Building learning resources in a participatory digital library, based on Moodle

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ABSTRACT: Such outstanding problems as lack of user participation, low resource-sharing and inconvenient retrievals still exist in the construction of digital learning resources in China. Using a questionnaire, the demand and application of current digital learning resources in colleges and universities was analysed, and the problems in the current construction of digital learning resources identified. Based on the analysis and to address the identified problems, a system for the construction of learning resources in a participatory digital library based on Moodle was developed and is presented in this article.

INTRODUCTION

Social networking has promoted the development of education information technology. The open and participatory e-learning 2.0 teaching model has been developed, based on Web2.0 technology. Various learning management systems, such as Moodle (modular object-oriented dynamic learning environment), have emerged. The MOOCs (massive open on-line courses) are rapidly expanding and have triggered an educational reform or a *MOOC storm* [1][2]. Education information technology must be supported through abundant digital learning resources. Chinese colleges and universities have put much effort into the development of digital learning resources, and there have been some positive results. However, there are problems with a lack of user participation, low resource-sharing and inconvenient retrieval interfaces.

The user's demand for digital learning resources is the driving force for colleges and universities to construct digital learning resources. Only when digital learning resources match user demand, can the benefits be realised and the support of users secured.

The research reported in this study was an investigation into digital learning resources from the perspective of students and teachers. A questionnaire survey and interviews were used in the research. A system model of teachers' and students' participation in library digital learning resources was constructed, based on these research data.

QUESTIONNAIRE SURVEY

Research Subjects

The survey was conducted in 2013. The subjects were the students and teachers from four universities and colleges. In the survey, 460 questionnaires were handed out, 372 to students and 88 to teachers. Of the former, 360 were returned or 97%, and 80 of the latter were returned or 91%. The questionnaires were filled out personally. Some teachers and students from the School of Information Science and Technology, Beihua University in China were selected for more in-depth interviews.

Current Situation of Digital Learning Resources

- Access to digital learning resources:

    In responding to the question in the survey, *Where do you acquire digital learning resources during learning/teaching?*, it was found that 73% of students and 93% of teachers acquire such resources from the

Internet, and 56% of students and 57% of teachers use the library Web site. Only 21% of students and 34% of teachers use the course centre or excellent course Web site, which are offered by the Academic Affairs Office.

- Evaluation of digital learning resources:

In responding to the question in the survey, *Are you satisfied with learning resources (i.e. course centre and excellent course Web site) on the school Web site?*, it was found that 11% of students had never used these learning resources. Among the students who have used the resources, 40% were *neutral*, 24% were *not satisfied*, and only 37% were *satisfied*. By comparison, 86% of teachers were *neutral*, 14% chose *not satisfied* and no teachers chose *strongly satisfied* or *satisfied*.

The responses from students and teachers to the question in the survey, *Why are you dissatisfied with the course centre and the excellent course Web site?* cited limited quantity of resources (71%), poor quality of resource (47%), a single type of resource (39%), the unavailability of the required resources (56%) and resource dispersion (42%).

Demand for On-line Teaching

- Evaluation of traditional teaching methods:

In responding to the question in the survey, *Are you satisfied with the traditional teaching methods (classroom teaching)?*, 11% of students chose *not satisfied*, 0.6% chose *strongly dissatisfied*, 62% choose *neutral* and only 26% choose *satisfied*. By comparison, 79% of teachers chose *neutral*, 21% chose *not satisfied* and no teacher chose *satisfied*. It, thus, can be seen that both teachers and students give a low satisfaction rating to traditional classroom teaching.

- Willingness to participate in on-line participatory teaching:

In responding to the question in the survey, *Are you willing to participate in on-line participatory teaching if it were implemented for your course?*, 73% of students were *willing*, of which 12% were *strongly willing*, 20% were *neutral* and only 7% of students were *unwilling*. By comparison, 36% of teachers were *strongly willing*, 64% were *willing*, and no teachers were *unwilling*. This shows that teachers and students generally have high enthusiasm for participating in on-line teaching.

- Learning functions of the teaching platform:

In responding to the question in the survey, *Which basic learning functions do you expect the participatory teaching platform to provide?*, 88% of students chose *acquiring the course syllabus, courseware and other information*, 77% chose *selecting favourite courses*, 47% chose *submitting assignments on-line*, 33% chose *on-line test* and 23% chose *on-line classroom survey*.

By comparison, 71% of teachers chose *acquiring course syllabus, courseware and other information* and *submitting assignments on-line*, 64% chose *on-line classroom survey and selecting the favourite courses* and 57% chose *on-line test*. It can be seen that students and teachers pay much attention to the acquisition of platform resources. In addition, teachers show more interest in information related to the teaching routine, while students are more interested in the freedom to select their favourite courses.

- Interactive functions of the teaching platform:

The survey shows that 81% of students and 79% of teachers chose *course database*, 67% of students and 79% of teachers chose *topic discussion area*, 48% of students and 59% of teachers chose *subject blog*, 43% of students and 59% of teachers chose *Wiki collaboration* and 61% of students and 46% of teachers chose *instant communication*. As a result, the on-line participatory teaching platform should provide such collaborative functions as course database, topic discussion area, subject blog, Wiki and instant communication.

Construction of Learning Resources in the Digital Library

- The necessity of the digital library:

Students' and teachers' enthusiasm for on-line teaching provides favourable conditions for the construction of the participatory digital library. When asked about the necessity of establishing a digital library, 77% of students chose *necessary*, of whom 9% chose *strongly necessary*, 21% were *neutral* and only 3% chose *unnecessary*. Similarly, 79% of teachers chose *necessary*, of whom 14% chose *strongly necessary*, 21% were *neutral* and no teachers chose *unnecessary*.

- Willingness to participate in the construction of the digital library:

Responding to the question in the survey, *Are you willing to participate in the construction of learning resources in the participatory digital library (if any)?*, 74% of students were *willing*, 21% were *neutral* and only 5% were *unwilling*. Similarly, 79% of teachers were *willing*, 21% were *neutral* and no teachers were *unwilling*. It can be concluded that it is feasible to integrate the construction of digital learning resources into on-line teaching.

Requirements for the Digital Library

- Resource management functions:

  The survey shows that students expect the following resource-related functions: resource download (93%), resource retrieval (66%), information release and reception (52%), resource upload (51%), resource organisation and integration (48%), resource evaluation (48%), resource navigation (44%) and incentive function (41%). Teachers expect the following resource-related functions: resource download (93%), resource retrieval (79%), information release and reception (43%), resource upload (86%), resource organisation and integration (57%), resource evaluation (57%), resource navigation (50%) and incentive function (37%).

- Sources of learning resource:

  The survey shows that students expect the following sources of learning resource: resources provided by teachers (72%); resources from on-line excellent or open courses (69%), modern educational technology centre (69%), library Web site (65%), other network resources (45%), Academic Affairs Office's Web site (42%) and resources from students (36%). Teachers expect the following sources: resources provided by teachers (64%), resources from on-line excellent or open courses (93%), modern educational technology centre (86%), library Web site (43%), other network resources (71%), Academic Affairs Office Web site (42%) and resources from students (35%).

- Nature of teaching materials:

  From the survey, it can be seen that students expect the following forms of teaching materials: video (84%), text (74%), Web pages (51%), pictures (47%) and audio (41%). Teachers expect the following forms of teaching material: video (93%), text (93%), Web pages (71%), pictures (57%) and audio (43%).

- Expected social network functions:

  It can be seen from the survey that students expect the platform to possess the following social network functions: releasing the log, mood and comment (84%), chatting and discussion (83%), downloading, forwarding and sharing (77%), uploading pictures (53%) and uploading documents (33%). Teachers expect the following social network functions: downloading, forwarding and sharing (64%), chatting and discussion (50%), uploading pictures (50%); uploading documents (43%) and resource recommendations (36%). Hence, the majority of students and teachers are interested in the interactive and participatory functions of the social network.

Results of the Interviews

Digital learning resources in colleges and universities have disparate sources, e.g. the library, Academic Affairs Office, and Educational Technology Centre, which require co-ordination. Interviews were carried out with students, teachers, librarians and Academic Affairs Office staff so as to understand their opinions on the construction of the digital learning resources.

The feedback is summarised as follows: about 3/4 of the interviewees hold that the library should be the main body in the construction of the digital learning resources; about 1/4 hold that the Academic Affairs Office should be the main body; and only a tiny minority hold that the Educational Technology Centre should be the main body. Hence, it is concluded that the library should assume the lead role in the construction of the digital learning resources, with support from other relevant departments.

Most of the interviewees believe that the construction of the library digital learning resources should be closely related to the teaching demands of teachers and students, as well as facilitate an increase in communications and interaction among them. Integrating the digital learning resources into the teaching improves its pertinence. To avoid problems in achieving the necessary co-operation, the system needs to be managed.

Based on the survey and the interviews, the problem with constructing digital learning resources lies in the separation of on-line teaching from the construction process. As a result, the digital learning resources are separate for each department and cannot be shared. Hence, the construction of learning resources cannot be carried out based on the overall demands of teaching. In order to solve these problems, the library should co-ordinate with the teaching departments and the teaching environment of teachers and students, to ensure teachers and students participate in the construction of the digital learning resources, with users' course demands at the centre.

CONSTRUCTION OF LEARNING RESOURCES IN THE DIGITAL LIBRARY

Learning management systems (LMSs) have emerged to provide e-learning in a social network environment. Moodle is an open-source on-line LMS, which was designed and developed based on the learning theory of constructivism. By integrating such Web2.0 tools as blog, wiki and RSS (rich site summary), Moodle has realised the functions of learning management, course management and Web site management. It emphasises that educators (teachers) and learners (students) are both subjects. In teaching activities, they co-operate with each other and participate in teaching; they also can jointly construct course knowledge and carry out the corresponding construction of participatory learning resources.

Released in August 2002, the Moodle platform was introduced in China from 2004. From the perspective of participatory learning resource construction, Moodle has the following three major functions:

- Construction of diversified resources:

  Teachers can use the resource module to add various forms of resource to a course. Local or network resources specified by a URL can be integrated into the course resources. In addition, the course module enables teachers and students or students and students to interact and co-operate to create the course resources.

- Interactive and collaborative mechanisms:

  Through Moodle abundant user interactive and collaborative mechanisms can be provided, themed around social network technology. These mechanisms can be accessed using various activity modules in Moodle. For example, the wiki module allows participants to create, expand or modify contents of the Web page.

- Open flexible platform:

  As open-source software, Moodle is free. Moodle has a template structure making course development flexible and convenient. Administrators can choose to install various modules through the management interface, and developers can develop further, based on the defined interface.

To date, Chinese use of Moodle has focused on the following: promotion of Moodle, course design with Moodle, in-depth study of on-line teaching and collaborative learning with Moodle, training based on Moodle, as well as design and development of the Moodle platform.

Some Chinese scholars have considered the role of Moodle in the construction of digital learning resources. Two aspects have been studied. For example, Lu analysed the advantages of Moodle in the construction of excellent courses, taking the construction of an excellent course on microcomputer principles as an example [3]. Also, Yang et al analysed current Chinese education resources and, then, expounded how to apply Moodle to the personalised construction of an on-line resource library [4]. Wang analysed the current situation and problems with the construction of learning resource libraries, and provides a model for the construction of learning resource libraries, based on Moodle [5].

LEARNING RESOURCES IN THE PARTICIPATORY DIGITAL LIBRARY BASED ON MOODLE

Guided by the survey data, and exploiting the functionality of Moodle, a system model has been developed for the learning resources in the participatory digital library, as shown in Figure 1.

The user-centred social network environment emphasises user participation. Therefore, teachers and students (the human element) and their interaction and collaboration are at the core of the operation of the construction system. The students and teachers complete the following activities in the process of on-line teaching and learning: contribute their knowledge and experience, modify, supplement and improve others' views, reduce the uncertainty of knowledge and ultimately achieve a consensus. Hence, they construct and share the knowledge library and participate in the construction of library digital learning resources.

The system of learning resources in the participatory digital library based on Moodle provides such functionality as discussion areas, messages, blogs, personal space, course activity material and course resources. The course activity module and course resource module are the core modules of the system. The course activity module allows users to participate in such course activities as the blog, wiki collaboration, the discussion area, database, real-time chat, homework, voting and testing. Through their interaction and collaboration, users provide their own resources and use the resources which are provided by others. The course resource module allows students to view and download the course resources, which were uploaded by teachers as a file, Web page, folder or URL.

Through the reward points, the system incentivises students and teachers who have participated in the construction of course resources. This provides encouragement to actively participate in the further construction of digital learning resources.
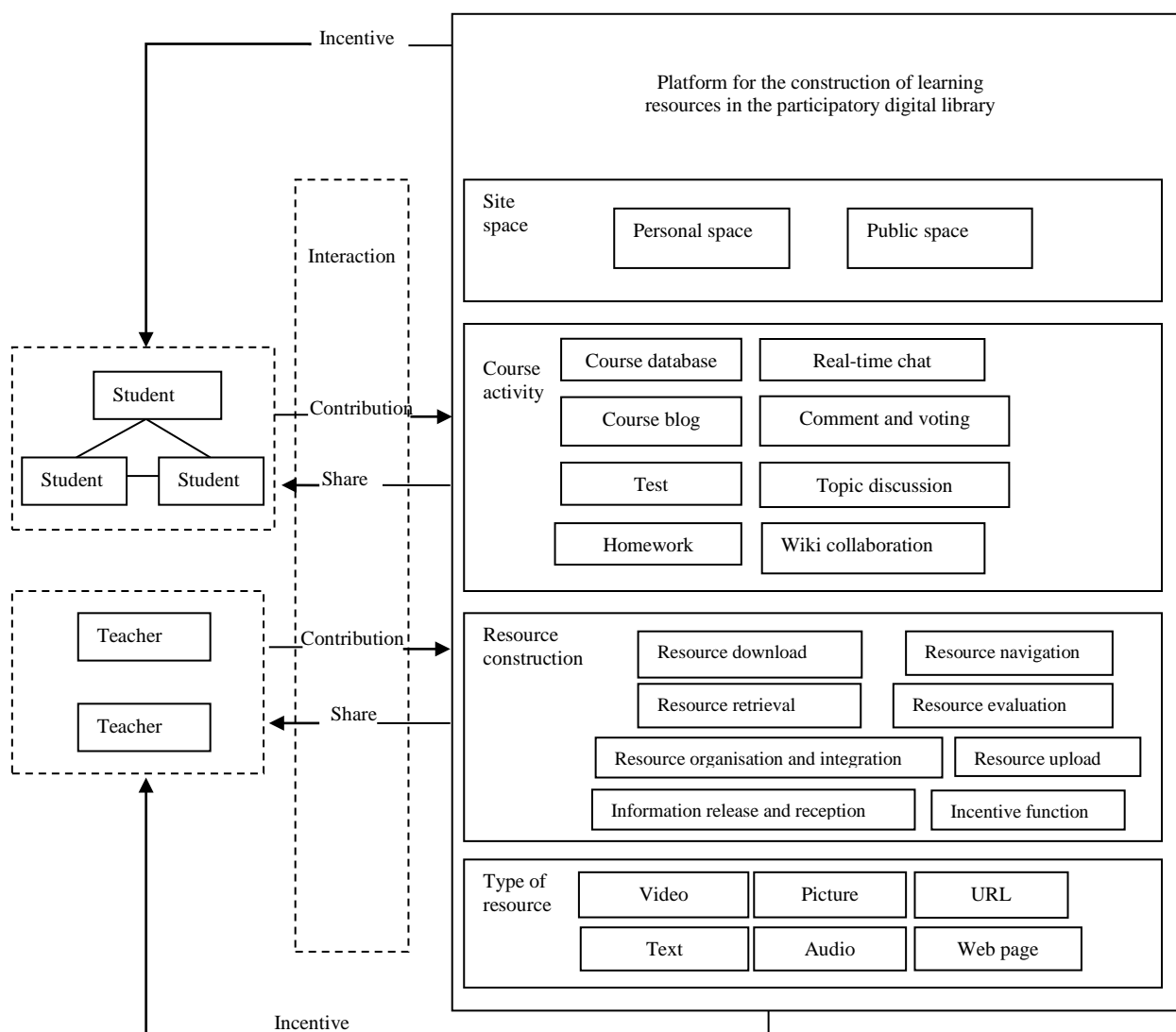
Figure 1: Learning resources in the participatory digital library, based on Moodle.

The system is an integration of external resources, including those from the library, Academic Affairs Office, Educational Technology Centre, research centre and other departments, with various network resources, such as on-line excellent courses or open course resources.

CONCLUSIONS

Moodle can be used for the construction of digital learning resources but, usually, it is restricted to learning resources related to teaching. Usually, no attention is paid to managing and updating the learning resources in the long term. With Moodle as the platform, the library is in co-operation with teaching departments to research the construction of library digital learning resources based on user demand.

With the open platform code, the flexible design of the platform structure and various functions for resource construction, Moodle can be used to realise the best combination of on-line teaching and library digital learning resource construction. Moodle is a support for on-line teaching interaction, as well as resource construction and sharing between teachers and students through the active participation of learners and the management and guidance of the library. This achieves the sustainable construction of digital learning resources. A system model for the construction of learning resources in the participatory digital library based on Moodle was developed, according to survey results and user demands.

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