

Study on the Patterns of Library Resource Construction and Services in MOOC

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Abstract

It is of great significance to reform the patterns of library resource construction and services in MOOC, for example, it can help to fulfill the individual needs of learners, and achieve sustainable development for the library. Firstly, the author analyzes the characteristics of MOOC; secondly, discusses the characteristics of information construction of library; and then designs a knowledge discovery model of the library information resources construction in MOOC; finally proves that it could provide favorable support for the improvement of library resource construction and services to discover knowledge from library data base according to the result of case study.

Keywords: *MOOC, Library, Resource Construction, Service Pattern*

1. Introduction

MOOC (Massive Open Online Courses) is well received by many learners as a new online resource for its advantages like convenient, low cost, high efficiency and so on. People worldwide gradually pay more attention to MOOC, and are passionate about on-line study. Hundreds of student, universities, media and companies are involved in the MOOC learning mode. Similarly, the construction of library information resources also affected by MOOC and faces a number of challenges because of MOOC. For the new situation, libraries should respond to changes and eye on the future, constantly improve organizational behavior, continue to enhance the vitality of the organization, and promote the development of resource construction [1]. Actually, the construction of information is equal to the construction of library collection, including the collection of information resources, tagging, management, storage, uploading and prolonged custody. It is the only way that must be passed during library development with deepening idea of MOOC. The information service of library is the basic target of the information construction of library, which mainly refers to improve the quality of information services on the basis of changes in external environment and readers' requirements, to promote sustained progress in the quality of the library information services. The construction of information resource and service are the roots of libraries' sustainable development and the main content for libraries to complete the fundamental tasks.

2. Characteristics of MOOC

MOOC, which is short for massive open online courses, differs distinctly from traditional classroom teaching. It allows thousands of people simultaneously involved in the course teaching through network platform. Any student can log into the platform and participate in the learning after registering an account. It can be conducted through the network and completely free from the constraints of time and place. In recent years, developers have paid more attention to MOOC online platform, and have developed a number of famous MOOC platforms by cooperating with universities, for example, "edX", "Udacity" and so on. MOOC has the following features [2]:

(1) MOOC completely changes the traditional mode of learning and makes a new attempt in teaching model

Traditional learning mode in classroom has become a very standardized teaching process, which meant that students can learn simply by a piece of chalk or a media file. This process is featured with relatively fixed teaching content, programmatic teaching method, and conventional teaching tools. In traditional classroom teaching, teaching time and teaching locations are fixed, all teaching activities have relatively strict management, the learning process is not flexible enough, and the teaching process is relatively uninteresting. With MOOC, classroom teaching has undergone enormous changes, for example, mainly conducted by virtue of hypermedia technology in teaching process, adopted a new innovative teaching mode, broke the limitations of time and place in teaching process, met the individual needs of learners through online learning, enriched teaching content, greatly improved teaching quality, achieved a better online interaction, etc, thus MOOC has been accepted by the majority of learners.

(2) MOOC can increase communication and exchange between school, society and government.

It is the fundamental needs of the current development for schools to establish a modern school system. Due to the restriction of various factors, it has always been failed to create a bridge for schools, civil society and the government to communicate with each other. Yet with the continued development of MOOC, we can effectively solve this problem. Schools can gradually provide and generalize their high-quality teaching resources and academic achievements to our society, which can enhance communication between the government and the society as well. Thus, the functions of the school can be recognized, and the teaching quality can also constantly be improved. Similarly, from the point of view of society and government, schools which are admitted by learners may enjoy richer social support and better running conditions through comprehensive analysis and consideration of learners. All these can achieve the optimal allocation of educational resources, thus conducive to the further development of the modern school system.

(3) MOOC accelerates the internationalization process of education.

By network platform, MOOC provides rich, vivid, flexible online learning resources for learners, which not only breaks the limitations of time and place in teaching process over the past years, but also makes the school truly free from geographical constraints and develop into internationalization as it is possible to increase exchanges between learners from different countries and to achieve the co-building and sharing of educational resources. In addition, MOOC are welcomed by more learners because of its lower requirements for access and learning costs, more abundant educational resources, more flexible approach for learning. All learners could make use of these high-quality teaching resources, thus enabling equitable development of global education and internationalization of education.

3. Characteristics of the Information Construction of Library in MOOC Mode

(1) Changes in the information construction and responsibility positioning of library

Paper documents hold a greater proportion in the past process of information construction of library, and still irreplaceable in its scale and value in MOOC mode. However, the emergence and continuous development of digital information collection has made it an important part of the information construction of library. Also, the gradually more and more important role also makes it an irresistible trend. The major presentation of library collections in the past were physical resources with commodity attribute as the optimal information construction usually cannot be attained influenced by funds, book market and publishing. In addition, as more and more new academic ideas as well as new academic monographs are arising from various developing subjects, just rely

on paper-based resources will be restricted by funding conditions and efficiency due to time delay. Yet the information construction of library in MOOC mode can effectively deal with these disadvantages by using database. We can put fewer funds to get rich and latest academic information and constantly enrich a library's information resources. Thus the intermediary role of conventional books in data acquisition and publishing process will be influenced by changes of information construction in form and content. In MOOC mode, learners enjoy sufficient access authority, information rights and the right to use and diversified ways of obtaining information at the same time, thus the infomediary role of information construction of library is diluted and the resource center , information service center have also been impacted [3].

(2) Diversification of learners' utility pattern for information resources and personalized demand for librarians' services

Rich and various information resources of library including paper-based information resources, digital information resources, network information resources, video and audio resources, *etc.*, make it possible for learners to adopt diversified approaches in using. Especially, learners usually are willingness to access information resources in Internet skillfully. The promotion of MOOC mode allows students to employ a variety of means to obtain information resources, and gradually changes the traditional learning mode with paper-based information resource acquisition. What's more, it also weakens the monopoly position of paper information resources in library and promotes information construction of library as well as the improvement of service delivery model, which will help to build mutual sharing information resources and optimize the configuration of library information resources.

Requirements to library staff from readers also appeared personalization features along with the changing in resources construction mode of information. When using information resources, the new mode can select different types of information resources according to the actual needs. At the moment, each learner can communicate with library staff solely. While library staffs provide services for learners, the sharing of tacit knowledge occupy a greater proportion in the sharing process. Tacit knowledge refer to the experience that library staffs accumulated in the construction process of library information resources, which mainly be showed as the image of the library, the qualities of its librarians, service quality of the library and so on. For the various needs of learners with different characteristics, library staffs continuous accumulate tacit knowledge of library and fit their personalized needs through communication with learners and continually learning from readers [4].

(3) Changes in the concept of library services

In MOOC mode, information resources from library have gradually transformed from entity into digitization, learners' behaviors gradually have developed from traditional lending to online access, and library services also have changed from traditional literature services to knowledge services. Knowledge services can meet the changed actual needs of learners for library information resources, transmit information resources for learners and solve problems encountered in the use of information resources. Compared to conventional information services, knowledge services are more concerned about the settlement of readers' practical problems and stress to push personalized services to readers actively rather than just waiting for readers' coming. It should be noted that readers may not aware of such service pushing as it is combined in their usual learning. In addition, we should also ensure the quality of information services and improve the accuracy of library information resources processing.

4. The Knowledge Discovery Model for the Library Construction in Information Resources in MOOC

In order to promote the rapid development of the library construction in information resources and provide superior information services for MOOC learners, we should explore the relevant data in the tacit knowledge to build the corresponding knowledge discovery model.

Given: a collection of all the items $I = \{i_1, i_2, i_3, \dots, i_m\}$, the item-sets is A, the subset is T, and the unique identification for different corresponding transaction is T_{id} . If there are k projects in A, then A is called the item-set of k . We can define the database as D, and then the ratio of arising times for A in D and the total number of the matters are called item sets for data. And when it is greater than the lowest critical value of learners, we call it large item set. The nature of association rules is logical implication relation, while we can define X and Y , and $XY = \Phi$, X and Y are respectively the antecedent and the final result of this association rule. And for the XY association rule, we can get the concept of credibility and support degree. Credibility represents the strength: $Confidence(XY) = P(Y | X)$; and support degree for frequency of this mode, $Support(XY) = P(XY)$. Here, association rule refers to a rule in which credibility and support degree would suit for the critical value set by learners [5].

To improve the efficiency and accuracy of knowledge discovery, we can adopt granular computing, which combines the rough sets, fuzzy sets and artificial intelligence techniques, to achieve knowledge reduction.

Definition 1: Given the non-null universe U, dataset V, binary relations $B \subseteq U \times V$, and use $\forall p \in V, N(p) = \{u : uBp\}$ to represent the subset of U.

Definition 2: The granule contains knowledge f is described by a binary number equaled to m. When $u_i \in [X]_{IND(r)}$, the i -digit of this binary number is 1, otherwise is 0.

Definition 3: A binary grain matrix (BGrM) is defined as: $\{Y_{p \times m}, X_{q \times m}, C_{p \times q}\}$. Wherein,

$$Y_{p \times m} = \begin{bmatrix} a_{11} & a_{12} & \dots & a_{1l} \\ a_{21} & a_{22} & \dots & a_{2l} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \dots & a_{ml} \end{bmatrix}, \quad X_{q \times m} = \begin{bmatrix} b_{11} & b_{12} & \dots & b_{1l} \\ b_{21} & b_{22} & \dots & b_{2l} \\ \vdots & \vdots & \ddots & \vdots \\ b_{n1} & b_{n2} & \dots & b_{nl} \end{bmatrix}, \quad C_{p \times q} = C_{YX} = Y \cdot X'$$

The algorithm of knowledge discovery based on granular computing are illustrated as follows:

Step 1: Pelletize the decision table based on binary number, and then testify that whether the decision table and conditions are compatible or not through binary matrix operations.

Step 2: Arrange the decision table, delete redundancy and error objects.

Step 3: Analyze all the attributes of decision table, then combine objects with indiscernible relationships and delete superfluous attributes according to their degree of importance.

Step 4: Sort the decision table and analyze the actual attribute value in the table. Delete superfluous ones when there is no affection in distinguishing different objects.

Step 5: Once again arrange the decision table, eliminate superfluous records included in the table and ultimately obtain contracted knowledge.

5. Case Study of Knowledge Discovery in Library Resource Construction

Export learner’s library record including title, bar code and serial number of the book, the borrower’s name, and borrowed time and so on and ultimately get the decision information table after discretization of selected data. We can see part of the data in Table 1. The domain of discourse U represents corresponding borrowers, $C = \{C_1, C_2, C_3, C_4, C_5\}$ means condition attribute, and $D = \{D_1, D_2, D_3, D_4\}$ works as the decision-making properties.

Table 1. Decision Information

U	C					D
	C1	C2	C3	C4	C5	
1	0	3	2	1	0	2
2	1	0	5	0	4	1
3	2	3	0	5	3	3
4	1	3	1	0	4	1
5	0	2	4	5	1	2
6	3	2	0	4	1	3
7	5	3	1	0	2	1
8	3	2	1	2	3	2

We can get a reduced decision information table after calculation according to knowledge discovery based on granular computing, see Table 2.

Table 2. Decision Information Table

U	C		D
	C1	C2	
1	0	3	2
2	1	0	1
3	2	3	3
4	1	3	1

Finally, the associative rule list can be determined. We can see part of the data in Table 3.

Table 3. Associative Rule List

Project	Support degree/%	Confidence coefficient /%
Mathematics, Computer	2.01	13.54
Politics,	3.20	31.92

Language		
Management, Finance	4.54	11.28
Medicine, Chemistry	2.94	15.32

As can be seen from Table 3, some of the books are more popular, thus we can increase the quantities of these books when expanding library collections. The results can offer favorable theoretical basis for sub-information construction of libraries. By analyzing the results, we can know that whether a library's information resources are in shortage or behind the times, then improve personalized service, and promote further development of the construction of library resources and services.

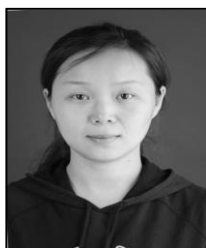
6. Conclusions

The emergence of MOOC brings forward higher requirements to the construction of library resources. To accommodate the actual needs of online teaching in MOOC to information resources, libraries should continue to improve the construction level of information resources, and strengthen service capabilities. Additionally, the application of modern technology should be adopted for libraries in this process, and the learner's individual needs should be considered timely. Based on the present and eyes on the future, then libraries can supply a convenient way to use information for learners in MOOC mode by allocating education resources rationally.

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