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## A Web-Based Learning Portfolio Framework Built on Blog Services

Hsien Tang Lin, Tsai-Hsing Kuo and Shyan-Ming Yuan  
Department of Computer Science, National Chiao Tung University,  
1001 Ta Hsueh Road, 300, Hsinchu, Taiwan

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**Abstract:** The purpose of this research is to propose a learning portfolio framework called blogfolio on the basis of blog. A portfolio has been used as an approach to record student learning progress and assess student learning performance in the education system for a long time. A blog is a kind of social computing in which a virtual community may be formed to perform certain activities. In terms of content collection and maintenance style, portfolio and blog have a certain degree of similarity. In this research, some types of portfolio definitions are discussed and the blogfolio is on the basis of Barrett's description which takes collecting, selecting, reflecting, projecting and respecting as the activities of a portfolio. The blogfolio not only keeps all the functions a traditional portfolio should have, but also incorporates the features and advances of blog services such as publicity, cross link and syndication that make it a more suitable and convenient platform to let students build their portfolio. The proposed framework is described in detail, an experiment was conducted to understand the system usability and a comparison was made to investigate the advantages and disadvantages between different implementations of a portfolio. We conclude that some modifications should be made on typical blog to fit the requirement of a portfolio. In addition, blogfolio is superior to traditional portfolio in easy to use, publicity and collaborative learning but lack of authentication.

**Key words:** Blogfolio, blog, portfolio, web 2.0, ICT

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### INTRODUCTION

Pedagogically speaking, creating a portfolio is a process which systematically and purposefully collects artifacts, works, learning process details and achievements created by students. The contents of a typical portfolio are lecturing notes, homework assignments, extended learning material, learning reflections and files archives. The purpose of such a collection is to archive documents, showcase student performance and to be a reference for further usage. Meyer *et al.* (1990) defined a portfolio is a purposeful collection of student work that tells the story of the student's efforts, progress, or achievement in the given areas. Sharp (1997) suggested that most portfolios share three key elements in common: students must collect, make selections from and reflect on their own work. The content of a portfolio may be collected and recorded by traditional or electronic approaches. It is called e-portfolio in electronic version. In the traditional approach, a portfolio consists of printed material such as written works, paints, or audio/video tapes which are all put into a document file folder. In contrast, an e-portfolio consists of computer files. Barrett (2003) stated that an electronic portfolio allows the portfolio developer to collect and

organize portfolio artifacts in many digital media types (audio, video, graphics and text). Teachers assess students' learning performance by the content of their portfolios instead of traditional paper and pencil tests gradually. It is called portfolio assessment. It has been proved that portfolio assessment is more effective and authentic than traditional approaches (Mason *et al.*, 2004; Lin *et al.*, 2004). Lawson *et al.* (2004) evaluation result showed that students reported that the e-portfolio was relatively easy to use. They have expressed mixed levels of confidence in the technology. Writing up reflections was an unfamiliar concept to these students and this created additional challenges. Pullman (2002) described an electronic portfolio called efolio which enables students to concentrate on writing rather than on technology and to create an electronic environment conducive to student-outcomes and program assessment. Although an e-portfolio is richer than traditional and is also easier, it can be further enhanced with the advanced of Information and Communication Technology (ICT).

ICT provides powerful computing and communication approaches which facilitate information gathering, sharing, analyzing and archiving. The blog is one of the most popular services on the web, especially on web 2.0. Gordon (2006) described a blog as a mini

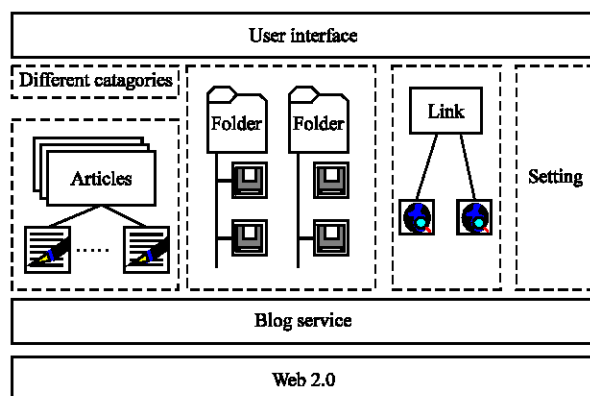


Fig. 1: Blog architecture

website where individuals can record their activities, thoughts, musings and ramblings for others to read and comment on. The simplified blog architecture is shown in Fig. 1. A blog consists of articles which can be organized into different categories, archives, photos and system setting. To explain the concept of Web 2.0 to the public, O’reilly, one of originators of web 2.0 term, stated that a personal web site is an example of web 1.0, whereas blogging is in the era of web 2.0 (O’reilly, 2006). Karger and Quan (2005) pointed out that, blogs turn web content consumers (end users) into web content producers, which is one of initial goals of the web.

Blog is a kind of social computing or social networking. Social computing is defined as any type of computing application that serves as an intermediary or a focus for a social relation (Kwai and Wagner, 2007; Schuler, 1994). Kwai and Wagner (2007) reviewed weblogs and their role as a social networking device for young people. They categorized participants into four types which are labeled as habitual, active, personal and blogging lurker on the basis of usage intensity. They derived the needs-technology fit model in which the relation between needs and technological feature is clarified from the task-technology fit model. With regard to learning, students who maintain portfolios on blog should be at least personal type and promoted to active or even habitual type with technology used fits their needs.

Henri and Pudelko (2003) define four types of virtual communities: community of interesting, goal-oriented community of interest, learners’ community and community of practice with the inspiration of Wenger’s social learning theory (Wenger, 1998). On the basis of Henri and Pudelko’s definition, a blogfolio can be view as a learners’ social community. What makes a blogfolio differs from traditional portfolio is its easy to access, publicity and sharing with peer. Therefore students’

blogfolios form a virtual community on cyberspace. Henri and Pudelko (2003) stated that the formal declared objective of a learners’ community is learning. Owing to learning is guided by an instructor and linked to the disciplinary or transdisciplinary objectives of the curriculum or studies program, it is distinct from that which is performed in the other forms of community.

Recently, researchers are contributing their effort on combining blog and portfolio. One of such a system also called blogfolio is hosted at UBC (UBC, 2007). Lin and Yuan (2006) has built a reflective journal which is part of a portfolio system on the basis of blog service. Their research result showed that student’s learning performance has positive correlation ship with reflective activity on blog. Du and Wanger (2007) adopted weblogs as on-line learning reflection. The blog platform they used is blogger, which is maintained by Google currently. They requested students to reflect their learning on the weblog and make reference to others’ blogs. They conducted a detail analysis on various data collected during lecturing period and found that student learning performance has positive correlation with blog performance which is defined as following 5 criteria: completeness, evidence of thoughtful responses, support provided for observations, relevance to course content and technical sophistication. They concluded that blog is as a predictor of learning performance. Their conclusion is similar to Lin and Yuan’s. The weblog in Du and Wanger’s research was a place for learning reflection which is one of major components of a portfolio. They didn’t consider other components of a learning portfolio. In addition, the system they adopted was maintained by a commercial company, it takes the advantages of less maintenance effort while incurs lack of flexibility to fit system into more specific need.

In this research, a portfolio framework based on blog service is presented. This framework is called blogfolio (blog+portfolio). This framework takes both the advantages of blog and portfolio while reducing the disadvantages of portfolio in traditional or electronic style. The objectives and construction of blogfolio are similar to one at UBC, with the following differences: the proposed system 1) is reconstructed from ordinary blog to allow student projects and presents; 2) focuses more on projection and respecting which is one of advantages of blog; 3) is not a subset but a equivalent of traditional e-portfolio system.

### SYSTEM FRAMEWORK

There are many well definitions about portfolio, we do not create a new but adopt an existing one to propose the framework. The proposed framework of portfolio is

based on the e-portfolio expert Barrett's definition. The reasons for choosing Barrett's definition are: it clearly defines the process of a portfolio should be. It does not emphasize assessment, as many portfolio definitions do, too much but on reflection and projecting. It fits the above mentioned advantages of a blog system. Barrett said: .... electronic portfolio .... is to get students to collect (create their digital archive), select the key pieces, reflect on their growth over time, project their future goals and respect their work through sharing with a wider audience (Barrett, 2003). The proposed framework provides suitable functions to fulfill the collect, select, reflect, project and respect task. The blogfolio does not establish a new type of virtual community beyond Henri and Pudelko's four types of virtual communities. It fits into the learners' community because of the maintenance of a portfolio strongly depends on the tutor (Henri and Pudelko, 2003). No matter what technology is used, in order to align to traditional portfolio, an electronic portfolio system should at least have following functions:

- Provide suitable interfaces for different users, such as authors, teachers and administrators to perform their task;
- Keep with the advance of technology;
- Provide integration capability with other educational systems, such as a campus wide administrative system, or a curriculum scheduling system.

The above statement will be treated as a guideline in constructing a blogfolio framework. The blogfolio provides a convenient approach to let students collect

their own work and other data. In general, articles on a blog are available to all who visit or link to this blog. If it is necessary, say, for students to make some things public and others private, the original blog functions have to be modified. Since data stored on a blog is in chronological order, students can easily view their own growth over time. For assessment purposes, teachers can also evaluate students' progress and growth with ease. With respect to project future goals, after reviewing blogfolio content, a student may find out what is lacking in his/her learning and adjust his/her plans or future goals accordingly. Sharing (respecting) content with more audiences was one of original goals of the blog. Blogfolio does this by treating collection, selection, reflection, projection and respect as key functions. The relationship of these functions with participants of blogfolio is shown in Fig. 2.

To illustrate the usage of blogfolio, a simple usage flow is shown in Fig. 3 and listed below:

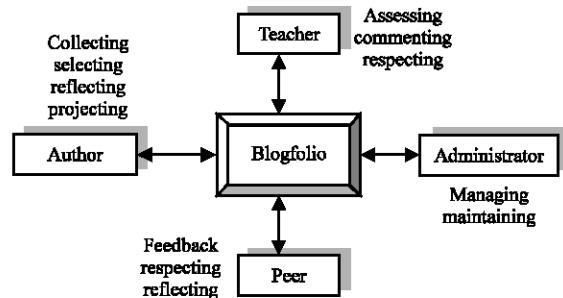


Fig. 2: Relationship of blogfolio with participants

Author	Peer	Teacher	Admin.
<b>Preparing</b>			
2. Blog setting	3. Subscribe with RSS reader	3. Subscribe with RSS reader	1. Create blog for students
<b>In course</b>			
4. Content collecting	6. Viewing respecting commenting	6. Viewing respecting commenting assessing	Periodical
5. Content selecting			
7. Reflection self assess			
8. Projection			
<b>Finishing</b>			
9. Archiving		9. Summary assessment	

Fig. 3: Usage flow of blogfolio

- First of all, Authors collect all material, files, articles, notes, or assignments into a portfolio, then
- Authors select the collected material they are willing to showcase to peers or teachers and place them in categories,
- Authors usually reflect on their learning situation by self assessment, teacher comments and viewing content of their portfolios, then
- Authors project and adjust their learning attitude and approach according to the results of the self reflection,
- Authors present their portfolios to peers or teachers and are willing to receive comments from peers and/or teachers.

technological features should fit specific needs. The functions of LifeType can not fit all requirements a portfolio system needs; it has been modified to add some functions which are listed in Table 1. A pilot study of this proposed framework was conducted on fall semester of 2005. It focused on reflection and the result of experiment showed that student learning performance has positive correlation with the activity on blogfolio. In addition, student expressed their preference of making collection and reflection on such a system (Lin and Yuan, 2006).

Upon system completion, an experiment was conducted and a comparison was made to evaluate system performance.

**SYSTEM IMPLEMENTATION AND EVALUATIONS**

A blogfolio (<http://blog.csie.thit.edu.tw>) was constructed based on the proposed framework with an open source blog system called LifeType (LifeType, 2007). LifeType is a blog platform based on PHP and MySQL. As Kwai and Wagner (2007) stated that

**Teaching experiments:** The experiment was conducted at a university in Taiwan. The thirty-four students in the research sample were computer and information science majors. They were all male and senior. This was a three credits course called Artificial Intelligence. The lecturing period was fourteen weeks in the spring semester of 2006.

Prior to course opening, a blog was allocated for each student (Fig. 4). Students were asked to replace the

Table 1: Functions added to create blogfolio

	Normal blog functions	Functions added
Collect	A password protected interface lets author adds/modifies/deletes posts, articles, links. All the posts, articles, links issued by author are open to public.	A new function is added to let author decides if a post, article, link, etc., will be open to public or not. The default is yes.
Select	No such function	A new function is added to let authors select items from blog they are willing to showcase in their showcase category. A default folder called reflection is added to the blog for collecting reflection/projection.
Reflect project Respect	A password protected interface lets author adds/modifies/deletes posts which are for learning reflection and projection purposes. Visitors can view all content issued by author and freely give comments to all posts.	Visitors can view contents in the showcase category. If the author uses default setting, the content is shown automatically.



Fig. 4: A sample screenshot of system usage

Table 2: A comparison among traditional, digital and blogfolio

Item	Advantages	Disadvantages
Traditional	<ul style="list-style-type: none"> <li>• Easy to implement,</li> <li>• Basically without any extra devices such as computer.</li> <li>• Authentication with ease,</li> <li>• Keep privately</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to maintain, showcase and long term storage,</li> <li>• Many different type of medias such as paper, video/audio tapes, pictures, photos,...</li> </ul>
Electronic	<ul style="list-style-type: none"> <li>• Ease to maintain, showcase and long term storage,</li> <li>• All content are in digital format,</li> <li>• Ease to transfer to other location,</li> <li>• Has multimedia capability</li> <li>• Good authentication</li> </ul>	<ul style="list-style-type: none"> <li>• Need computer system,</li> <li>• Most of the systems are tailored made system with own data or database format</li> <li>• Difficult to upgrade to keep the advance of technology</li> </ul>
Blogfolio	<ul style="list-style-type: none"> <li>• Based on web 2.0,</li> <li>• Ease to build with open source solution,</li> <li>• Easy to maintain and upgrade system functions,</li> <li>• Easy to maintain, showcase and long term storage,</li> <li>• All content are in digital format, Ease to transfer to other location,</li> <li>• Easy to interact with others,</li> <li>• Multimedia enriched content,</li> <li>• Ease to interface with mobile or telecommunication devices</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of authentication</li> </ul>

outlook skin (user interface) with templates provided in the system or selected from the outside world. Students were also asked to set a password. There was a mandatory task to ensure each student knew where his/her blog was and how to manage it. In the lecturing period, students were asked to:

- Use RSS (Really Simple Syndication) reader to syndicate peers' and teacher's blog.
- Collect and select their learning material such as homework assignment and extended learning material.
- Reflect their learning about this course regularly (said weekly).
- Project and adjust their learning attitude and behavior based on their own reflection.
- Respect the works of their peers.

To encourage students to actively participate and maintain their portfolio, the activity on blogfolio was a part of formal assessment. The teacher gave a score to students based on the content of their portfolio, such as participation, collection, respecting from peers (citation). The total score of the portfolio was 20% of the student's grade. At the end of this course, students were requested to fill a user satisfaction survey to check students' comments about this system. Owing to the publicity and ease of use are major advantages to using blogfolio; the user survey focused on these two parts. The result showed that about 75% of students felt this system was easy to use. Over 90% of students anticipated comments or feedback from peers or teachers. Almost all students felt that viewing a classmate's learning portfolio has a positive impact on their learning. Finally, most of the students felt system has positive impact on their learning.

**Comparison:** In addition to the user survey, a comparison between traditional portfolios, electronic portfolios and blogfolio was made. The items compared were collection, selection, reflection, projection, versatility and ease of use. The result of the comparison is shown in Table 2. Blogfolio is superior to other types of portfolios although the lack of authentication is an obvious shortage.

### CONCLUSIONS

This research examined a portfolio framework called blogfolio on the basis of blog services and such a system that was built utilizing that framework. This blogfolio is a kind of learners' community derived by Henri and Pudelko (2003). The experiment result showed that students expressed the feature of easy to use and their willingness on maintaining portfolio. We can conclude that such a system, at least, has the following advantages to all participants of a portfolio system:

- The portfolio author has more freedom to arrange his/her own portfolio collection. Blogging is one of the fastest growing communities in cyberspace. There have been tremendous developers and experts spending a lot of time and effort in developing better system functions. The major web portals around the world now provide blogspace for users such as Yahoo and Google. Incorporated with some features such as Trackback, RSS and Atom, portfolio authors may present content to others easily and conveniently.
- It is easy to include multimedia files such as graphs or audio/video clips into a blog. Many of current implementations of blogs are photo albums, audio/video clip showcase centers, etc.

- In a traditional portfolio system, if teachers want to view student's portfolio, they should check one by one. In general, there are tens of students in a class, not all of them maintain (append, edit, or delete) the content of their portfolios daily. If teachers view each of the student's portfolios daily, it may waste a lot of time. In addition, even teachers check each of them daily, it may occur at a fixed time, say 9 am. If a student update his/her content at 9:01 am, then the teacher will not know of it until the next day. With the RSS function, teachers may use an RSS reader to subscribe to student learning portfolios. Once there is any change in the student learning portfolios, teachers can be notified immediately. RSS readers will periodically (e.g., 15 min, 1 h, or 2 h) scan all subscribed blogs to see if there are any updates. If any blog has been updated, RSS reader will get that item and inform the subscriber using the appropriate medium (such as audio, video, or image). In such circumstances, teachers need not pay attention to every student learning portfolio. They are informed changes of learning portfolios immediately. This is impossible to realize in traditional, electronic, or web-based portfolios.
- Students may also use RSS functions to subscribe to teachers' and peers' blogs. In such a way, if there are any updates on those blogs, the subscriber (student) is informed promptly. With regard to teacher blogs, teachers may post announcements related to teaching activities occasionally, in turn, their students can learn about of these announcements on time through the RSS function. In addition, a teacher may teach several classes in a semester, a student does not need to go through as many steps to find information related to his/her own class. It has been confirmed that collaborative learning has positive impact on student learning. By viewing peers' portfolios, especially someone who has better learning performance, a kind of collaborative learning is achieved. In such a manner, students have a model to reflect upon and learn. Traditionally, it is quite difficult to realize such an environment, with RSS in a blog, it is easy to build.
- The blog is based on web2.0 technology and is one of most successful services on web 2.0. The essence of web 2.0 means blogs have strong personal style. A traditional paper, electronic, or web-based portfolio basically adopts a uniform outlook or style and rarely presents a personal style. The portfolio system based on blog services can be built with a strong personal style outlet by adopting templates which are available on the web. Building up a portfolio system with a strong personal style using a simple procedure will enhance students' motivation in maintaining their portfolios.
- Most of the blog systems available are open source packages. That means anyone who takes such a package and modifies it to fit the requirements of a learning portfolio can distribute it to the public with certain terms and conditions (such as GNU, GPL). It lets school teachers who are willing to adopt portfolios into their teaching a less costly and easier method of implementation.

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