

## Research Paper

# Digital Resources Management Based on Open Archival Information System

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### Abstract

**Purpose:** The purpose of the paper is to identify the status of digital resources management in the central library of Allameh Tabataba'i University based on the Open Archival Information System(OAIS) Reference Model Template. **Method:** Essentially we have drawn on an applied case study method. The director and staff of the Central Library of Allameh Tabataba'i University formed our research community. By reviewing the literature and resources available in relation to digital resource management, a six-part log was provided for this research. The data were analyzed by descriptive statistics (calculating abundance, frequency and mean) and interpretation. **Findings:** The Findings were supposed to determine the significance of the 6 subsystems of the OAIS model. Among them, the "subsystem of acceptance and processing" with 90%, the access subsystem with 81%, the subsystem of management with 70%, archiving storage subsystem "with 71%, data management subsystem with 59% , Maintenance and Maintenance Planning subsystem "with 52% percent respectively, were obtained for the digital resources management of the Central Digital Library of Allameh Tabataba'i University. **Conclusion:** The practical applications and significance of this study indicate that this model has considered all aspects of the implementation of a secure digital repository in a library, and Allameh Tabataba'i University, based on its structure, can manage its digital resources. In general, the significance of the four subsystems of the O.A.I.S. (Acceptance, Processing, Access, Management, and Archiving Storage) for the digital resources management of the Central Library of Allameh Tabataba'i University is up to the maximum. And the 2 subsystems (data protection and management planning) are average.

**Keywords:** Digital resources management, Central library of Allameh Tabataba'i University, OAIS Reference Model.

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**Introduction:**

The management of information resources is a concept that, although relatively interdisciplinary, is mainly used by three groups of specialists, including experts in information science, management professionals, and information management professionals (MIS). However, it is itself a speciality in the field of management and MIAs. Information resource management looks at "information" as valuable assets and independent from the organization (like other resources, such as financial, human, etc.). It is natural that each source has cost and value and needs management. The reason behind this outlook is the abundance of information and the need for it for any kind of decision-making process. . Access to information can lead to strength and wealth and create a competitive advantage in business. Therefore, information resource management looks at "information" as a strategic asset and aims to provide the right person with the right information about the quality (or relevant information, accurate, complete, clear and up-to-date) at the right time and place. In other words, the key issue in managing information resources is: " What information is being obtained, at what cost, and to whom does it transfer?" The management of information sources is somewhat synonymous with knowledge management and these two terms are used interchangeably. Sometimes information resource management is also considered an information audit, and sometimes information audit, i.e., identification and analysis of information resources, is considered as one of the sources of information management processes (JamaliMahmoui, 2009 and Zahedi , 2015).In recent years, as many information centers and libraries have digitized their resources, with the advent of new information technology every day various standard storage formats have been created, and old hardware and software have replaced its hardware and software, and This has created a major challenge in long-term access to digital content, so digital lifecycle processes that have a long-term protection and access to one of its parts are important (Samiee, andet.al,2010).

Many of the world's libraries and archives have used the Open Archival Information System (OAIS) ReferenceModel to correctly implement the digital life cycle in their digital libraries and archives, a reference standard, the official standard in the cycle of information . Information circulation in the digital environment was approved by the International Organization for Standardization (ISO) in 2003 under the standard number 14727. The system is an archive that combines the organization of the individual and system, which is responsible for the protection of information and It has been made available to a specific community (Alison, 2006:CCSDS, 2002; Samiei, 2013). This system is one LEGO or the overall framework for building and

maintaining a digital repository of secure digital information for long-term protection and access to digital material (Samiei, 2011; Samiei, 2013).

Many projects have been carried out abroad in the application of this standard model. Like the The National Information infrastructure and preservation program (NDIIPP), with the Digital Information Archival System (DIAS), Digital - preservation-oriented projects such as CEDARS in England, Preserving and Accessing Networked Documentary Resources of Australia (PANDORA) in Australia, the National Library of the Netherlands for information and maintenance, In Australia, Networked European Deposit Library (NEDLIB) in European Union and The National Archives (TNA) and UK Data Archive (UKDA) in the England and other national parliaments use the OAIS Reference Model for the protection of their digital resources (Rasouli and Samiei, 2012; Samiei, 2011; Beedham and et.al, 2004). Also, Samiei (2011), Samiei and et.al, (2010) Lee (2005); Alison (2006); Nordland (2007), ,And McDonald's (2014), both inside and outside the country, specifically examine the concept implications and use of digital resources management in digital libraries and archives (Norland, 2007; Alison, 2006; Mac Donalds, 2014; Lee, 2005; Samiei and et.al, 2010).

Given the importance of the information resources available at AllamehTabataba'i University's Digital Library and the need for uniformity in management, protection, rapid access to information and easy retrieval, it is necessary to have a model for achieving these goals. Since until now, a research on the management of information resources of the digital library of AllamehTabataba'i University has not been conducted based on the OAIS Reference Model, the issue that will be studied in this paper is the review of the OAIS Reference Model Assessment of information resources management in 6 sub-systems of acceptance and processing, archival storage, data management of, Leadership, Protection and Achievement Program, Digital Library of AllamehTabataba'i University. For this purpose, the present research will be carried out to answer the following questions:

- 1- Which of the elements in the ingest section is the OAIS Reference Model?  
Is it important to manage the digital resources of Central Library of *Allameh Tabataba'i* University?
- 2- Which of the archive storage section elements, the reference model of the OAIS, is important for managing the digital resources of the central library of *Allameh Tabataba'i* University?
- 3- Which of the data management section elements, the OAIS Reference Model, is important for digital library management at *Allameh Tabataba'i* University?
- 4- Which element of the management section, the reference model of the OAIS, is important for managing the digital resources of the Central Library of *Allameh Tabataba'i* University?

- 5- Which elements of the preservation and management planning section, the OAIS Reference Model, is important for digital library management at AllamehTabataba'i University?
- 6- Which elements of the Access section, the reference model of the OAIS, is important for managing the digital resources of the central library of *Allameh Tabataba'i* University?

### **Method**

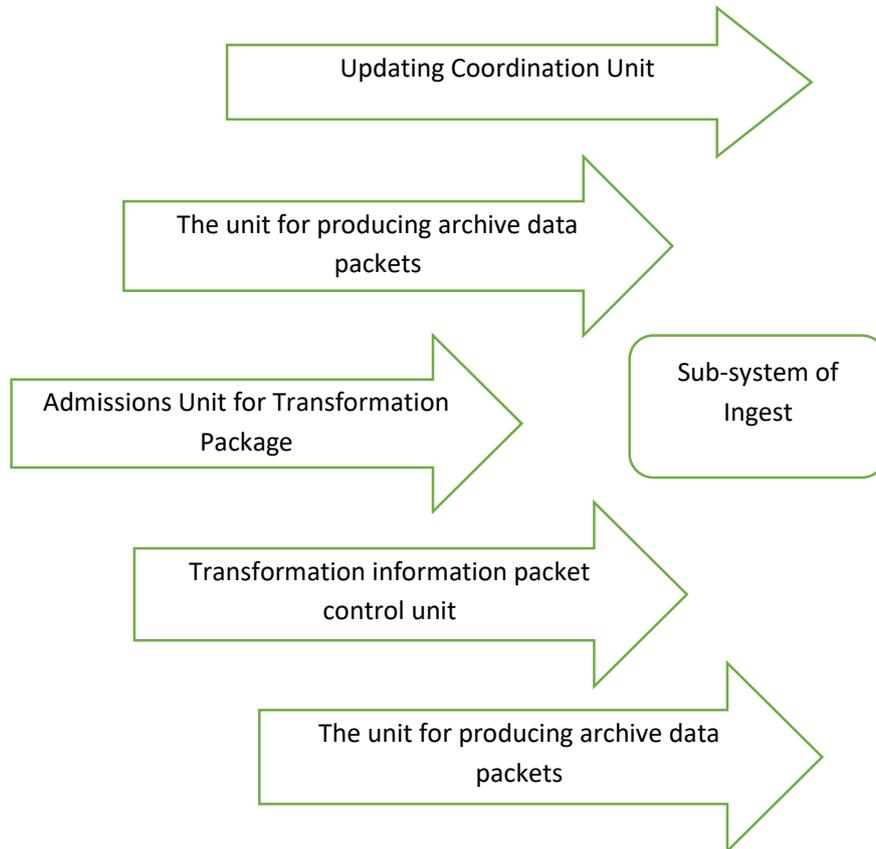
Since the results of this study can be used to manage the digital resources of Allameh Tabataba'i central library, the research is of a practical nature and is a case study in terms of the method. We have used a case study method to analyze the importance of each element of the OAIS model for managing digital resources of the central library of Allameh Tabataba'i.

The statistical population of this research includes the director and staff of the Allameh Tabataba'i Central Library. The total number is 11. All members of the community are experts in the field of library science and information science. And given that the check list consists of 6 main sections, each section is answered by the staff associated with the same department in order to determine the importance of each option for the management of digital resources of the central library of Allameh Tabataba'i .The analysis of the findings was done with descriptive statistics (frequency, frequency percentage, mean).

### **Findings**

**Question 1: Which of the elements in the ingest section is the reference model of the OAIS. Is it important to manage the digital resources of Central Library of *Allameh Tabataba'i* University?**

The subsystem of ingest consists of 5 subunits: units for accepting packet delivery data, controlling the quality of packet delivery information, generating a packet of archive information, generating information and descriptive metadata, synchronizing upgrades.



**Figure 1. Components of the subsystem of ingest**

In response to the first question that considers the importance of the ingest subsystem elements for managing the digital resources of Central AllamehTabataba'i's library, it should be noted that 30 of the questions raised in the subsystem of the ingest of 27 cases have been important. The most important are the "acceptance of packet information" and "information generation and descriptive metadata" units with (100%) and the least importance for the "production of archival package" with (75%). Meanwhile, it is important to "control the quality of packet delivery information" and "synchronize upgrades" with (80%). Also, among the issues raised in this subsystem are the criteria, the control of the packet of information delivered by the virus, the interaction of the unit to produce archive information packet with other system units to obtain additional information required; sending confirmation message after completing the transfer to the archive repository

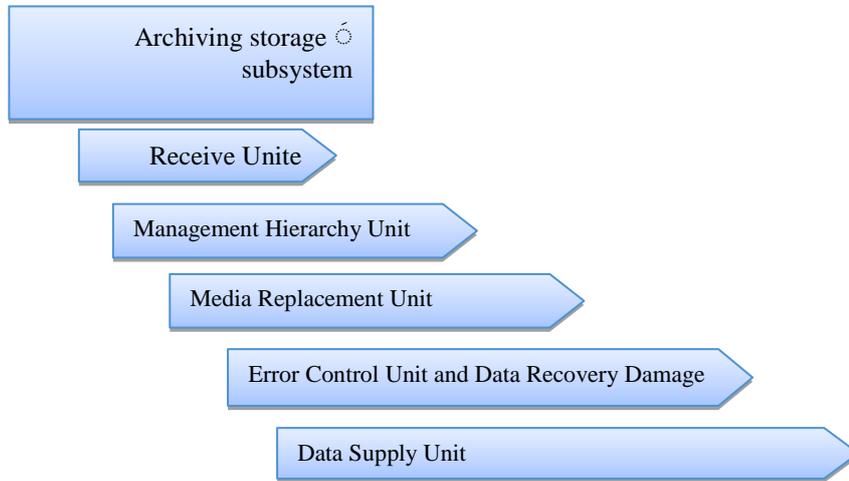
was not considered. . Therefore, in general, the results show that 90% of the elements of the ingest subsystem based on the reference model of the UAIS for managing the digital resources of Central Library of Allameh Tabataba'i are important. The results of this research are important in terms of the importance of the elements of the ingest department with the researches Samiee (2011), Rasuli and Samiei (2012), Beedham and et.al (2004), Lee (2005), Alison (2006), Nordland (2007) .

**Table 1 shows the status of the subsystem of ingest**

Sub-system of ingest												The main criterion
Total measurement		Updating Coordination Unit		The unit for producing archive data packets		The unit for producing archive data packets		Transformation information packet control unit		Admissions Unit for Transformation Package		Sub criteria
percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	assessment's result
90%	27	80%	4	100%	5	75%	3	80%	4	100%	11	important
10%	3	20%	1	0%	0	25%	1	20%	1	0%	0	Not important

**Question 2: Which elements of the archival storage section at OAIS are important for the management of digital resources at central library of Allame university?**

Is it important to manage the digital resources of Central Library of Allameh Tabataba'i University? The archiving storage subsystem allows the storage, repair, maintenance and retrieval of archival packets. This subsystem consists of five sub-subsystems for receiving data, storage management hierarchy, media replacement, error control, recovery and recovery of damaged information and data provision.



**Figure 2. Archiving Subsystem Components**

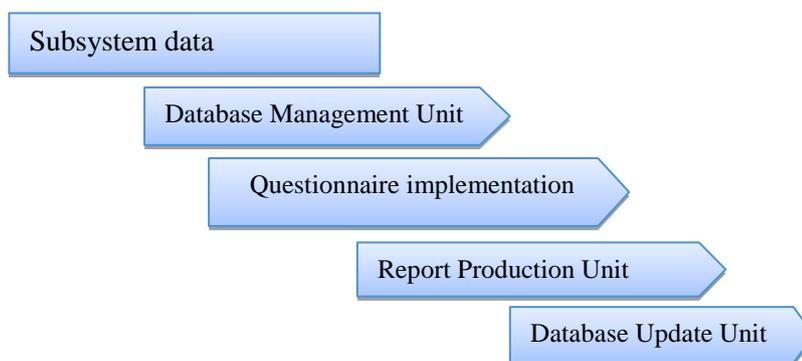
The answer to the second fundamental question, which examines the importance of the archival storage subsystem elements for managing the digital resources of Allameh Tabataba'i 's central library, should be given noting that out of the 14 questions raised in the archive subsystem, 10 cases proved important. The most important are the "received" and "error control and damaged data recovery" units with (100%) and the least important one was "data provision" with (0%). Meanwhile, the "management of storage hierarchy" and "media substitution" are important (67%). Also, among the issues raised in this subsystem, ensuring the requirements for ensuring the appropriate level of archival information packets; updating the corresponding metadata; identifying requested archives; providing archival information packets for access to subsystem to distribute DIPs was not considered. Therefore, in general, the results show that 71% of the elements of the archiving subsystem based on the reference UAE reference model for managing the digital resources of Central Library of Allameh Tabataba'i are important. The results of this study are in line with the importance of the elements of the archival storage section in Samiee Research (2011), Rasuli and samiei (2012), Beedham et.al (2004), Lee (2005), Nordland (2007).

**Table 2. Survey of the status of the archiving storage subsystem**

archiving storage subsystem												Main criterion
General assessment		Data supply unit		Error Control Unit and Data Recovery Damaged		Media Replacement Unit		Hierarchy Management Unit		Receive unit		Sub criteria
percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	assessment's result
71%	10	0%	0	100%	3	67%	2	67%	2	100%	3	important
29%	4	100%	2	0%	0	33%	1	33%	2	0%	0	Not important

**Question 3: Which elements of the data management section in the OAIS Reference Model are important? Is it important to manage the digital resources of Central Library of Allameh Tabataba'i University?**

This subsystem consists of four subsystems database management, query execution, report generation, and database updates.



**Figure 3. Data Management Subsystem Components**

In response to a third fundamental question that examines the importance of the data management subsystem elements for managing the digital resources of Allameh Tabataba'i 's central library, of the 17 questions in the data management subsystem, 10 cases proved important. The most important one

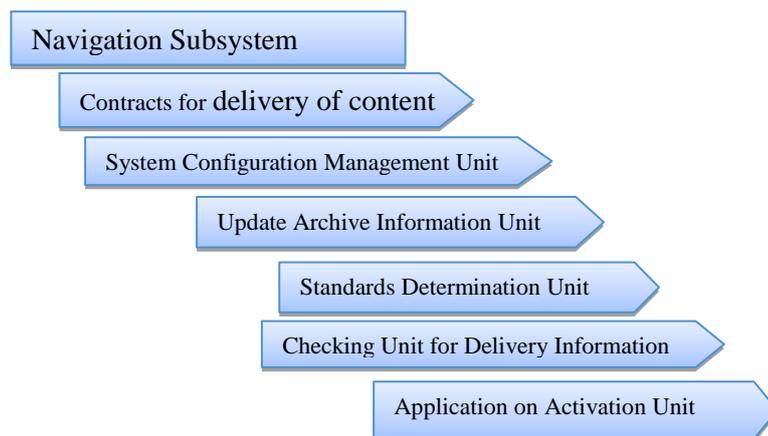
is the Reporting Unit (80%) and the least important is the "Database Update" (40%). questionnaire implementation " is important with (67%) and "database management" (50%).Also, among the issues raised in this subsystem, providing internal validation of the contents of the database; creating and maintaining a database or table for data management; generating a set of results; the ability to create database update confirmation reports; statistics and errors for the access subsystem; acceptance; Updates from other digital storage subsystems (for example, various processing, access or management subsystems); Online updating of records individually by authorized employees; Updating synchronization with metadata in other systems was not considered. Therefore, overall results show that 59% of the elements of the data management subsystem are important for the management of the OIS Reference Model for managing the digital resources of Allameh Tabataba'i Central Library. The results of this study are consistent with the importance of the data management elements of Zahedi (2015) , Lee (2005), Nordland (2007).

**Table 3. Status of the data management sub-system**

Subsystem data management										Main criterion
General assessment		Database Update Unit		Report production unit		Questionnaire implementation unit		Database Management Unit		subcriteria
percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	assessments result
59%	10	40%	2	80%	4	67%	2	50%	2	important
41%	7	60%	3	20%	1	33%	1	50%	2	Not important

**Question 4: Which of the elements of the Navigation Section at OAS Reference Model are important for the management of digital resources in the central library of Allame Tabatabaee University ? Is it important to manage the digital resources of Central Library of Allameh Tabataba'i University?**

This subsystem includes 6 subcontracting of the content delivery contract, system configuration management, updating archival information, setting standards, policies and procedures, reviewing delivery packages and activating requests.



**Figure 4: Components of the navigation subsystem**

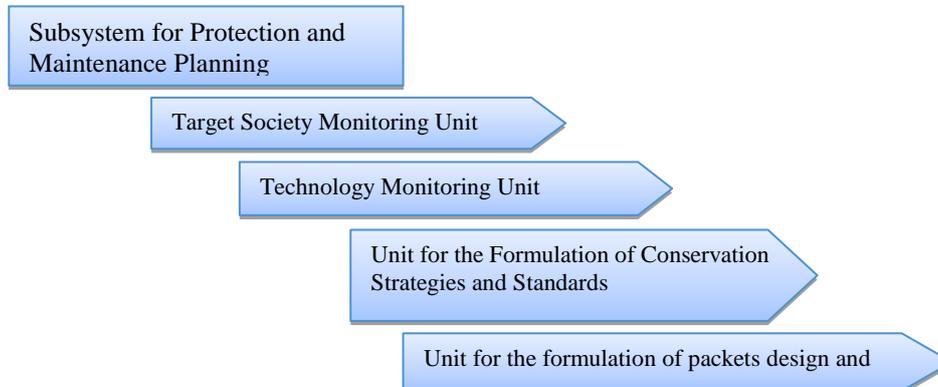
In response to the fourth fundamental question, which considers the importance of the subsystems for digital resources management of Allameh Tabataba'i central library, it should be noted that out of the 34 questions 24-items proved important. The most important ones are the "System Configuration Management" and "Checking the Deliverables Package" with (78%) and the least important one is "archiving update" with (40%). Meanwhile, the "content delivery contract" and "review of the delivery package" (75%) and "activation requests" are important (67%). Overall, the results show that 70% of the subsystem elements of Leadership are important based on the reference model of AIES to manage the digital resources of AllamahTabataba'i's central library. The results of this study are consistent with the importance of the elements of the planning (planning) section of Rasouli and samiei (2012), Nordland (2007).

**Table 4: Survey of the status of the sub-system**

Navigation subsystem														Min crite rion
General assessme nt		Applicati on activation unit		Checking unit for delivery informati on		Standard s Determin ation Unit		Update archive informati on unit		System Configur ation Manage ment Unit		Contracts for the delivery of content		Sub crite ria
perc enta ge	freq uenc y	perc enta ge	freq uenc y	perc enta ge	freq uenc y	perc enta ge	freq uenc y	perc enta ge	freq uenc y	perc enta ge	freq uenc y	perc enta ge	freq uenc y	Asse ssme nt result
70%	24	67%	2	75%	3	78%	7	40%	2	78%	7	75%	3	impo rtant
30%	10	33%	1	25%	1	22%	2	60%	3	22%	2	25%	1	Not impo rtant

**Question 5: Which elements in the Protection and Maintenance Planning Section at the OAI Reference Model are important for the management of digital resources?**

Is it important to manage the digital resources of Central Library of AllamehTabatabai University? This subsystem consists of four subsystems for monitoring the target community, monitoring technology, formulating strategies and standards for preservation, designing packages and migration solutions.



**Figure 5: Components of the protection and maintenance planning subsystem**

In response to the fifth question, which considers the importance of the elements of the preservation and management planning subsystem for managing the digital resources of AllamahTabatabai's central library, of the 25 questions raised 13 items proved important . The most important thing is for the "target community monitoring" unit with (78%) and the least important one for "technology monitoring" with (0%). In this regard, the "drafting of preservation strategies and standards" is important (67%), and only (30%) of the unit "Package design and migration solutions" was recognized.

Among the issues raised in this subsystem, monitoring the preservation of architecture and computer platforms (hardware and software) to identify new technologies for preventing system aging; monitoring metadata standards and data relationships; obtaining abstract consumer comments from the system Guidance; Submitting recommendations on system evolution to the management subsystem; Receiving and reviewing the damaged information retrieval policies and procedures from the management subsystem; Providing SIP delivery and AIP archiving forms for the management subsystem; Provide advice, customize Check the packages SIP or AIP archiving information about the application of these designs to the management subsystem; the creation of new AIP archive packet designs in response to the purpose of migration; the creation of pro module software in response to the data migration needs; the development of test plans in response to data migration needs ; Developing a review plan for related groups in response to the data migration needs; Developing implementation plans for the archiving of the new AIP archive packet in response to the data migration needs were not considered. Therefore, in general, the results show that 52% of the elements of the preservation and management planning subsystem is important based on the reference model of OAIS for managing

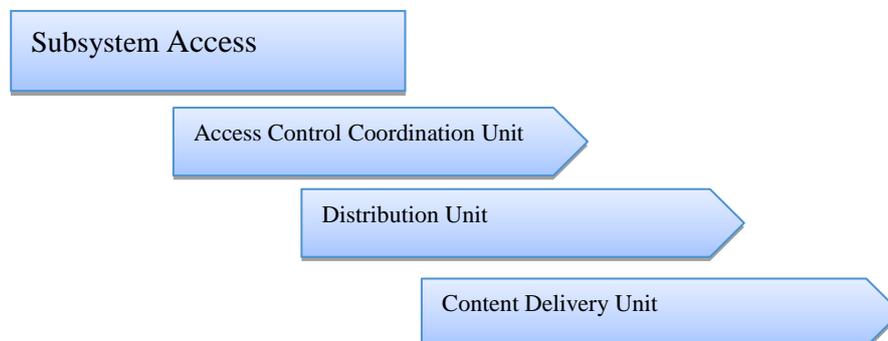
the digital resources of AllamahTabatabai Central Library. The results of this research are important in terms of the importance of the elements of the preservation and preservation planning section with Samiee research (2011), Rasuli and Samiei (2012), Beldam and et.al (2004), Lee (2005), Alison (2006), Nordland 2007), McDonald's (2014).

**Table 5. Survey of the status of preservation and preservation planning**

Subsystem for protection and maintenance planning										Main criterion
Total measurment		Package design and migration solutions unit		Unit for the formulation of preservation strategies and standards		Technology Monitoring Unit		Target Society Monitoring Unit		subcriteria
percen tage	freque ncy	percen tage	freque ncy	percen tage	freque ncy	percen tage	freque ncy	percen tage	freque ncy	Assessment result
%۵۲	۱۳	%۳۰	۳	%۶۷	۶	%۰	۰	%۱۰۰	۴	important
%۴۸	۱۲	%۷۰	۷	%۳۳	۳	%۱۰۰	۲	%۰	۰	Not important

**Question 6: Which elements of the access section at the reference model of the OAIS are important for the management of digital resources ? Is it important to manage the digital resources of Central Library of Allameh Tabataba'i University?**

This subsystem consists of 3 subsystems for coordinating access functions, generating a distribution packet, and delivering content.



**Figure 6. Access control sub-system components**

In response to the sixth question, which considers the importance of the access subsystem elements for managing the digital resources Allameh Tabataba'i 's central library, it should be noted that out of the 43 queries raised in the access subsystem, 35 cases have been important. The most important thing is for the "coordination of access functions" (91%) and the least important for the "production of distributive package" (40%). Meanwhile, content delivery is important with 60%. Among the issues raised in this subsystem are the creation of employees to edit and delete metadata; the ability to combine search results with library inventory; the availability of search through engines Search outside of the system such as Google and Yahoo in accordance with the library policy; Receiving content delivery requests; Retrieving archive archives from the archiving subsystem; Sending a copy of it to the temporary storage environment for subsequent processing; Distributing the information packet Prepared in the temporary storage environment and send a message to the Preparatory Access Control Coordination Unit. In general, the results showed that 81% of access subsystem elements are based on the reference model of OAIS for the management of the digital resources of the central library of Allameh Tabataba'i. The results of this study are consistent with the importance of the accessory elements with researches of Rasooli and Samiei (2012), Zahedi (2015), Alison (2006), Nordland (2007).

**Table 6. Survey of access status**

Access subsystem								Main criterion
Total measurement		Content Delivery Unit		Distribution Unit		Access Control Coordination Unit		subscriber
percentage	frequency	percentage	frequency	percentage	frequency	percentage	frequency	Assessment result
81%	35	60%	3	40%	2	91%	30	important
19%	8	40%	2	60%	3	9%	3	Not important

### Conclusion

Utilizing the Open Archiving Information System (OAIS) Reference Model can have significant benefits to libraries and archives, and support the process of long-term protection and information accessibility in an appropriate manner. This template provides the management of information resources in a secured digital library. The beneficial feature of this template is compliance with the policies and procedures for long-term protection and secure and continuous access to information in a digital resource management process (Semple, 2015 ; Samiei, 2011). This information system provides a general framework for the construction and maintenance of digital information storage for long-term protection and access to digital material. The results of this study indicate that this model has considered all aspects of the implementation of a secure digital repository in a library, and Allameh Tabataba'i University, based on its structure, can use it as a native to manage its digital resources. Implement and implement. This template, in addition to the general processes that can be performed at each stage of the information management, defines all the subsets and operations that must be performed at each step on the information sent to the digital repository.

-- Success in the ingest stage, which determines the interaction between the digital library's reservoir and the information assigner, makes the tank capable of controlling the content. Considering that 90% of the elements of the ingest subsystem based on the reference model of OAIS are important for the management of the digital resources of the central library of Allameh Tabataba'i , it is suggested that 5 units of acceptance of the packet of information, the control of the quality of the package of delivery information, the production of archive information packet, the production of information and descriptive metadata, the synchronization of updating in the management of digital resources of the central library of Allameh Tabataba'i University be considered.

- There is always minimal provision for long-term protection of digital resources, but if these conditions are not enough or do not go along with the advancement of technology then maintenance is not guaranteed. Considering that 71% of the elements of the Archiving subsystem based on the reference model of OIS are important for the management of digital resources of the central library of Allameh Tabataba'i therefore, in order to ensure and guarantee the protection, it is suggested in accordance with the research findings, the data acquisition units, the storage management hierarchy, media replacement, error control, and the recovery and recovery of damaged information under the archival storage system in the digital resources management process of the Central Library of Allameh Tabataba'i University be considered.

- Descriptive metadata are maintained to support the search and retrieval of archived content and the management of internal operations. According to the results of the research, 59% of the data management subsystem elements are important based on the reference model of OASIS for managing the digital resources of Allameh Tabataba'i Central Library. In order to conduct the digital resources management process of the Central Library of Allameh Tabataba'i University as standard and correct, it is suggested that database management units (metadata), query execution, report generation be included in the digital library data management system.

-The critical component of each library is its resource management function, because all functions of the digital library, such as guidelines and guidelines for the delivery of resources, system configuration management, archival archive updates, and application acceptance, are included. Therefore, the inappropriate performance of this section affects the performance of the entire sections. According to the results of the research, 70% of the elements of the governance subsystem based on the reference model of the UASIS for managing the digital resources of Central Allameh Tabataba'i 's library are important, and for the proper implementation of the subsystem management it is suggested that the units of the contract for the delivery of content, manage system configuration, update archival information, set standards, policies and procedures, review the delivery packages in the digital resources management system of Central Library of Allameh Tabataba'i University.

- Based on the reference pattern and opinions of the experts in the library's digital library, current, accurate and documented strategies must be proven . This should be clear, comprehensive, current, and usable, so considering that 52% of the elements of the OASIS Reference Framework for Protecting and Protecting the Subsystem is important for managing the digital resources of the Allameh Tabataba'i Central Library. Therefore, in order to properly manage the digital resources in the central library of

AllamehTabataba'i University, it is recommended that the subsidiaries of the target community be monitored. Formulation of preservation strategies and standards, elaboration of packaging designs and migration strategies of the reference model of the OAIS must be considered.

- The access section provides the minimum level of metadata that allows digital objects to be mapped and managed in the system. This metadata helps locate request, receive and deliver content in the archives. Therefore, based on the findings of the research, that 81% of the access subsystem elements based on the reference OAIS reference model for managing the digital resources of Central Library of Allameh Tabataba'i, seems to be the use of the proposed elements of the library in Providing information packets and providing appropriate access levels to meet the needs of their users:

- controlling access to data based on various authorized levels (such as general users; metadata production librarians; digital file support and maintenance staff; system administrator)
- Definition of the terms of access to digital objects individually or collectively
- Ability to search for images, multimedia, full text with standard search operators and advanced search
- The availability of objects in the storage for automated functions such as data mining or auto resource retrieval
- The system should provide metadata for the collection of existing protocols such as OAIS
- Ability to perform correlated search through various sites
- Functions (subject matter updates, number and resources used, corrective notes, etc.), forms (email, RSS, podcast, etc.), dynamic selection of delivery media without re-requesting, restrictions
- Providing a wide range of standard formats for displaying and enabling the user to personalize the display of search results
- Providing access to a suitable copy of the document (image, video, etc.) for the user
- Availability of access to other caches or systems for collecting web-based metadata based on automated library access standards and protocols.
- Supporting different languages and non-roman lines in search and retrieval and display
- Accessing all copies of the digital object in the repository
- Send request reports to the subsystem of data management and get relevant metadata
- XML output for batch downloads.

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