Optimizing Library Services – Institutional Repositories and Knowledge Curation: Revisiting Knowledge Conversion in the Academic Environment

Arjun Sabharwal

Lindsay Wertman

Caroline Campbell

Follow this and additional works at: <https://docs.lib.purdue.edu/atg>

Part of the [Library and Information Science Commons](#)

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries.
Please contact epubs@purdue.edu for additional information.

Optimizing Library Services — Institutional Repositories and Knowledge Curation: Revisiting Knowledge Conversion in the Academic Environment

by **Arjun Sabharwal** (Associate Professor/Digital Initiatives Librarian, University of Toledo, USA)
<Arjun.Sabharwal@utoledo.edu>

Column Editors: **Caroline J. Campbell** (Marketing Manager, IGI Global) <ccampbell@igi-global.com>

and **Lindsay Wertman** (Managing Director, IGI Global) <lwertman@igi-global.com> www.igi-global.com

Column Editors' Note: This column features **IGI Global** author, **Arjun Sabharwal**, Associate Professor/Digital Initiatives Librarian for the University of Toledo, USA, and a contributor to the publications *Managing Knowledge and Scholarly Assets in Academic Libraries*, edited by **Bhojaraju Gunjal** from National Institute of Technology Rourkela, India, and *Digital Curation: Breakthroughs in Research and Practice*, edited by **Information Resources Management Association, USA**. — CC & LW

The ubiquity and importance of institutional repositories (IRs) in higher education have significantly increased over the past two decades, as IRs have become recognized tools for curating organizational records, digitized heritage collections, research data, and scholarly publications — in other words, organizational knowledge.

Knowledge curation combines commitments to long-term preservation with teaching and making institutional records more accessible for scholarly and public inquiries in order to inspire sustained discourse. In contrast, knowledge conversion represents the latent but truly epistemological dimension of knowledge curation with a focus on knowledge acquisition.

Knowledge acquisition is an outcome of research, observation, experiments, analysis, collaboration, and presentation, and it evolves in personal (tacit) and shared (explicit) forms, resulting from learning and communication. Knowledge conversion is, in fact, a human curation practice through acquiring, interpreting, and communicating knowledge within an organization, surrounding communities, and communication networks beyond. Institutional repositories play a clearly defined role in this context, as curation involves critical selection, knowledge organization, and communication.

However, not all knowledge-focused fields utilize an IR. For example, knowledge as it is understood in philosophy, psychology, ethnography, social sciences, and humanities evolves independently of such tools until scholars incorporate them into their practices.

As such, this article focuses on using the IR as a knowledge curation platform and, more specifically, as a knowledge conversion tool in the higher education environment to handle a broad range of data, information, and knowledge. The article first presents a

conceptual framework of key concepts, and then it addresses the role of IRs in the four modes of knowledge conversion.

Conceptual Framework

Knowledge curation, knowledge conversion, knowledge architecture, and institutional repositories are related concepts. At the heart of knowledge curation are knowledge and curation. The *Oxford Dictionary* defines knowledge as “Facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject” (Oxford University Press, 2019). Curation means “guardianship” (Compact Edition of the *Oxford English Dictionary*, 1971 “curation”) focused on selection, organization, presentation, and care of artifacts (in museums) and manuscripts (in archives) in collections and exhibitions. Knowledge curation means “The selection of a subset of information based on particular criteria that is distributed to users” (IGI Global, 2019, “What is knowledge Curation”). Murray and Wheaton (2015) have defined knowledge curation as “the care and feeding of an organization’s critical knowledge” (para. 2) with two dimensions: an explicit dimension dealing with technology used to record information; and a tacit dimension focused on knowing recorded information. To this end, knowledge conversion (Nonaka and Takeuchi, 1995) refers to the interaction between tacit (personal and intangible) and explicit (tangible and transmittable) states of knowledge.

A university’s knowledge architecture (Applehans, Globe, and Laugero, 1999; Rebentisch and Feretti, 1995) is its framework for incorporating content (data, information and knowledge), people (researchers, faculty, students, administrators, technologists, information specialists, and others who create share, and curate content), and technologies (databases and digital repositories) used to curate knowledge.

As a part of such an architecture, the IR “is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members” (Lynch, 2003, “Defining Institutional Repositories” section, para. 1). An IR is also a “knowledge curation platform...to enable researchers and experts in a particular field to define, detail and explore the knowledge within that field via a quality-driven collaborative

curation process” (Gorza, Tudorache and Dumontier, 2013, p. 1).

IRs are vital elements in the tool chain for knowledge management “in the process of capturing, distributing, and effectively using knowledge” (Davenport, 1994; Davenport and Prusak, 1998). In his elaborate definition for knowledge management, Duhon (1998) includes identification, capture, evaluation, retrieval, and sharing of organizational assets (including documents, policies, and procedures) in databases with previously uncaptured employee expertise and experience. Young (2009) defines knowledge management as “the discipline of enabling individuals, teams and entire organisations to collectively and systematically create, share, and apply knowledge” (para. 2). Deshpande et al. (2017) define academic knowledge management as “a set of processes that provides academic(s) the most effective way to create and organize knowledge, share this knowledge, and foster its application...which supports the achievement of the goals related to their missions” (p. 8).

IRs are not just information retrieval mechanisms but curation platforms ensuring long-term access to organizational assets, they are important components in the systematic management and curation of organizational knowledge. “By virtue of their association with archives and digital curation, IRs play a transformative role in academic knowledge management,” which is vital to knowledge activities including the acquisition, creation, conversion, sharing, dissemination, transfer, preservation, and reuse of knowledge in higher education (Sabharwal, 2017; see also Sabharwal, 2010).

The Knowledge in Knowledge Curation and Conversion

Universities and scholarship evolve and revolve around humanistic knowledge and scientific research, which require rich source data, information, and knowledge obtained through observation, fieldwork, interviews, research, analysis, interpretation, and scientifically sound methodology, which serve as a foundation for continued scholarship. Knowledge creation is a cyclical process. In fields like ethnography, sociology, philosophy, folklore, and history (particularly, oral history), humans are the sole sources of rich local (and tacit) knowledge and other data and information that requires further analysis and interpretation.

continued on page 79

Once published, however, explicit knowledge does not necessarily circle back to the sources who may not be available for future input in some fields. Researchers are able to customarily share their data, information, and knowledge through formal publication, informal correspondence or discussions, classroom teaching and other channels of verbal communication (such as workshops and conferences), or curation using a subject or an IR.

How *knowledge* becomes an object of curation may be evident in how it relates to the concepts of data and information. Zeleny (1987) and Ackoff (1989) have presented frameworks for clarifying data, information, knowledge, and wisdom. Building on Zeleny's work, Ackoff (1989) has developed a framework for systematic thinking that distinguishes data, information, and knowledge and is illustrative for present purposes:

Data are symbols that represent properties of objects, events and their environments...they are products of *observation*...Information is inferred from data...[It] is contained in *descriptions*, answers to questions that begin with such words as *who, what, when, where, and how many*...Knowledge is know-how...[which] makes possible the transformation of information into *instructions*. (p. 3-4)

Ackoff also asserts that data, information, and knowledge may be available as sources of new data, information, and knowledge, thus underscoring the cyclical nature of knowledge creation. The systematic differentiation of *knowledge* from data and information facilitates the treatment of *knowledge* (in explicit form) as a self-defined object of curation (in the form of written documents, worksheets, databases, shape files, and non-textual media) while much personal knowledge (in tacit form) remains intangible or socialized via verbal discussions. Effective curation of knowledge then ensures fruitful conversion of knowledge discussed next.

Knowledge Conversion and the Institutional Repository

While it is possible for IRs to contain and represent tacit knowledge in limited form, such as lecture or field notes, they are designed to contain explicit (shared, printed, communicated) knowledge and can facilitate knowledge conversion between tacit and explicit forms. Several commonly known platforms have been in use for decades, such as *DSpace*, *Digital Commons*, *Fedora Commons*, *Islandora*, *Hydra*, *Omeka*, and *CONTENTdm*. Owing to their unique architectures and capabilities, some are more suitable for curating scholarly research (e.g., *Digital Commons*) while others are ideal for curating digitized heritage collection (e.g., *Omeka*) in a digital humanities context.

Nonaka and Takeuchi (1995) have analyzed the four modes of knowledge conversion, but it is necessary to interject the role of the institutional repository in order that each of these

modes fits into the framework of knowledge curation via such repository. Socialization, in most cases, retains tacit knowledge in that form. It is a "process of sharing experience and thereby creating tacit knowledge such as shared mental models and technical skills" (Nonaka and Takeuchi, 1995, p. 62). A digital curator can hold workshops to train others to use the IR platform and share anecdotes, personal experiences, and even some horror stories related to content migration, metadata transformation, and reference transactions. Using the IR is essential in order to get points across to the audience favoring visual content also, but the purpose of the platform in this case is not to convert knowledge. In some cases, training materials may appear in published in technical publications, books, webinars, and posters, but these forms no longer fall under socialization.

Presentations and social media conversations involve a high degree of socialization, but the inclusion of some media (slide presentations, podcasts, *YouTube* videos, images, visualizations, etc.) indicates the use of externalization, which converts tacit knowledge into explicit knowledge. "It is an essential knowledge creation process in that tacit knowledge becomes explicit, taking the shapes of metaphors, analogies, concepts, hypotheses, or models" (Nonaka and Takeuchi, 1995, p. 64). Researchers present new knowledge resulting from research, surveys, interviews, and experimentations at conferences and publish in various forms, and universities have begun to encourage faculty to upload their post-prints (within legal limits set by publishers and copyright terms) into their IRs. However, such cases may truly be considered post-conversion activities unless authors voluntarily use the IR as a self-publishing avenue. Open access (especially Green OA) publishing is likely to enable IRs to become a part of the externalization process, which can convert authors' tacit knowledge into explicit form. Archives are also increasing their efforts to make some institutional records available to the public, which is another demonstration in knowledge curation because data and information have been shared in reports, supporting decision making and other actionable knowledge by organizational leaders (chairs, deans, directors, and senior administrators).

Combination retains knowledge in explicit form. It is a "process of systemizing concepts into a knowledge system. This mode of conversion involves combining different bodies of explicit knowledge. Individuals exchange and combine knowledge through such media as documents, meetings, telephone conversations, or computerized communication networks" (Nonaka and Takeuchi, 1995, p. 67). The IR serves as an ideal tool in knowledge curation since all contents in the combination process may be accessible. Data, information, and knowledge presented in digital form are accessible to anyone at the organization preparing reports and other studies.

Finally, internalization represents the reversal of the conversion process. It is the "process of embodying explicit knowledge into tacit knowledge and is closely related to 'learning by doing.' When experiences through social-

ization, externalization, and combination are internalized into individuals' tacit knowledge bases in the form of shared mental models or technical know-how, they become valuable assets" (Nonaka and Takeuchi, 1995, p. 70). This method allows trainees to study data and information published in the IR in order to develop new (tacit) knowledge, which authors can eventually pass on to others through the methods described above.

Conclusion

Institutional repositories are vital to knowledge curation in the digital environment, and the discussion of knowledge conversion has presented a systematic view of the roles IRs have in creating and sharing knowledge through digital technology. Knowledge conversion is a knowledge curation process allowing researchers, teaching faculty, administrators, staff, donors (of special collections and archival records), interviewees (in oral histories), cultural informants (in ethnography and folklore) to share data, information, and knowledge with a wider audience in a variety of ways known to academics and practitioners in the business community and various industries. There is, however, a vast epistemological ground in the social sciences (e.g., anthropology, ethnography) and the humanities (e.g., philosophy, history) where knowledge creation does not rely on curation technologies (such as IRs). In fact, authors may decide to curate their own works in their institutional repositories well after publishing in a formal venue such as a journal, conference proceeding, or book chapter. The use of the IR represents interests related to historical reflection and preservation, which is where finalized reports and data are available for viewing and further study. Knowledge curation through the IR further supports collaboration across organizational units that have relied for very long on data silos and departmental databases.

References

- Ackoff, R. L. (1989). From Data to Wisdom. *Journal of Applied Systems Analysis*, 16, 3-9.
- Applehans, W., Globe, A., and Laugero, G. (1999). *Managing Knowledge: A Practical Web-based Approach*. Reading, Mass.: Addison-Wesley.
- Curation. (1971). In *The Compact Edition of the Oxford English Dictionary*. Oxford: Clarendon Press.
- Davenport, T. H. (1994). Saving IT's Soul: Human-Centered Information Management. *Harvard Business Review*, 72(2), 119-131. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=edsbig&AN=edsbig.A14913078&site=eds-live>.
- Davenport, T. H., and Prusak, L. (1998). *Working Knowledge: How Organizations Manage What They Know*. Boston, Mass: Harvard Business School Press.
- Deshpande, D., Bhosale, N. P., and Londhe, R. J. (2017). *Enhancing Academic Research with Knowledge Management Principles*. Hershey, PA: Information Science Reference.

continued on page 80

Optimizing Library Services from page 79

Duhon, B. (1998). It's All in Our Heads. *Inform*, 12(8), 8-13.

Groza, T., Tudorache, T., and Dumontier, M. (2013). State of the art and open challenges in community-driven knowledge curation. *Journal of Biomedical Informatics*, 46(1), 1-4. doi:10.1016/j.jbi.2012.11.007

IGI Global. 2019. "What is Knowledge Curation?" In *Info-Sci Dictionary*. Retrieved from <https://www.igi-global.com/dictionary/knowledge-curation/42291>.

Knowledge. (2019). In *Oxford Living Dictionaries*. Retrieved from <https://en.oxforddictionaries.com/definition/knowledge>.

Lynch, C.A. (2003). Institutional Repositories: Essential Infrastructure For Scholarship In The Digital Age. *portal: Libraries and the Academy*, 3(2), 327-336. Retrieved from <https://muse.jhu.edu/article/42865>.

Milton, N. (2005). *Knowledge Management for Teams and Projects*. Oxford, UK: Chandos Publishing.

Murray, A., and Wheaton, K. (2015). Welcome to Curation 2.0. *KMWorld*, 25(1). Retrieved from <http://www.kmworld.com/Articles/Column/The-Future-of-the-Future/Welcome-to-Curation-2.0-108249.aspx>

Nonaka, I., and Takeuchi, H. (1995). *The knowledge-creating company: how Japanese companies create the dynamics of innovation*. Oxford University Press.

Rebentisch, E., and Feretti, M. (1995). A knowledge asset-based view of technology transfer in international joint ventures *J. Eng. Technol. Manage.* (12), 1-25.

Considering Games ... from page 73

tography skills and deep thinking and colorful lights. By all accounts all of the participants had a blast, had fun and did learn a great deal about the science and necessities and danger and adventure in planning and executing a mission to Mars. The trick seemed to be that it was not necessarily fun to learn about those Mars and space things. But, in the process of having fun in the experience (by surviving a crash landing on Mars), the participants learned things — not the least of which was cooperation and problem solving under pressure. Indeed, hearts and minds were grabbed.

So, this games in education thing can actually work. I look forward to applying it directly to teaching library skills. Seeing my students having fun in a library instruction class is a particular secret fantasy of mine. I can hardly wait. Learning may not always be fun. But, one can more easily learn something while having fun. So, up with the online catalog and bring on the smoke machine! 🚬

Sabharwal, A. (2010). *Digital Directions in Academic Knowledge Management: Visions and Opportunities for Digital Initiatives at the University of Toledo*. Paper presented at the Special Libraries Association 2010 Annual Conference, New Orleans, Louisiana.

Sabharwal, A. (2017). The Transformative Role of Institutional Repositories in Academic Knowledge Management. In **B. Gunjal and M. Padmaja** (Eds.), *Managing Knowledge and Scholarly Assets in Academic Libraries* (pp. 127-155). Hershey, PA: Information Science Reference.

Young, R. (2009). Definition of Knowledge Management. Retrieved from <http://www.knowledge-management-online.com/Definition-of-Knowledge-Management.html>

Zeleny, M. (1987). Management support systems: Towards integrated knowledge management. *Human Systems Management*, 7(1), 59-70. Retrieved from <http://www.milanzeleny.com/documents/publications/mss.pdf>.

Recommended Readings

Armbruster, C., and Romary, L. (2012). Comparing Repository Types: Challenges and Barriers for Subject-Based Repositories, Research Repositories, National Repository Systems and Institutional Repositories in Serving Scholarly Communication. In **C. Wei, Y. Li, and C. Gwo** (Eds.), *Multimedia Storage and Retrieval Innovations for Digital Library Systems* (pp. 329-341). Hershey, PA: IGI Global. doi:10.4018/978-1-4666-0900-6.ch017

Axford, M., and Renfro, C. (2015). Personal Knowledge Management in Outreach and Instruction. *International Journal of Digital Library Systems (IJDLS)*, 5(1), 16-30. doi:10.4018/IJDLS.2015010103

Belikov, O., and Kimmons, R. M. (2019). Scholarly Identity in an Increasingly Open and Digitally Connected World. In **M. Khosrow-Pour**, D.B.A. (Ed.), *Advanced Methodologies and Technologies in Library Science, Information Management, and Scholarly Inquiry* (pp. 579-588). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-7659-4.ch046

Bielenia-Grajewska, M. (2019). Knowledge Management From the Metaphorical Perspective. In **M. Khosrow-Pour**, D.B.A. (Ed.), *Advanced Methodologies and Technologies in Library Science, Information Management, and Scholarly Inquiry* (pp. 402-411). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-7659-4.ch032

Fteimi, N., Basten, D., and Lehner, F. (2019). Advancing Automated Content Analysis in Knowledge Management Research: The Use of Compound Concepts.

International Journal of Knowledge Management (IJKM), 15(1), 53-68. doi:10.4018/IJKM.2019010104

González-Pérez, L. I., Ramírez-Montoya, M., and García-Peñalvo, F. J. (2018). User Experience in Institutional Repositories: A Systematic Literature Review. *International Journal of Human Capital and Information Technology Professionals (IJHCITP)*, 9(1), 70-86. doi:10.4018/IJHCITP.2018010105

Kisielnicki, J., and Sobolewska, O. (2019). Technical Infrastructure of Network Organizations. In *Knowledge Management and Innovation in Network Organizations: Emerging Research and Opportunities* (pp. 55-85). Hershey, PA: IGI Global. doi:10.4018/978-1-5225-5930-6.ch003.

Säisä, M. E., Tiura, K., and Matikainen, R. (2019). Agile Project Management in University-Industry Collaboration Projects. *International Journal of Information Technology Project Management (IJITPM)*, 10(2), 8-15. doi:10.4018/IJITPM.2019040102

Wimmer, H., Du, J., and Rada, R. (2019). Knowledge Portals: A Review. *International Journal of Knowledge Management (IJKM)*, 15(1), 1-18. doi:10.4018/IJKM.2019010101

Zhang, Y., Deng, Q., Xing, C., Sun, Y., and Whitney, M. (2012). A Service Component Model and Implementation for Institutional Repositories. In **X. Liu, and Y. Li** (Eds.), *Advanced Design Approaches to Emerging Software Systems: Principles, Methodologies and Tools* (pp. 61-81). Hershey, PA: IGI Global. doi:10.4018/978-1-60960-735-7.ch004. 🌐

Column Editor's End Note: As the curation and dissemination of knowledge is critical to the education of all researchers and professionals working within information and knowledge management fields, *IGI Global* continues to publish innovative, peer-reviewed research within *Library & Information Science*. With a collection of over 600+ titles in timely topics including collection development, acquisitions, archiving, technology, administration and leadership, and more, all of these titles are featured in *IGI Global's InfoSci-Library and Information Science* database. To learn more, visit: www.igi-global.com/ere-sources.

Additionally, *IGI Global* invites researchers within these fields of research to submit a book proposal or submit a chapter to one of our publications. To learn more about these publishing opportunities, please visit: www.igi-global.com/publish.