Implementation of Electronic Resource Management System: A Case Study of Central Library, IIT Delhi

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Abstract

The share of electronic resources in library subscriptions has been increasing over a period of time. Academic institutions worldwide spend significant amounts on electronic resources, including e-journals, databases, and eBooks. Global research indicates that the management of electronic resources is very complex, and the workflows associated with them differ from the workflow of print resources. Although electronic resources have been around for almost two decades, librarians are still trying to figure out the most effective way to handle them. The study suggests that many non-compatible stand-alone systems are used to manage electronic resources. Library Management Systems (LMS) and Library Services Platforms (LSPs) cannot manage electronic resource workflow. Electronic Resource Management Systems (ERMS) can be used to manage electronic resource workflow. However, cost is an important factor in not using commercial ERMS. This study examines the implementation of open-source ERMS CORAL in the Central Library, IIT Delhi. It discusses the steps involved in the implementation stages and the problems faced while implementing the system. It also discusses the features of CORAL. This study also finds improvements in electronic resource management after the implementation of ERMS CORAL. This study will be beneficial for those institutes that are looking for the implementation of CORAL.

Keywords: CORAL, Electronic Resources, ERM, Electronic Resource Management System, Open-Source Software

1. Introduction

The dramatic increase in electronic resources made available by publishers and suppliers has altered the traditional methods through which libraries acquire different reading materials (Pilgrim and Dolabaille, 2011). A study published by Tripathi and Jeevan (2013) estimated that 86.5% of journal titles in the arts, humanities, and social sciences were available online, whereas the percentage for science, technology and medicine was 96.1%. Most libraries have increased their budgets for acquiring electronic resources reflecting the increasing importance of these resources. It was estimated that, by 2020, digital resources may account for as much as 80% of all spending in academic libraries (Fluvog *et al.*, 2015). Many factors are driving the shift from print to electronic resources. These factors include early publication, convenient download possibilities, search capabilities, hyperlinking, multimedia elements and 24/7 access, and, in most cases, secure access outside the campus. Users have also significantly benefited from e-resources because of their integral characteristics, like simple navigation, rapid availability, and seamless compatibility with different devices. Despite all these positive characteristics, difficulties in their management have arisen because of their inherent nature. As Rinck pointed out that managing electronic subscriptions is increasingly time-consuming and complex (Rinck, 2017). Due to the unique characteristics of electronic resources, the same management principles which apply for managing print resources cannot be applied for managing e-resources. Recent studies have shown that users use e-resources at all levels in an organization (Bentil *et al.*, 2022). A study conducted by Nihar K Patra

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on 38 management libraries in India found that these libraries had implemented library automation software, but they were missing some vital operational procedures with respect to electronic resource management (Patra, 2017). Studies have also highlighted the number of non-consistent options available to library professionals for managing electronic resources. Librarians do not keep data in a single location (England, 2018). Depending on resource type and librarian's preference, spreadsheets, emails, shared drives, and even paper files were utilized as archival medium (England, 2013). Branscome's results of an online poll of academic librarians on managing electronic resources in 2011 revealed that librarians employed over 30 other technologies (Branscome, 2013). A survey of 343 academic libraries showed that most of these libraries spend between 25% and 75% of their time managing Electronic Resources (ER) (Abrams, 2015). Three Library Services Platforms (LSP), namely Alma by Ex Libris, WorldShare Management Services (WMS) by Online Computer Library Centre (OCLC), and Sierra by Innovative were analyzed by Singley and Natches. They discovered a gap in ERM workflows involving these platforms, with many ERM- related tasks still being handled separately from these LSPs. Their research indicated that ERM is complicated, and authors were unsure if it can be automated or will always be cumbersome and time-consuming (Singley and Natches, 2017). In a survey of 196 participating academic institutions worldwide, Hawthorne and Watson, found that 47% of respondents mentioned a higher cost, lack of interoperability, and a lack of adaptation to local demands in the ERMSs. The study revealed that the available ERMSs on the market were not a panacea for ERM issues (Hawthorne and Watson, 2004). Open Source ERMS is essential for librarians and electronic resource managers, as stated by Emery and Stone in Technique for Electronic Resources Management (TERMS) (Jill and Stone, 2013).

2. Literature Review

Academic libraries are reorienting their collections and collection development policies in light of electronic resources (Verma *et al.*, 2021). The workflow of e-resources cannot be supported by conventional library management systems (Emery *et al.*, 2004). Electronic resources are much more complicated than print serials

(Lam, 2001). The maintenance of ER needs significant financial inputs, and managing ERs is a difficult task. For this reason, librarians are worried about how to manage these resources efficiently to promote their use (Bentil *et al.*, 2021). Bentil, in 2021, citing Wadekar and Nagarkar (2018), noted how Indian university libraries manage their electronic resources. According to the study, university libraries were trying to embrace ERs. Some of the observations made were: the absence of standard operating methods, collection development and preservation standards, user requirements evaluations, negotiation skills for ER acquisition, and a lack of a competent workforce (Bentil *et al.*, 2021). Despite the universal acceptance of the criteria in the 2004 Electronic Resource Management Initiative Report, Electronic Resource Management Systems (ERMS) have yet to satisfactorily address the challenge of managing electronic resources (Heaton, 2020). Despite the benefits that ERMS provide, many organizations, particularly in developing nations, have not yet implemented ERMS due to a lack of budget, expertise, skills, and understanding of the advantages (Hawash *et al.*, 2020).

3. Methodology

A survey of 70 CFTIs was conducted to know the current electronic resources management practices, the issues they faced, their willingness to implement Open source ERMS CORAL, and the modules they require in an ERMS. The study also finds the existing infrastructure of these institutions. ERMS CORAL was implemented and tested in IIT Delhi Central Library.

4. Results

Overall, 94% of institutes feel that the electronic resources' management approach differs from that of print resources. 70% of institutions feel that substantial time is involved in managing the complex lifecycle of electronic resources. 91% of institutions opined that there is a need for ERM policy. All the institutes did not have an ERM policy documents. Most institutions used Library Management System (LMS) KOHA, and some were planning to migrate from the existing LMS to KOHA. No institution under study was using any LSP. Only two IITs were using some modules of ERMS CORAL.

The institutions faced various issues with their current practices of electronic resource management. The most prominent issue was the existence of many stand-alone, resource evaluation-related issues and scattered communication. The cost was the main reason for not using any ERMS. There was also the issue of no trained staff and a lack of infrastructure. On the question of whether they were willing to use ERMS CORAL, 90% of institutes were willing to use CORAL. On a question about the need for different modules in an ERMS, all institutions under study mentioned the need for the following modules in an ERMS:

(i) Licensing (79%) (ii) Management (79%) (iii) Organisation (71%) (iv) Resources (87%) (v) Usage statistics (83%). Regarding familiarity with information technology 84% of institutes are familiar with Linux OS, 73% with MySQL and 54% with Apache Tomcat.

5. ERM Practices at IIT Delhi for Electronic Resource Management

For managing electronic resources workflow partial and fragmented ERM workflow was followed with much emphasis on ordering and renewal. Licenses were kept in a paper file, and the entire license had to be referred to when any information was needed with respect to any particular clause in the license agreement. There was no metadata for the license agreement. Various communication channels were used, resulting in scattered and fragmented communication. All these practices led to various issues concerning the management of electronic resources.

6. Implementation of CORAL ERMS

The major components for the journey of implementing CORAL as ERMS for the Central Library, IIT, Delhi are as follows:

6.1 Central Library IIT Delhi Decided to Use ERMS with the Following Wish List

- A centralized location for all types of information
- Centralized communication

- Overcome many stand-alone systems
- Improve and complete the practice of ER workflow and eliminate potential gaps in workflow
- A centralized database for license agreements
- Simplify License Agreement information
- Centralized Usage Statistics
- Minimize the issues faced to the maximum extent
- Easy to use.

An implementation plan was prepared with two LIS professionals and one computer professional.

6.2 The Team Members Met and Performed the Following Activities

- Worked on detailed ER workflow
- Decided to use CORAL
- Overall customization of CORAL
- Decide naming structure
- Customized fields of the required module
- Tested its functionality
- Decided what to enter under the different module
- Decided which expressions to gather in Licensing
- Tested workflow with data

The reasons behind the selection of CORAL were the following:

- Simple Web Interface
- Hierarchal structure
- No Cost Involved
- Open source
- Modular structure
- Tested product in many libraries abroad
- Powerful search functionality

7. Installation and Customization of CORAL at Central Library IIT Delhi

To install Coral-ERM, there are certain prerequisites that must be met. These include PHP 5.5 or above, required PHP extensions such as gettext, mbstring, and mysqlnd, MySQL 5.5 or above (or an alternative such as MariaDB 10 or above), Apache 2.2 or above with the "AllowOverride" directive set to "All", and server space requirements of 2 CPUs, 20 GB of disk, and 2 GB of RAM. Meeting these requirements is essential for the successful installation of Coral-ERM (GitHub, 2022).

7.1 Cloud System and System Specification Used by Central Library, IIT Delhi

IIT Delhi has a cloud system for high-performance computing called "BAADAL".

In this regard, Central Library requested cloud space on BAADAL Cloud System of IIT Delhi with the following machine specification: RAM: 8 GB, CPU: 8 Core, HDD Space: 80 GB, and OS: Ubuntu 20.04 Desktop amd64. This specification will meet all requirements of CORAL-ERM.

7.2 Prerequisites Software Used and its Version

Apache 2.4 is the server software used, while PHP 5.6 is the scripting language used with all PHP extensions of version 5.6. To ensure compatibility, the depreciated repository of PHP 5.6 and MySQL 5.7 has been added. MySQL 5.7 is the database software used, with the depreciated repository also added. This ensures that the system is running the most up-to-date versions of the software, ensuring optimal performance.

7.3 Coral ERM Version Used in Central Library IIT Delhi

The Central Library IIT Delhi is using CORAL 2020.09, which was downloaded from the GitHub repository. CORAL 2020.09 is the latest version of the software, providing users with the most up-to-date features and bug fixes.

7.4 Installation Process

The installation process involved copying all the files to the respective locations on the Apache Server and following all the steps of the Coral Community using "CORAL Web Installer". After completing all the steps, the software was successfully installed and customized for the Central Library, IIT Delhi (Figure 1).

7.5 Customization for Central Library IIT Delhi

The landing pages have been updated with the Central Library, IIT Delhi logo and label. The logout page has also been customized to suit the library's needs better.

Figure 1. Main interface of CORAL.

Figure 2. CORAL at Central Library, IIT, Delhi.

Table 1. CORAL configuration at Central Library, IIT, Delhi

Problem	Reason	Solution
PHP codes were not compiled and displayed backend codes after installation	The latest PHP version was not supported (Done experiment using PHP-8, PHP-7, PHP-6)	Only PHP 5.5 and 5.6 were supported
Not communicating with Database	The latest version of MySQL was not supporting	MySQL 5.7 was supported
File uploading error	Default root permission issues with ubuntu.	Issue Read-Write permission on a specific directory
SUSHI error	Proxy network issues on BAADAL	Setup proxy environment for the machine

Additionally, some default codes on coral have been corrected, and CSS codes have been customized. The image for the background has been replaced and read and write permissions have been enabled for some directories which are mandatory, such as the SUSHI saving folder and the document uploading folder (Figure 2).

8. Issues Faced while Installing

However, some issues were encountered while installing the Coral-ERM. Table 1 summarizes the issues faced and their solution.

9. Main Modules of CORAL

Licensing Module: Licensing module has a provision to access digital copies of ongoing and expired licence agreements and other pertinent documentation. The Licensing module is a flexible document management system that enables organisations to plan for future licensing and agreement requirements. The capabilities include signature tracking, organisation and consortium association, and document attachments. The Licensing module has an extension that displays the licence terms when a user requests a particular resource. This simple extension is an excellent resource for anyone working in the field of interlibrary loans. Apart from this, one can compare the licences the terms and conditions of licences of different resources using this module.

Management Module: The Management module holds documents about the management of electronic resources, such as policies, processes, and procedures.

Each document is stored in a separate record and can be assigned a type. When a new version of a document is created, the prior version can be kept as a record of the document's evolution. A document record permits the creation of notes that can be linked to a specific document version (CORAL Working Committee, 2017).

Organisations Module: The Organisations module provides a convenient solution for managing contact and account information for publishers, vendors, consortiums, and other entities. The organisation module has a robust administrative interface for customisation. Features include aliasing for acronyms and name modifications, and a parent-child structure.

Resources Module: The module provides access to a robust database for monitoring information regarding the organisation's resources. It features a workflow tool that can be customised to monitor, delegate, and finish the workflow tasks of a resource. Due to its administrative front end and scalability, the Resources module can be adapted to meet a variety of purposes. It is possible to search for resources, export data to MS Excel, and import information. The CORAL Resources module is capable of operating independently without other modules. However, the Licensing and Organisations modules are also integrated with the Resources module to expedite the retrieval of pertinent licensing papers and contact/account information.

Usage Statistics Module: The usage Statistics module supports COUNTER reports, and any non-COUNTER report is changed to a counter-like style. In the Organisations module, any platform or provider can be associated with a specific organisation, which will

import all related account information. Consequently, organisations can function as a single entry point for all administrative account data.

10. Advantages after Installation

These are the advantages after the installation and use of CORAL:

- Central Library created ER workflow
- Better clarity for lifecycle of E-Resources
- The number of stand-alone systems reduced
- Fast retrieval of the required information
- Less deficiency on one person
- Upload Licenses and other related files
- No consultation of License Agreement (LA) paper file every time
- Point-wise comparison of LA expressions of different publishers
- Way opens for further improvement of the system
- Effect on overall functionality efficiency

11. The Future Course of Action

These are the following future course of action planning:

- Setting up the automatic Email configuration
- Configuration of LDAP authentication
- Knowledge base integration
- Workflow improvement
- Complete Licence Agreement digitisation and metadata creation
- Integration of CORAL and KOHA (if needed)

12. Conclusion

The management of electronic resources is a complex process and many steps under different workflow stages were not being performed by the institutes under study. The findings of the study are similar to the findings of other studies conducted by different scholars elsewhere. The institutions use various systems to perform electronic resource workflows. Non-adherence to standard workflow steps of the electronic resource life cycle and the use of many systems lead to various issues like scattered communication, the existence of many stand-alone systems, the non-availability of metadata for license terms and conditions, resource evaluation-related issues,

overlapping of resources, and access management-related issues. For the management of the workflow of electronic resources, various non-compatible systems were used. Electronic Resource Management Systems are needed for better ERM, but due to the high cost of commercial ERMS, they are not being used. Most of the institutions under study want to use the open-source ERMS, CORAL. The requirements of different modules and the associated features under these institutions are also similar in nature. There are five main modules required in an ERMS by institutions, with various associated features under each module. After the use of ERMS CORAL, electronic resource management practices have been improved at the Central Library of IIT Delhi.

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