Study on Development and Utilization and Service Mode of Scientific and Technological Literature Information in Digital Environment

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Abstract. On the basis of deep analysis and conclusions of the research status and practical work of educational circles, this paper starts study with the guidance of such theories as information resource sharing, information appreciation, information flow model, information construction and risk management. According to the appeals of scientific and technological literature development and utilization in digital environment caused by changes from traditional environment to digital environment reflected in literature review stage, this paper defines the factors and makes analysis, from which it conducts deep research on the development and utilization of scientific and technological literature information in digital environment.

1.Introduction

At present, scientific and technological literature information source exists in the form of “islets” in digital environment, which is the primary cause of “inconvenient search and utilization of scientific and technological literature, and over-dispersion of resources” put forward in utilization survey. According to the theory of information resource sharing, the ultimate goal of inforamtion management is that anybody can gain any information resource from anay information source at anytime and anywhere. Solve scuh problems in systematic isolerism, huge data and difficulties to deal in the integration, sharing and concentrated offer of scientific and technological documenatl information.

2.Analysis on meta-data design of scientific and technological literature

Based on the resource analysis of earlier satge, this paper makes standard literature descriptive sets as 3 element sets, whose relationship is as shown in Figure 1. It describes the inner and outer features of standard literature. Holding element set is mainly used to help find the physical location of academic dissertation installment.

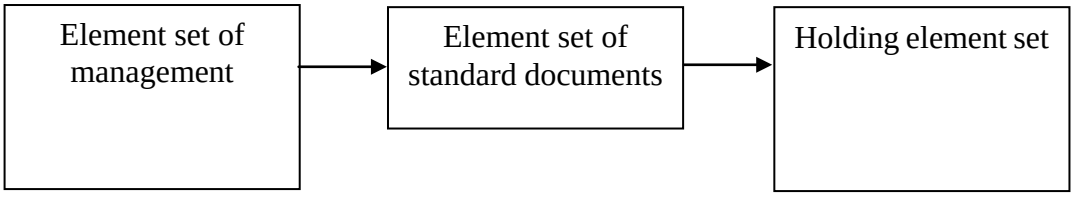

Figure 1: Descriptive set of standard literature

All the tandarud literature (national standard distributed by competent departments of CNS) basically have standard name, No., specification, UDC class number, standard publishing institution, publishing time, implementation date, declaration of standard replacement, responsibility declaration of approval, main body of standard, standard affix, and publishing information of standards. The main information source of collection is title page. The items of different records of single standard literature are standard item number, title and statement, paragraphs illustrate and version, paragraphs, publishing, distribution and morphological, series items, note item, standard number and method to get. In the digital environment, it is necessary to consider users’ daily habits to retrieve on the basis of

focusing on the fixed features of standard literature, giving consideration to the disclosure and exploration of cotents, as well as the design of element sets of standard literature.

Table 1 Element set of standard literature

No.	Chinese name	English name	Necessity
1	标准号	Stand_no	Necessary
2	中国标准分类号	CCS	Necessary
3	国际标准分类号	ICS	Necessary
4	标准名称	stand_name	Necessary
5	关键词	keywords	Necessary
6	标准类型	standes_type	Necessary
7	标准状态	stand_state	Necessary
8	强制力	force	Necessary
9	起草单位	Draft_org	Necessary
10	发布单位	issue_org	Necessary
11	发布日期	issue_date	Necessary
12	实施日期	inure_date	Necessary
13	代替标准	cover_for	Selective
14	采用关系	adopt	Selective

Through resource analysis, scientific and technological research has the feature of literature comparing with ordinary technological research; within literature, it is independent against documentary archives, which is both documental and professional scientific and technological literautre. The relationship is shown in Figure 2.

Figure 2: Descriptive set of scientifc and technological research

Scientific and technological research have specific layout, keeping site and management mechanism. This resaerch designs the element set of metadata of scientific and technological data sets, such as Table 2; at the same time of providing utilization, it shows the property of research in whole, to satisfy the keep demands of literature.

Table 2: Element set of scientific and technological resarch

No.	Chinese name	English name	Necessity
1	文件编号	file_no	Necessary
2	题名	arch_name	Necessary
3	责任者	liability	Necessary
4	关键词	keywords	Necessary
5	版本	edition	Necessary
6	稿次	manu_ sequence	Necessary
7	密级	classification	Necessary
8	保管期限	Keep_erm	Necessary
9	形成日期	create_date	Necessary
10	归档日期	docum_ date	Necessary
11	档号	arch_no	Necessary

Target analysis of the service model of scientific and technological information

The developments in technology, society, idea and scientific and technological information resources lead to the complexity of the environment of users, which makes user demands jump to higher level. Modern users need abundant scientific and technological information resources, clear

information guidance, active methods to provide knowlege, individual and different service methods, convenient communication environment and expert-level guidance, all of which will be the premise of the existence and development of scientific and technological information service in the future. Therefore, it is necessary to insist the idea of “user concentration”, to seek for the utilization service model which supports this idea and satisfies the goal above, so as to provide new impetus and breakthroughs for scientific and technological information service.

1. Heuristic guidance. Researchers sometimes run into some blocks in the process of research, and then they need some inspiration, some inspiration, which can help them out of the woods and make research breakthroughs in scientific and technological innovation. In the fermentation and innovation environment, open and closed methods can be used to conduct heuristic guidance on researchers. Layer and layer in depth, it reveals the tacit link between problems, until we find a satisfactory answer or direction. As shown in figure 1, open heuristic guidance method can be expressed as A - B - C.

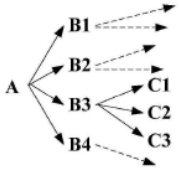

Figure 3 Open heuristic guiding process

Closed method canhelp researchers to verify the hypothesis or search for the correlation of two things. As shown in Figure 2, it is the process to seek for common contact relationship from both ends; this association is recessive originally, which is not established directly between A and C.

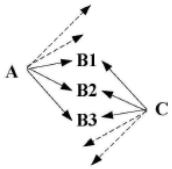

Figure 4 Open heuristic guiding process

Scientific and technological literature information grid structure design

1. Scientific and technological resource block. This group block is the basic guarantee of users using scientific and technological information resources, which is composed of all kinds of resources of science and technology distributed in everywhere of homogeneous and heterogeneous of different kinds. It not only includes scientifical and technological literature information resources, but also includes large computer resources, laboratory and application, and other real entities. It is also the basis of the scientific and technological information grid.

2. Virtual abstraction block. This block is responsible for the virtualization of heterogeneous resources provided by scientific and technological resource group blocks; its purpose is to shield the heterogeneity of the underlying resource, and will further abstract all kinds of scientific and technological resources into various scientific and technological services to offer support for users. Usually the virtualization of resources of science and technology and various cooperative work of different scientific and technological resources can be provided in the form of virtual organization.

3. Business processing block.This block is the core important management tool of the information grid of science and technology, including the service creation, maintenance, and service life cycle management, and other business functions.This study intends to use the pattern of serving the factory in the traditional design pattern. It is responsible for the registration of grid service, searching for and invoking services according to the requirements of usersce.

4. Interactive communication block.This block provides grid security infrastructure (GSI) based on key agreement, single sign-on authentication (SSO), communications limited protection as well as some hosting support. SSO allows the user to set up agency after an identity authentication certificate; later, agent certificate can be applied to any program of remote service authentication. The block

implements the concept of grid service agent (GSP); the main functions of the GSP is access to meet the demand for the user to use the grid service.

XML Schema is the second alternative to describe the standard of XML file after the DTD; it is the language used to define types of XML files, to set XML document data type and organization mode; meanwhile, it is the rich metadata resources at the same time. XML Schema is a form of defining files, having many similar DTD rules, but more powerful than a DTD. There are two main important modes: MicrosoftXML Schema and the W3C XML Schema; this article uses the W3C XML Schema. Here taking patent element as example, this paper provides the definition of metadata XML Schema of literature:

```
<?xml version="1.0" encoding="gb2312" ?>
<xs:schema
 xmlns:xs=http://www.w3.org/2001/XMLSchema
elementFormDefault="qualified" attributeFormDefault="qualified">
<xs:element name="patents">
<xs:complexType>
<xs:sequence maxOccurs="unbounded">
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:element name="patent">
<xs:complexType>
<xs:sequence>
<xs:element name="IPC" type="xs:string" minOccurs="0"
maxOccurs="unbounded">
<xs:annotation>
<xs:documentation>ICS</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="patent_id" type="xs:string">
<xs:annotation>
<xs:documentation>Record number</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="patent_name" type="xs:string">
<xs:annotation>
<xs:documentation>Patent name</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="keywords" type="xs:string" minOccurs="0"
maxOccurs="unbounded">
<xs:annotation>
<xs:documentation>key words</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="patent_type" type="xs:string">
<xs:annotation>
<xs:documentation>Patent type</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="application_no" type="xs:string">
<xs:annotation>
<xs:documentation>Application_No.</xs:documentation>
```

```
</xs:annotation>
</xs:element>
<xs:element name="proclaim_no" type="xs:string">
<xs:annotation>
<xs:documentation>publication number</xs:documentation>
</xs:annotation>
</xs:element>
<xs:element name="proposer" type="xs:string" minOccurs="0"
maxOccurs="unbounded">
<xs:annotation>

<xs:documentation>patent agency</xs:documentation>
</xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
</xs:element>
<xs:restriction base="xs:short">
<xs:minInclusive value="1" />
<xs:maxInclusive value="500" />
</xs:restriction>
</xs:simpleType>
</xs:schema>
```

Other element sets and elements can also be defined syntactically as this.

Those which meet the conditions above are taken as the best time of transformation. The best social and economic benefits can be gained through reasonable allocation of resources, optimization of transportation organizations, and full exploration of transportation ability of urban railway traffic system.

Comprehensive and overall meta-data of scientific and technological literuature is the powerful tool for the indexing, reveal and retrieval of scientific and technological literature; it is also the basis of the whole explroation and utilization. The description of the indexing and reveal of digical scientific and technological literature information is the important means for information exploration. Lastly, the markup of XML language of meta-data can be taken to realize the readability of meta-data.

References

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