Practices for Enhancing the Role of Institutional Repositories: Integration and Reuse of Multidisciplinary Educational Resources

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Abstract

Based on a literature review of institutional repositories, this research compares the institutional repository functionalities of multiple university libraries in Hong Kong and the National Science Library in Beijing. The design encompasses: expanding institutional repository functionalities according to user workflows; redesigning the institutional repository homepage based on user behavior; considering an email authentication system; adding cross-institutional search capabilities; and integrating Web 2.0 service elements into institutional repositories. Through participant observation and case study methods, an industrialized production line is proposed: planning, publicizing, and hosting events; collecting, organizing, and classifying library activities; and managing, retrieving, and providing network services. This workflow can transform library activities into online educational resources.

Full Text

Abstract

Based on a literature review of institutional repositories (IRs), this study compares the IR functionalities of multiple university libraries in Hong Kong and the National Science Library in Beijing. The proposed design framework includes: (1) extending IR functions according to user workflows; (2) redesigning IR homepages based on user behavior; (3) implementing email authentication systems; (4) adding cross-institutional search capabilities; and (5) integrating Web 2.0 service elements into IRs. Employing participant observation and case study methods, the research proposes an industrial production line—encompassing planning, promotion, event execution, collection, organization, classification of library activities, and management, retrieval, and provision of web services—to transform library activities into online educational resources.

Keywords: learning objects; open access; library activities; knowledge management; institutional repository

1. Introduction

Traditional education and training rely on the "Three Ts" model: Talk, Text, and Test. While this approach produces top-tier professionals, graduates entering the workforce must collaborate with colleagues from diverse disciplinary backgrounds. In the past, students trained through such specialized programs could immediately engage in professional work upon graduation. However, in today' s rapidly changing society driven by technological advancement, these graduates may struggle with effective communication, mutual understanding, and collaboration across disciplines.

To address this potential threat, educational initiatives have begun promoting interdisciplinary training alongside specialized skill development, providing students with opportunities to appreciate, learn from, and communicate with others. As central hubs for educational resources, libraries bear the responsibility of collecting, organizing, and managing information. A common challenge facing all libraries is how to maximize the utility of limited resources—both materials and physical space.

Libraries conduct numerous activities, including exhibitions, lectures, seminars, symposia, orientations, and training sessions. These events generate substantial archives before, during, and after their execution, encompassing text, images, video, and audio formats—all possessing educational value. To properly manage these educational resources and maximize their impact on knowledge management, cultural development, and inter-departmental collaboration, this study presents a comprehensive workflow for archiving and displaying library activity records.

This paper employs multiple case studies to examine the entire process from library activity planning and promotion to the collection, organization, and curation of outcomes. To foster an environment conducive to multidisciplinary training, the Run Run Shaw Library at City University of Hong Kong collaborated with the Chinese Culture Center and the Department of Architecture and Civil Engineering to organize a student works exhibition. The library provided venue and event planning support while systematically organizing the outcomes for access by faculty, students, and external stakeholders. Additionally, a series of lecture events featuring scholars and experts was organized. Drawing from experiences in exhibition and lecture management, educational resource collection, and information organization, this research develops a management system and retrieval framework to support the transformation of library activities into online educational services.

2. Related Research

On the integration of digital libraries and virtual learning environments, Sirje Virkus et al. (2009) reviewed relevant literature in LISA from 2000 to 2008, identifying trends toward collaborative approaches, resource reusability, cross-search functionality, time-saving for academics, and librarian-student relationships [1]. Regarding IR implementation in libraries, Ashalatha Laxminarsaiah et al. (2007) discussed the selection process and outcomes of choosing DSpace over Archimede, CERN, E-Prints, and Greenstone for IR development, along with metadata conversion issues [2]. Plato L. Smith II (2007) examined IRs' mediating role between digital object description and researchers [3].

John C. Kelly (2007) addressed cost-saving strategies for IR implementation in resource-constrained institutions [4], while Marinne A. Buehler et al. (2007) identified numerous "gray areas" between organizational archives and institutional repositories warranting future research [5].

In open access and IR policy development, Elisavet Chantavaridou (2009) [6] and Andreas Geyrecker et al. (2008) [7] described Greek DSpace-based IR cases and policies. Marie Wise et al. (2007) [8] and Sai Deng et al. (2009) [9] presented U.S. IR cases with particular focus on evolving metadata standards. Nicholas Joint (2009) compared UK and U.S. institutional archiving policies, highlighting mutual learning benefits for open access and IR development [10], demonstrating that regional IR initiatives can learn from one another. This study examines IRs at seven Hong Kong universities and the Chinese Academy of Sciences for comparative insights.

Within Greater China IR research, Irene S. M. Wong et al. (2009) from Hong Kong developed an integrated system for Hong Kong' s seven university thesis collections [11], representing a novel cross-institutional IR. This study investigates and compares such integrated services. Kuan-hua Chen et al. (2009) from Taipei compared IR collection volumes across Taiwanese university libraries and proposed improvements using their institutional data [12], a research model this study emulates. Guo Jing et al. (2009) from Shanghai discussed university library digital system orientation, service principles, and concepts—such as "I move, I search" —in ubiquitous knowledge environments [13], frameworks applied herein to examine Hong Kong' s IR mechanisms.

Regarding learning objects, Wu Di (2007) discussed standardization and organizational technologies for learning resources [14]. Wei Lai (2007) analyzed metadata, content packaging, and system interoperability in learning object-centered IRs [15]. Li Jing and Zhou Zhurong (2006) combined learning objects with super-distributed objects to enable decentralized processing of learning resources and services [16]. Zheng Li et al. (2005) provided specific solutions for content storage efficiency, retrieval performance, data consistency, and integrity [17]. Zhou Zhurong et al. (2005) early proposed the "resource repository-concept map-web courseware" model [18]. Liang Huizhi and Zhang Xiaozhen (2005) validated learning-oriented knowledge base models and frameworks [19]. These

works collectively provide comprehensive understanding of learning objects.

On DSpace applications, Lin Ying and Zhang Zhixiong (2007) systematically outlined DSpace' s Chinese language support, file format and metadata extension patterns, workflow customization, and integration with other service systems [20]. Ma Jianxia et al. (2008) detailed processes for importing Excel data into DSpace and customizing metadata input and display interfaces [21]. Huang Chunyan and Zeng Weizhong (2009) introduced DSpace installation and operation procedures [22]. Zhu Zhongming et al. (2009) systematically described CAS-IR platform design and experiences [23].

Regarding storage models, Du Pingping et al. (2009) defined and compared institutional repositories, disciplinary repositories, and personal homepage blogs [24]. Li Jing (2009) discussed information management approaches including IRs, library automation, one-stop services, and digital libraries [25]. Fan Yafang (2007) examined IRs' impact on resource development, information organization, and services [26]. Liu Hua (2007) addressed long-term preservation in IRs [27]. Li Xia et al. (2007) discussed IRs for knowledge-based customer service [28].

On IR functions, Zhao Jihai (2006) identified roles including scholarly communication, electronic publishing, long-term preservation, knowledge management, education, research evaluation, and sharing mechanisms [29]. Chang Wei (2006) noted IRs' functions in collecting, organizing, preserving, and serving institutional intellectual assets [30]. Zeng Yingzi (2007) highlighted characteristics such as showcasing achievements, promoting open access, making tacit knowledge explicit, long-term preservation, improving information access efficiency, and academic exchange [31].

For IR promotion, Wang Xueqin (2009) emphasized the importance of collaborative team composition, division of labor, and policy support [32]. Li Daling and Ke Ping (2009) studied factors motivating staff to contribute intellectual assets to IRs [33]. Lai Ronghui (2009) advocated diversified strategies to address IR resource development challenges [34].

3. Observations of IRs and Comparative Advantages

A notable phenomenon at City University of Hong Kong Library's website is the discrepancy in thesis collection numbers: the institutional repository contains 1,968 titles (including CityU theses) [35], while other catalog systems include 3,251 City University theses [36].

A second phenomenon involves different publications for the same author across systems. For example, Ahsan Ullah, A. K. M. has one document in the IR [37] but three documents in the catalog system [38].

Finally, the two systems lack bidirectional interaction: while catalog content can be found in the IR, the IR cannot access all data and resources from the catalog. This weakens IR functionality and creates an impression of redundant resource development (despite their distinct functions and purposes).

These observations are partial, as each system serves different goals, functions, support structures, and collections. However, they may cause confusion and anxiety in users' information-seeking behavior (see [39]), leading them to question library system reliability, why different results appear across systems, and how to determine correct search outcomes.

The first phenomenon occurs because the IR includes only doctoral and research master' s theses, while the catalog includes both these and undergraduate and non-research master' s dissertations or projects [40]. The second phenomenon reflects that the IR collects the author' s thesis while the catalog contains the author's papers and publications. Additionally, the catalog includes both print and electronic bibliographic data, whereas the IR contains only electronic records—another reason for publication count discrepancies.

The third phenomenon stems from workflow processes: current MARC metadata is first completed in the Catalog, then converted to XML format and input into the IR system using Dublin Core. Print materials predating 2003 have been digitized, with MARC data completed in the Catalog before being served through Series Online. Since both Catalog and IR data originate from the same server, no redundant resource development exists.

Users familiar with each library system' s objectives, functions, support, and collections would not encounter confusion, but we cannot assume all users possess librarians' system proficiency or complete operational training. Therefore, minor adjustments to workflow and interface design could enhance IR collection and service delivery.

4. Proposed Improvements to IRs

4.1 Extending IR Page Functions Based on User Workflows

In Hong Kong Baptist University' s IR [41], users can view collection statistics by department, degree, year, and language while searching, providing clear auxiliary bibliographic information despite simple presentation. Conversely, City University of Hong Kong Library' s IR lacks such functionality. Although it displays title, author, subject, and recent upload entries and quantities, the labeling is less clear and direct (requiring additional clicks). Communities & Collections (equivalent to departments) entries and quantities appear individually, requiring users to query each degree program under each faculty (three clicks total).

The Chinese University of Hong Kong integrates thesis collections with its catalog system, displaying physical locations for print copies and electronic links below search results [42]. Though not explicitly labeled as "IR" services, this approach allows users to complete comprehensive library collection searches—including theses—through a single system.

Hong Kong Polytechnic University's doctoral and master's thesis database, built on JAVA rather than DSpace, offers functionality comparable to commercial

databases [43]. Users can select desired theses and click "Export" to download or email them. This design allows users to interact with the IR as they would with electronic journal databases, eliminating the need to learn new systems.

Although these three universities' thesis systems and IR platforms differ from City University's, they offer valuable insights for IR page function extension: (1) existing IR services should provide basic statistical data aligned with user workflows; (2) thesis search systems should conform to user database search habits or at least unify library system interfaces; and (3) IR pages should add consistently positioned links facilitating access to other library systems and services.

4.2 Designing IR Homepage and Page Links Based on User Habits

Lingnan University's catalog system contains only 137 theses but compensates through "Search Google Scholar" and "find relative resources" functions [44], mitigating potential service limitations from low collection volume. While not primary IR services, these links connect the IR with external network services (Google) and internal electronic resources (catalog), positioning Lingnan's IR as an intermediary between library and external systems rather than merely a catalog component.

The Hong Kong Institute of Education's IR, also DSpace-based [45], features a single search box on its homepage—aligning with Google search habits—while advanced search reveals multiple query windows. Related links appear on the right side, with current browse content displayed below rather than blank space. Though similar to CityU's IR, this design better conforms to user habits and more comprehensively presents DSpace's extensible functions.

4.3 IR Email Authentication System

Hong Kong University's "Hong Kong University Theses Online (HKUTO)" [46] features a notable email authentication system that tracks user downloads, locations, discovery methods, and voluntary feedback, enabling behavioral analysis for service improvement. The workflow requiring verification code confirmation before download also effectively limits download frequency. This system, like Sum Company's online theses, provides limited open access.

Hong Kong Polytechnic University's thesis database differs from HKUTO by emphasizing batch downloads, whereas HKUTO requires justification and email verification per thesis. The former lacks user behavior data collection, limiting service improvement analysis, while the latter lacks user convenience, serving only retrieval-oriented users seeking individual theses rather than browsing-oriented users needing multiple documents. City University could create greater service opportunities by combining these approaches' strengths.

4.4 Adding Cross-Institutional Search Engines

Hong Kong University of Science and Technology (HKUST) offers more than visible on its website. While not perfect, HKUST demonstrates many implementable improvements. Regarding thesis collections, HKUST maintains two systems similar to CityU: an "Electronic Theses" system and the "Hong Kong Institutional Repository."

As an early IR practitioner, "Hong Kong Institutional Repository" has been featured in English journals [47] and on the DSpace website [48] as an Asian case study. Notably, its name– "Hong Kong Institutional Repository" rather than "HKUST Institutional Repository" –reflects its cross-institutional search engine [49], allowing users to search any Hong Kong-produced thesis through HKUST' s system, including CityU doctoral theses.

4.5 Incorporating Web 2.0 Service Elements

Beyond Hong Kong, the Chinese Academy of Sciences' National Science Library represents a significant case as a large-scale mainland library (with over 470 staff serving 89 CAS institutes across 24 Chinese cities) that collaborates with European EIFL, the German National Library, Stanford University Libraries, Japan JST, and Korea KISTI. It recently developed an institutional repository [50].

Like CityU, CAS's IR is DSpace-based but incorporates more interactive services [51]. Its search engine features a single query window integrating all database systems. The IR homepage prominently displays the latest uploads (10 items), download rankings (10 items), and links to other library systems. Users can access metadata and download files while also viewing copyright confirmations, recommended citations, and Web 2.0 elements including Google Scholar, Scirus, social bookmarking, and end-user browser logging [52]. Since IRs facilitate free scholarly communication and Web 2.0 emphasizes collaborative building, sharing, and creation, integrating these links enhances IR services, creating a more open academic atmosphere that reduces user resistance and accelerates collection growth.

5. Technical Selections

5.1 On DSpace Selection and Utilization

Developed by MIT and Hewlett-Packard, DSpace is an open-source system compliant with OAI-PMH metadata transmission protocols, enabling item indexing and internet discoverability. Its key feature is that files are not only stored in the repository but also located through institution-assigned identifiers, enabling long-term digital object storage and indexing. For this study, DSpace-based IRs represent one of City University of Hong Kong' s existing digital collection systems, providing an economical foundation for developing library activity archives.

5.2 On Dreamweaver Selection and Utilization

Adobe Dreamweaver is a web authoring tool offering efficient and simple operational strategies. Its key advantages are convenience, time-saving capabilities, and support for various web programming languages. For this study, this software facilitates the creation of interactive web pages needed for integrated systems.

6. Library Workflow

In digital libraries (DLs), institutional repositories (IRs) serve dual functions: as databases for academic community activity outcomes and as databases for library activity outcomes. City University of Hong Kong Library' s IR already includes electronic theses, award-winning works, and outstanding papers from academic activities. This study discusses enhancing IR functionality by incorporating library activity content and management.

Based on investigation, library activities can be categorized as: A. Humanities and Arts B. Interdisciplinary Collaboration C. Inter-institutional Collaboration D. Pearl River Delta and Yangtze River Delta Information Services Centre Events E. Reading Promotion F. Others

The framework for transforming these activities into educational resources is illustrated in Figure 1 [Figure 1: see original paper]. Drawing from MIT Libraries' 2004 service model [54] and cases by Awre & Swan (2007) [55], Jones (2007) [56], and Rumsey (2006) [57], the framework can be simplified into four components: service mission, document types, key users, and development strategies.

Service Mission: a. Increase IR collection volume b. Preserve library activity archives c. Promote library activity effectiveness d. Manage educational resources

Document Types: a. Formal publications b. Activity records c. Learning materials

Key Users: a. Library staff b. University administrators c. On- and off-campus students d. Event guests

Development Strategies: a. Long-term preservation with sustainable educational resource integration b. Activity and administrative teams supporting system team collection c. Adaptable presentation strategies as needed d. Prioritizing renowned scholars and major events while gradually incorporating others e. Publishing activity content and processes with stakeholder consent f. Providing basic bibliographic and metadata when resources are scarce

6.1 Overall Workflow

The overall workflow comprises three components: library activity archive production, storage, and utilization (services). These yield archive organization, IR

operations, and web presentation, as shown in Figure 2 [Figure 2: see original paper].

A. Production Process (Activity Management): This involves organizing an event and managing archives generated during pre-event preparation, execution, and post-event organization.

B. Storage Process (System Management): This involves database operations for uploading, searching, and downloading organized archives, including activity description, database operation, and file usage testing.

C. Service Process (Web Management): This involves resource management through webpage links based on user characteristics and behavior patterns for stored event records and attachments.

6.2 Production Process

A. Library Activity Workflow: Library activities involve five stages, as shown in Figure 3 [Figure 3: see original paper]. The relationship between library activities and IRs is illustrated in Figure 4 [Figure 4: see original paper].

B. Library Activity Productivity: If activity archives are considered products, library activity productivity can be described as shown in Figures 5 [Figure 5: see original paper] and 6 [Figure 6: see original paper], distinguishing between internal non-public archives and external public archives.

C. Archive Types Generated: Although each library activity varies, archives can be categorized by productivity perspective (see Figures 5 and 6) as shown in Figure 7 [Figure 7: see original paper]. All archives, regardless of type, format, or content, follow standardized naming conventions:

- Text, image, and presentation files are stored as PDF format, sized A4 or A3 (scaled proportionally if exceeding A3)
- Video files are stored as WMV for web distribution
- Audio files are stored as MP3 for web distribution
- Important lecture recordings as non-public archives use AVI format to preserve quality
- File naming convention: "Date+LIB+Separator+EventType+Separator+Honorific+Surname+Sequence-

Example: "20091104LIB_lecture_profchow02.pdf" indicates "Professor Chow's second file from a library lecture on November 25, 2009."

Archives from pre-event, during-event, and post-event phases are systematically organized into public-accessible files and staff knowledge management materials. System planning for library activity archiving and display is summarized in Table 1 .

Table 1: System Planning Summary | Aspect | Public Use | Staff Use | | —-|———|——-| | Functions | Browse, download | Browse, download, upload | | Requirements | Fast, accurate, downloadable | Fast, accurate, downloadable |

| File Types | PDF (+WAV) | PDF + AVI + JPEG + HTML | | Access Model | Open access + controlled access | Public + non-public archives |

Implementation involved systematically organizing data from "Discovery of the Architectural and Cultural Values of Chinese Bridges Exhibition" and "Protecting the Environment in China and the World," listing all generated archives with file types and access permissions for each item.

6.3 Storage Process

A. IR Upload Workflow: After organizing archives using standardized formats, the upload process follows Figures 8 [Figure 8: see original paper] through 13 [Figure 13: see original paper]: login to IR, enter credentials, select Record Groups, choose Multidisciplinary E-learning resource location, select Create Collection, and edit metadata.

B. IR Search Workflow: After upload, archives are searchable following Figures 14 [Figure 14: see original paper] through 17 [Figure 17: see original paper]: access IR without login, select Group, select Record, and view relevant records.

C. IR Download Workflow: After locating records, users can download files through two scenarios shown in Figures 18 [Figure 18: see original paper] and 19 [Figure 19: see original paper]: direct download of public archives or password-protected download of non-public archives.

System implementation established a "Interdisciplinary learning Resources" community with two collection spaces: "Project" and "Lecture Series." Sample data from the bridge exhibition and Professor Chow' s lecture were stored in these spaces with metadata and four files each.

Search workflows were designed for four key user groups: event guests, university administrators, on- and off-campus students, and library staff. Four user models were created: "To know the events" (administrators and students), "To review the event" (guests and students), "To use the resource" (students and librarians), and "To re-organize & make the resource" (librarians and administrators).

Access management implemented "Open Access" and "Control Access" models, dividing users into public and staff groups corresponding to public and non-public archive categories, with system-editable permissions.

6.4 Service Process

A. Library Website Architecture: The webpage introducing library activities is shown in Figure 20 [Figure 20: see original paper]. The IR' s relationship to the library website architecture is illustrated in Figure 21 [Figure 21: see original paper].

B. User Characteristics and Behavior: Key users include library staff, university administrators, on- and off-campus students, and event guests—effec-

tively divided into staff and public groups. User characteristics are defined in Table 2 , and corresponding behaviors in Table 3 .

Table 2: User Characteristics Definition | User Type | Library Familiarity | Resource Demand | |——-|————|———-| | University administrators | Medium | Browse all events | | Event guests | Low | Search specific events | | On- and off-campus students | High | Browse/search events | | Library staff | Very high | Full access |

Table 3: User Behavior Design | Service Need | User Actions | Requirements | |———-|———-|———-| | Understand events | Search engine → Event record | Speed | | Review events | Library webpage → Event record | Accuracy | | Use resources | Multiple paths → Open access files | Accessibility | | Provide resources | Library system → Access control | Completeness |

C. User Search Flow: Search processes for four user types are shown in Figures 22 [Figure 22: see original paper] through 25 [Figure 25: see original paper]: "To know the events" (administrators & students), "To review the event" (guests & students), "To use the resource" (students & librarians), and "To re-organize & make the resource" (librarians & administrators).

6.5 Other Service Models

A. Model 1: IR Extension - *System Architecture:* Add categories and items within the existing IR: create new Group → Subject → Item → metadata and attachments. - *Example:* Figure 26 [Figure 26: see original paper] shows creating educational resource themes in IR. - *Metadata Requirements:* Describe the library activity itself (Title, Speaker, Date, Time, Venue).

B. Model 2: Separate System - *System Architecture:* Build a separate database and server using a common data warehouse, indexing by file category rather than event, enabling access control differentiation. - *Example:* Figure 27 [Figure 27: see original paper] shows creating a file-category-indexed IR. - *Metadata Requirements:* Describe the activity and add a "Description" field to convert text content into activity descriptions.

C. Model 3: Object-Oriented Management - *System Architecture:* Manage individual files rather than structured event data using object-oriented rather than structured data approaches. - *Key Distinctions:* Different file types require different metadata; event-level and file-level descriptions must not be confused; tags/keywords replace speaker/author fields for file-specific elements. - *Metadata Requirements:* Describe individual files with fields like Topic, Relevant Persons, Activities, Objects, Date, and Location.

D. Model 4: Web Link System - *System Architecture:* Create individual HTML pages for photos, audio, and video as objects, linking them to event description pages, then to activity type homepages, and finally to the library homepage or IR. - *Example:* Figure 28 [Figure 28: see original paper] shows web-linked educational resources. - *Metadata Requirements:* Describe files using

HTML meta tags (Title, Keywords, Description) while distinguishing metadata from actual file objects.

E. Model Comparison: Table 4 compares the four models across system complexity and workload requirements. All models support access control and retrieval paths, but differ in management difficulty and user experience.

Table 4: Comparison of Four Educational Resource Integration Models | Model | System Complexity | Workload Requirements | |—-|————-| ————| | Model 1 | Low | Low | | Model 2 | Medium | Medium | | Model 3 | High | Very High | | Model 4 | Low-Medium | Medium |

Model 1 offers fastest implementation but must conform to existing systems. Model 2 allows functional redesign but has limited future flexibility. Model 3 provides maximum future operability but requires substantial current investment. Model 4 combines benefits but lacks next-generation retrieval system development.

6.6 Policy Recommendations

As Wang Zhuang (2009) noted: "Knowledge management strategies in many knowledge enterprises have become fashionable management concepts and technical displays that fail to enhance core competitiveness"[58]. Effective knowledge management requires addressing spiritual, institutional, and material dimensions to leverage organizational culture' s guiding, communicative, and motivational functions.

As a collaborative organism, libraries transforming activities into educational resources simultaneously enhance internal unity and cooperation. Although production, storage, and service processes appear linear temporally, completing "Multidisciplinary E-Learning Resources" requires mutual assistance, as shown in Figure 29 [Figure 29: see original paper]. Collecting, organizing, and classifying archives from exhibitions, lectures, seminars, symposia, orientations, and training enables resource reuse and maximizes benefits.

Discussion

Current IR discussions often focus on how libraries can expand services through IRs or the task of building IRs, with less attention to developing IRs that meet user needs. As noted, "We need to focus not on the 'box' but on its contents and what services we can provide to faculty" [59]—a realization often stemming from profound setbacks. Greater China' s libraries can learn from others' successes and failures. This study examines the issue from the perspective of user thesis usage in library IRs, concluding that IRs should both differentiate from and interact with other library systems while incorporating new features like Web 2.0 services to reduce user confusion and attract participation. After all, IRs aim not only at digital storage but also at creating academic exchange opportunities [60].

This research establishes an archive management model for library activity processes, providing relevant metadata formats and operational samples based on the model. The results form a management system and retrieval framework supporting the transformation of library activities into online educational resources. Specifically, it stores and manages content from the "Discovery of the Architectural and Cultural Values of Chinese Bridges Exhibition" (with over 50 archives) and "Protecting the Environment in China and the World" lecture (with 6 archives), enabling internal and external stakeholders to utilize these educational resources.

The significance lies in converting library activity outcomes into teaching materials while creating knowledge management content for activity review and improvement, thereby supporting university teaching from the library' s perspective.

Based on this research, we recommend determining desired services and functions before system design and implementation, then selecting appropriate models to maximize cost-effectiveness, as shown in Figure 30 [Figure 30: see original paper]. For instance, if serving two groups—(1) public users needing activity display and downloadable archives, and (2) library staff needing complete workflow archives—Model 2 would be recommended.

This study' s observations of university and research institution IRs suffer from limited sample size. Through interviews and fieldwork, it discusses enhancing City University of Hong Kong Library' s IR collection and services, though implementation outcomes require evaluation. Future research should incorporate system data and user surveys while referencing additional case studies.

Recent Web 2.0 research offers relevant insights. Dean James et al. (2009) described how HAM-TMC, the largest U.S. medical library, used Velocity 6.0 to build cross-search systems, noting that web-based software tools facilitate faster, easier data discovery [61]. Nguyen Cuong Linh (2009) surveyed Australian university libraries' Web 2.0 applications, providing numerous practical cases beyond IRs [62]. Such technologies and surveys could enrich IR collection and service discussions.

As demonstration samples, the short-term plan archives two activities; the medium-term plan targets approximately thirty existing activities; the long-term plan aims for a sustainable educational resource integration system. Establishing IRs requires institutional policy support, user community backing, and continuous system testing and improvement. After completing each task, enhancing value-added services yields greater recognition and feedback.

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Note: Figure translations are in progress. See original paper for figures.