The Personal Digital Library (PDL)-based e-learning: Using the PDL as an e-learning support tool

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Abstract. The paper describes a support tool for learners engaged in e-learning, the Personal Digital Library (PDL). The characteristics and functionality of the PDL are presented. Suggested steps for constructing and managing a PDL are outlined and discussed briefly. The authors believe that the PDL as a support tool of e-learning will be important and essential in the future.

1 Introduction

The development and popularization of Internet is changing our society, everyday life, work and the environments of learning. With the change of the learning environments, there arises a new way of learning——e-learning, which is now making great changes in the contents and methods of learning, and will bring about a revolution of learning. E-learning covers a wide set of applications and processes such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It is composed of four elements:

① A learner,
②An instructor,
③ Technology, including a computer and,
④ Information or skills to be learned.

E-learning is important to learners because it offers a new way to learn at anywhere and at anytime. Learners can get abundant resources of learning content via Internet, intranet/extranet (LAN/WAN), and CD-ROM, etc. in the digital

environment of e-learning. As a self-directed learning, e-learning gives prominence to self-determination of learners and realizes the individualization of learning. Learners can obtain the information needed as much as possible via Internet according to one's own learning characteristic and the content of e-learning in the process of e-learning. The information needed for e-learning may includes multimedia data or files, learning materials, electronic textbooks, courseware, application programs, E-mail, BBS (Bulletin Board System), Usenet, Mailing-list, etc., which form the resources bank of learning and will be increasing day by day on the computer's hard drive till it becomes necessary and exigent for learners to manage and utilize them for proper and efficient e-learning. To construct the personal digital library (PDL) is just the effective solution for managing and utilizing the e-learning resources in digital environment.

We propose that using the personal digital library as e-learning support tool based on our experimenting with building a PDL and testing the functionality of the PDL. The research aim is to provide a support tool of e-Learning by managing and utilizing the e-learning resources in the PDL.

2   The necessity of constructing the PDL in e-learning

The personal digital library (PDL) refers to the digital library in which the digital information resources for purpose of e-learning are gathered and stored by individuals. It is the structured information aggregation for private utilization. Compared with the public-oriented digital libraries which abound on Internet, the PDL shows many distinguishing characteristics:

① The pertinence of information collection;
② The substantiality of data storage;
③ The convenience of information utilization;
④ The facility of information management;
⑤ The economy of structuring and maintaining PDL.

PDL is the purification and concretion of information resources on Internet. Also, it is the result of treating learning resources with individualization and the Supplement of the public- oriented digital library and Internet-based learning [1].

As e-learning is in vogue nowadays, it is inevitable and essential to construct the PDL for the following reasons:

⑴ E-learning is distributed learning and advocates the self-directed learning. Learners can download files via Internet and store learning resources on the individual hard drive independently according to their own needs. When the learning resources on the individual hard drive are too miscellaneous to manage and utilize for learning, effective ways to organize, treat, safeguard, maintain, and manage these learning resources will be expected.

⑵ E-learning is the process of individualized learning. The individualization of learning requires that the learning resources on the hard drive being hold and managed in the learner's own way.

⑶ The effective e-learning is actually the process in which the learner chooses, organizes, manages, stores, and utilizes information to change his knowledge

structure. Relatively stable learning environments and information management tactics are needed to meet the individual's demand and the goal of e-learning in the formation of e-learning modes.

⑷ The environment of e-learning still has the following limitations that require learners to take effective measures and methods to deal with.

•Internet bandwidth may not be robust enough to support the desired level of multimedia. The delivery speed of data on Internet is too slow to meet the need of e-learning so that learners have to obtain learning materials by other ways. In order to benefit fully from the learning resources, it is necessary to bring the learning resources to the learners' hard drive.

•The learning resources on Internet are unstable because of the constant renewal of learning contents and sometimes the disappearance of some learning contents from the web-sites. Therefore,   the learners have to store these important learning data on the individual hard drive for e-learning at any time.

There are a lot of e-learning resources on the Internet [2]. E-Learning is the Internet-based learning. Learners should use the Internet as school [3].

In consideration of the reasons discussed above, learners should construct the PDL and using the PDL as e-learning support tool.

3   The process of constructing and using the PDL

In general, there are following main steps to construct and use the personal digital library:

① To determine the goal of structuring the personal digital library according to learners' needs;

② To select the application software of constructing the personal digital library;

③ Using the selected application software to structure the personal digital library;

④ To collect and download the learning materials for the personal digital library;

⑤ To manage the learning materials in the personal digital library;

⑥ To export or to use the learning materials from the personal digital library for e-learning, etc.

The flow chart of constructing and using the personal digital library is illustrated as follows:
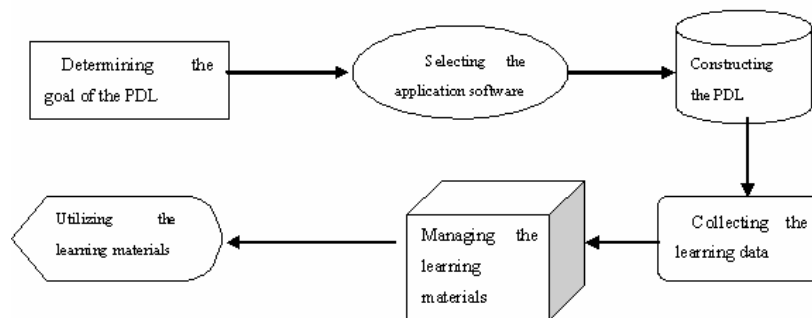
Fig. 1. The flow chart of constructing and using the Personal Digital Library

3.1   To determine the goal of structuring the PDL according to learners' needs

Each learner has his/her own goal of learning. At the first step, the learner should determine the goal of constructing the PDL according to his/her own needs. Generally speaking, the goal of constructing the PDL is to store, manage, and utilize the learning materials properly so as to improve the efficiency and the effect of e-learning.

3.2   To select the application software of structuring the PDL

The key of structuring the PDL is to select the proper application software. Different software has different functions. When learners select the application software to construct the PDL, they should consider the following parameter:

   •Information organization methods
   •Editing function
   •File formats of supporting
   •Import function
   •Export function
   •Searching function
   •Supplementary functions, etc.

   Generally speaking, the PDL that the learner constructs and uses for e-learning should possess the following functions:

   • All learning contents can be organized and managed in the PDL regularly and scientifically.

   • The PDL can organize and manage multi-format files.

   The PDL can export the learning contents in the formats according to learners' needs.

   • The PDL can keep the learning contents on individual hard drive steadily and substantially.

   • The PDL should have the search function enabling learner to find out the learning materials conveniently and swiftly.

• The functions of the PDL should be powerful enough to meet the various needs of organizing and managing the learning contents for e-learning.

• The interface of the PDL should be friendly and the operation should be simple and easy.

• The maintenance and management of the PDL should be at low costs.

• The PDL can set up the security password, emphasize the protection of the reader's privacy, and the like.

We have evaluated and analyzed the full text database software suited for the PDL. Based on the evaluation and analysis of full text database software that can be used to construct the PDL, we consider that the application software suited for building the PDL including:

①Super-emanager V2.0 beta 5 (http:// emanager.yeah.net);

②Netcollect V2001 beta4 build1015 (http://www.cssc.com.cn/netcollect/);

③Textfriend V3.68 (http://ourbooks.yeah.com);

④eLib V2.01 (http://www.shijun.com);

⑤TRS personal information center V3.0 build1009;

⑥Tips manager V3.2.4.725 (http://tipsmanager.yeah.net);

⑦MYBASE V4.56 (http://junjiao.yeah.net);

⑧ASKSAM4 RTS DEMO V4.0 (http://www.asksam.com).

After the test, comparison and consideration of the application software, we prefer choosing Super-emanager V2.0 beta 5 to structure the PDL [4].

3.3   To construct the PDL

Taking Super-emanager V2.0 beta 5 as an example, the following is the concrete measure and method of structuring the personal digital library:

① Download, setup and run the Super-emanager V2.0 beta 5;

②Building the new database as "stack room" in Super-emanager V2.0 for storing learning contents.

3.4   To collect the learning contents for the PDL

There are two methods to collect the learning contents for the PDL.

① Importing files

Learners can import single file or multi-files to the PDL. The file formats that Super-emanager V2.0 supports to manage involve: zip, rar, mht, msg, eml, doc, htm, txt, rtf, mpg, mp3, mp2, dat, avi, wav, mid, mov, wma, wmv, asf, rm, ram, rpm, ra, swf, etc.

② Snatching homepages at Internet

Learners can snatch homepages on Internet by hitting the right- button of mouse on browser. Super-emanager V2.0 will save the selected homepage in the special files.

3.5   To manage the learning contents in the PDL

It is necessary to manage the learning materials in the PDL after the PDL is structured. The management of learning materials in the PDL embraces:

① To delete, rename, move, open and copy a file.

② To undelete the deleted file.

③ To set up the security password for system or for important files

④ To search and find the file that is needed by learners swiftly. Super-emanager V2.0 can do the full-text retrieval in the files of HTML and TXT.

⑤ To backup important learning materials.

3.6   To export and use the learning materials from the PDL

There are many manners to export the learning materials from the PDL.

① Exporting the learning materials in the form of "data package".

Super-emanager V2.0 can export the learning materials in the formats such as zip, mht, dex, chm, and xml. The learner can copy the exported file from one disk to another, or exchange the learning materials in the exported formats with other learners by E-mail.

② Exporting the learning materials in the form of "catalogue"

Super-emanager V2.0 can export the learning materials in the form of "catalogue". That is to say, it can export the selected learning materials to the special disk or special path in the original structure in the PDL.

After finishing the process above, the learner can construct and use the PDL for e-learning.

4   The functions of the PDL in e-learning

The PDL can play a heavy role in e-learning. Its advantages in e-learning are demonstrated as follows:

• The PDL can realize the integration of learning contents. The PDL is the data repository of various types of learning materials such as texts, homepages, e-books, e-journals, E-mail, software, pictures, Video files, audio files, and the files produced by learners themselves, etc. Based on the evaluation and test of software suited for building the Personal Digital Library, we find that the learning materials can be organized and managed in the PDL regularly and scientifically. The PDL can empower the organization and management of learning contents, enable learners to store and retrieve information and organize data pertinent to the focused topics. Besides, it can be used to improve the learning environment. In the PDL, information is stored on learners' machines rather than a central file server. The PDL could have a great impact on the way learners retrieve and act on information.

• The PDL can offer an effective condition and environment of e-learning for learners to obtain the strong support of learning contents in it conveniently. The learning contents in the PDL can be used repeatedly and the PDL provides links to other learning resources makes learners more comfortable and more efficient in e-

learning. With its advantages set off by the PDL, e-learning can arouse learners' enthusiasm of learning, and will exert a profound influence on learners' personality and their capability of learning as well.

The research works of using the PDL as e-learning support tool have been done by researchers. The researcher has demonstrated that the usage the Full-text Searching function of the PDL system to implement the idea of "Learning words with a large amount of texts" [5]. It is identified that the PDL-based learning is important and essential. As a support tool of e-learning, the PDL can aid learning.

5   Conclusion

E-learning will be the mainstream of learning in the 21st century. The PDL will be the principal mode for learner to organize and manage information resources. As an e-learning support tool, the PDL provides a foundation for learner to build a more comfortable e-learning environment of the future. The PDL-based learning will be the next hot trend of e-learning, and will accelerate the pace of e-learning technology advances. The influence of the PDL will reach far beyond learners.

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