bookmarking tools (90.47%) (Table I).

Table I demographic information about students

	Experience of using social bookmarking tools before this class		
	Yes	No	Total
Male	0	9	9
Female	2	10	12
Total	2	19	21

B. The Use of Social Bookmarking in This Course

During the class, students collected a total of 4962 (M = 177.21, SD = 54.48) web pages, and each of them generated 15 different tags. As seen in Table II, they only generated 23 discussions during the course. The few talks they generated might be the requirement of the course.

Table II use of social bookmarking application

	Web pages	Tags	Discussions
<u>M</u>	177.21	15.00	0.82
<u>SD</u>	54.48	10.14	1.33

Here, we selected the top 10 popular bookmarks from among all the bookmarks collected by the students. By using these 10 popular bookmarks, we attempted to study the discussions they generated. We found that there were six different tags generated from the top 10 bookmarks. The first three tags the students used the most were news, education, and health (Table III).

Table III tags of top 10 web pages

	News	Edu	Health	Attitude toward life	NCU*	Values	Total
1	●	●				●	3
2	●		●				2
3	●	●	●				3
4	●	●					2
5			●				1
6	●	●					2
7	●	●					2
8		●		●			2
9	●	●	●		●		4
10	●		●				2

*Note: National Central University

As seen in Table IV, the top 10 web pages were also collected by 90 other people ('other' represents those who are not enrolled in the course), and they did not generate many discussion posts, except for the top 1 article. We also found that most of the discussions were generated by others; students pursuing the course did not appear to be enthusiastic about conducting discussions or posting comments for others. This may be because we did not ask them to post comments for others; they were only asked to collect web pages on a weekly basis. Another reason might be that they did not know how to use the comments function (a chance for peer interaction or peer assessment). However, let us reconsider the definition of social bookmarking from another point of view. It appears to focus on interesting and notable information that people read and share with each other. In other words, social bookmarking primarily focuses on creating connections rather than creating content. As seen in Table 4, these popular bookmarks were also collected by their classmates. We attempted to explain 'why students collected more than they discussed' from the perspective of social bookmarking. We explained that the act of collecting web pages has the same implication as posting a comment.

Table IV description of discussions generated

	How many other classmates collected this article	Discussion posts	Discussions generated by others
1	13	47	39
2	11	0	0
3	9	1	1
4	9	3	3
5	8	1	1
6	8	1	1
7	8	2	2
8	8	4	4

9	8	3	3
10	8	7	7
Total	90	69	61

C. Satisfaction, Self-efficacy, and Gender Issue

At the end of the semester, we used questionnaires to obtain information about the self-efficacy of using the social bookmarking application and their satisfaction with this course. A 4-point Likert scale was used as the measure, ranging from strongly disagree (1), disagree (2), agree (3), and strongly agree (4). The satisfaction questionnaire comprised three parts: teaching units, activities, and materials.

The results are presented in Table V. Of the three parts of the satisfaction questionnaire, students were most satisfied with the activities part ($M = 3.35$, $SD = .38$)—items such as ‘spending time trying to use the social bookmarking application in class can help you become more familiar with this tool’ and ‘your problems were solved or answered by the instructor immediately’. Generally speaking, students were satisfied with this course ($M = 3.10$, $SD = .29$). Students also had high self-efficacy in using the social bookmarking application ($M = 3.30$, $SD = .51$). The correlation coefficients of satisfaction and self-efficacy were not significant ($r = .29$), which implies that students who were satisfied with the course may not be using the social bookmarking tool appropriately. They may be satisfied with the atmosphere during the course or feel that the social bookmarking application was useful. Students may have high self-efficacy in using the social bookmarking application because the instructor can answer or solve their problem immediately in the class or provide them with practice time in the class.

Table V descriptive information of the questionnaire

Questionnaire	<u>M</u>	<u>SD</u>
Satisfaction questionnaire (N = 21)		
Teaching units	3.03	.26
Activities	3.35	.38
Materials	3.10	.29
Total	3.16	.24
Self efficacy (N = 21)		
	3.30	.51

In this study, we found that students were satisfied with the course, and they also confidently used the social bookmarking application. We also found that the correlation between satisfaction and self-efficacy was not significant ($r = .21$). There were no gender differences in both satisfaction ($t = .31$) and self-efficacy ($t = -.18$) (Table VI). This implies that both males and females in the class were satisfied with our course, and that they confidently used the social bookmarking application after the class.

Table VI gender differences in satisfaction and self-efficacy

	Male (N = 9)	Female (N = 12)
<u>Satisfaction</u>		
<u>M</u>	3.18	3.14
<u>SD</u>	2.56	.24
$t = .31$		
<u>Self efficacy</u>		
<u>M</u>	3.45	3.49
<u>SD</u>	.62	.34
$t = -.18$		

VI. CONCLUSION

The study examined the feasibility of the integration of social bookmarking and portfolios through a case study on an introduction to an instructional media course at a research university in Taiwan. With respect to portfolios, the instructional aims of the use of social bookmarking in learning were collecting, selecting, evaluating, and sharing information; discussions with and learning from peers; constructing learning communities; and knowledge construction. First, students were satisfied with the course under social bookmarking ($M = 3.16$, $SD = .24$). They were satisfied with the teaching units ($M = 3.03$, $SD = .26$), activities ($M = 3.35$, $SD = .38$), and materials ($M = 3.10$, $SD = .29$). They also had high self-efficacy in using the social bookmarking application ($M = 3.30$, $SD = .51$). The correlation coefficients of satisfaction and self efficacy were not significant ($r = .29$), which implies that students may be satisfied with the atmosphere during the course or feel that the social bookmarking application was useful. Students may have high self-efficacy in using the social bookmarking application because the instructor can answer or solve their problem immediately in the class or provide them with practice time in the class.

Second, during the class, students collected a total of 4962 ($M = 177.21$, $SD = 54.48$) web pages, and each student generated 15 different tags. Although they had few discussions with classmates, they collected the same web pages in bookmarking, which imply that in the social bookmarking environment, they used the collected bookmarks rather than posting comments. On the contrary, the comments that students received were mostly from people not enrolled in the course.

Third, both males and females were satisfied and had high self-efficacy. Gender issues do not make any difference in the satisfaction ($t = .31$) and self-efficacy ($t = -.18$) levels.

In this study, we use social bookmarking as portfolios. By using the social bookmarking application, students can easily collect, store, share information with others, and also connect with others. Future research should focus on the quality of bookmarks and types generated from them or the meaning of interaction in social bookmarking.

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