

# Chapter 10

## Lending and Borrowing Library Materials: Automation in the Changing Technology Landscape

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### ABSTRACT

*The first application of robotic technologies in libraries is in the area of storage and retrieval of library materials. This chapter discusses past, present, and future developments in robotic technologies in the area of library circulation. Issues and challenges libraries face in light of rapid developments in the electronic realm are discussed in relation to circulation. This chapter also highlights future trends and technologies for library lending, as well as possibilities for advancement with the increasing shift towards electronic content in libraries.*

### BACKGROUND

The ability of patrons to borrow materials is a core service provided by libraries. Patrons want to borrow materials, and libraries want to lend. For this reason, borrowing and lending were among the first operations to become automated when integrated library systems were introduced in the

market. Circulation is considered to be the most mature and stable automated process performed in libraries. However, until recently, there has been a dearth of information about these advances in circulation technologies. Not much has been written about libraries employing high-tech circulation technologies, nor has much attention been given to this service compared to other areas within library operations.

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Today, library circulation services are at a crossroads. The rapid development of online, digital, and multimedia technologies coupled with the shift in patrons' information seeking and retrieval pushes us to rethink how circulation services can better fit today's needs as well as patrons' expectations.

Circulation or library lending typically encompasses activities such as charging (checkout), returning (check in), routing items for internal use or handling, renewing, billing and fines transactions, holds management, shelving, inventory, and interlibrary or consortia lending (Aswal, 2006). Circulation can be viewed as a transaction-oriented system and serves as a direct interface between user and the library (Burns, 1975). Circulation can also be described as "the flow of materials within a library" (Dempsey, 2006). Essentially, circulation services provide the most basic library function of making materials available to its users and allowing access to these resources.

The technology development in circulation can be seen in two areas. First is the automated library catalog system that handles the work flow of circulation, and second, the automated mechanical system, or the robots that physically process library circulation-related tasks. Automated library systems and library robots work for both library staff and the library users. Their aim is to reduce human intervention during the circulation process, extend service coverage, and increase efficiency and accuracy of circulation.

## **OVERVIEW OF LIBRARY AUTOMATION**

Much of the literature in circulation focuses on technology developments in storage and retrieval of printed materials. To understand how this came about, it is useful to examine advances in library automation and library information technology side by side. Efficiency and productivity were the

impetus for automation in libraries. As computer systems became more widely available, libraries began a slow and gradual shift from focusing on collections to focusing on information access (Borgman, 1997).

Lynch (2000) provides a framework for understanding the changes in the library automation industry and its effect on organizations based on the three-phase process introduced by Richard West and Peter Lyman:

*Modernization (doing what you are already doing, though more efficiently); innovation (experimenting with new capabilities that the technology makes possible); and transformation (fundamentally altering the nature of the organization through these capabilities) (Lynch, 2000, p. 60).*

The first phase of the automation age occurred in the 1960s and 1970s when technology advanced in the personal computing arena. Due to this development, libraries felt the need to introduce efficiency in their internal operations, or to bring the benefit of automation to library staff. The earliest library automation projects computerized routine and core library operations in the areas of circulation, acquisitions, cataloging, and serials management mainly to improve internal workflow and processes (Borgman, 1997). Circulation control at this stage was based on batch processing techniques using keypunch or key-to-tape devices in order to convert information about individual circulation transactions to computer-readable form (Saffady, 1989). Workflow typically involved batch processing of circulation data, which was then uploaded, maintained on magnetic tapes, and printed so that checked-out materials could be viewed by library staff. Some circulation transactions were not real-time and because there was a time lag in between batch processing and printing, circulation data were difficult to track. Nonetheless, automated circulation processes showed great potentials in a computer-aided environment.

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