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Library Automation: An Emerging Technology for State University and Colleges in Sulu Province

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ABSTRACT

The library is one of the most important places in any academic institution and remains the primary source of information for students, teachers, and many others. This literature review aimed to describe technological advancement in the managing library. The breakthrough of technologies can help the library in various ways. Libraries need to adopt new technology that will allow them to operate and function efficiently and effectively, increasing their productivity and improving their user services without adding personnel. Fortunately, new technologies have developed barcode, digital libraries, quick response codes, and radio frequency identification (RFID) systems. Consequently, applying these technologies provides an end-to-end solution for easy library operation, such as borrowing and returning books, finding and locating books, and maintaining book records. The need to develop and enhance library services to meet users' demands is necessary.

1. Introduction

One of the primary functions of libraries is to stimulate the reading habits of the public, especially those in the academy.¹ Previous study explained how the ancient methods of maintaining a library are no longer dynamic and efficient.¹⁻³ The explanation is an accurate description of the library operation of the State University and Colleges in Sulu Province, where none of the institutions have adopted any source of new technology to their libraries. The school does not have the resources to implement high-tech solutions for its library operations. However, with this emerging technology that can use in the library, the students would greatly benefit from being able to experience library operation by using the so-called technology to

find what they need and want and complete the tasks quickly and fast.²⁻⁵

Since the manual library system involves lots of paperwork, the library information, including user data, staff data, book records, and purchase ledgers, is documented manually. Also, charging and discharging books are done manually, leading to a waste of time and resources for the users and the library authority. Having observed the existing manual library system thoroughly, it faces many challenges that indicate it is time to innovate it into automation.^{6,7}

Development in the field of technology has changed the way of library transactions (check-in and check-out). Extensive information available in the digital system is most desired by the users. As the application

of modern technology in the library system has emerged, it is necessary to adopt new technology instead of remaining to utilize an ancient method of managing and operating a library that is old-fashioned and no longer dynamic and efficient. It is time-wasting, as data and library material are missing. In this situation, it is necessary for speedy data retrieval and efficient services for library users with modern technologies in library operations.⁸⁻¹⁰

The great concern for the need of the users to quickly and speedily locate and retrieve library materials, including missing information, the researcher finds it beneficial/helpful to automate the school or institution library using technology like barcode technology, QR codes technology, digital library, or RFID for the library's operation. However, it may be old technology for some institutions in other places. But in the Province of Sulu, where libraries are still in manual operation, they need this technology. Introducing this technology can play an essential role in automating the function and processes of the library. This emerging technology will help the library users and the management of the library operators minimize data and library materials losses.¹¹⁻¹⁴ This literature review aimed to describe technological advancement in managing libraries.

Library automation

Library automation is the process that converts library methods from a manual process to a computerized one or from a manual card catalog to an integrated library system. Automation is the process of using technological advancement to save time in achieving tasks efficiently. The main idea of library automation is to extricate librarians and library staff to make more significant contributions to disseminating knowledge and information. It is also an application or system that enhances the services and operation of the library. In this context, the latest technology can improve library procedures that could, increase the efficiency and effectiveness of library transactions, reduce the workloads of the library staff, and enhance services for library users.^{15,16}

Library automation is an application of information and communication technologies software that automates library operations and services, covering acquisition, cataloging, circulation, serials management, stock verification, and other library-related activities. It is the best way to minimize human involvement in providing better library services to its users. It also offers complete services in minimum time at the lowest cost.¹⁷

Barcode technology

Barcode is coded information in bars scanned by a unique image scanner (barcode scanner). An image scanner, also called a scanner, converts any printed image into electronic form by flashing a light and sensing the patterns of printed bars on the barcode labels pasted on the books. The barcode identifies the books using the barcode reader/scanner, which emits a beam of light-frequently a laser beam that is reflected by the barcode image by recognizing bars. According to Singh et al., the white spaces reflect light, translated into relevant signals for the computer to read. Without the risk of human error, it converts the individual bar patterns into numeric digit-code so that the computer can understand what is in the code in the database.^{7,8}

Barcode technology in the library can process students, teachers, and visitors' requests easily and quickly. This type of technology can also be applicable in the circulation system to locate library material with speed, accuracy, and reliability. It opts to reduce the possibility of human errors, and it can guarantee the effectiveness and efficiency of services rendered. With the help of Barcode technology, the library inventory is more effective and efficient. The procedure is by scanning the barcode present in the identification cards of the clients or students by the library staff to identify their borrowing status. The library staff can check the document's accession number (Barcode) and give it to the user comfortably within a few seconds.⁷

Digital library

A digital library is a system stored in computer and computer networks. This type of library gives access to various contents with a possibly unlimited number of resources. It is similar to what is known as the electronic library or e-library. It can convert published books into digital forms like an e-book and modify them into the following digital formats; PDF, HTML, audio, video, and services, using the computer and its network. The students can easily download e-books. It is also easier to locate specific library material since it is all digitalized.

Quick response (QR) code technology

QR (quick response) code is the trademark name for the two-dimensional barcode systems. It was invented in Japan in 1994 for the automotive industry. The barcode is a machine-readable optical label that holds information about the item attached to it. It is a machine that reads information containing data for a locator, identifier, or tracker that points to the website or application. It uses four standardized coding modes, numeric, alphanumeric, byte/binary, and kanji, to store the data efficiently. It may also use extensions. A quick response (QR) code comprises black squares arranged in a square grid on a white background. The imaging device, such as a camera, can read and process using Reed Solomon error correction to interpret the image. Then reading, the required data from patterns present in the picture's horizontal and vertical components appear.⁶

Radiofrequency identification

Radiofrequency identification (RFID) is an automatic contactless data-capturing technique. It is also an electronic technology whereby digital data is in an RFID tag that can retrieve by utilizing a reader. The use of RFID as part of the library system consists of tags and sensors. In this technology, where students can walk in or out of the library, the sensor scans and displays the actions possible or required. RFID can directly provide book information and library member or user information to the library system, no longer

manual. The RFID tag contains unique information, such as a book's title and code, without needing a separate database. The RFID reader will read the data, which replaces the standard barcode reader commonly found at a library's circulation desk.³

Library management system

A library management system is a software developed to maintain the record of the library. The data in the system contains the number of available books in the library, the number of books that are issued, returned, renewed a book status or late, fines, and charge records. It is also a system that helps maintain a database for entering new books and records the books borrowed by the library members with the respective submission dates. Furthermore, it also reduces the manual record processing that is the burden of the librarian.⁷

Emergence of a library management system was developed through the years to address the problems and enhance the services rendered to library users. The developed software is the following; a library management system developed in 2016 aimed at reducing cost and time.¹² The system provides many features which are not available in most library management systems, such as the option of an online notice board about a particular workshop. The librarian can quickly provide a detailed description of workshops going on in the college and nearby colleges, a teacher login page where the teacher can add any events organized in the college, and essential suggestions regarding books, among other features. Library management using an android-based application was developed in 2014.¹⁵ The design is user-friendly, but as the name implies, it is platform-dependent. As the name suggests, it can only work on mobile phones.¹⁵ Another library management system with multimedia facilities as part of its features was developed in 2010. However, the system is not cost-effective.¹³

Another library management system with cloud computing is reliable and security conscious, but it is costly to manage because of the facilities required for

setting up a cloud database.¹⁶ Another automatic library management system design had the fast processing of books and other library transactions, but it is not cost-effective.¹⁴ The K-leg of the design is that it uses open source alone, in which everybody is free to make contributions, either relevant or not. Also, the system is platform-dependent, and it can only work on personal computers.^{8,9}

2. Conclusion

Automating the library utilizing new technology is the best option to make the library function to its total capacity in rendering services with minimal time taken in doing the process. The need to apply new technology to develop its existing methods into emerging technologies must be a priority of state universities and colleges in the province. It saves time, minimizes errors, increases efficiency at the circulation desk, and reduces operational costs by eliminating book cards and book pockets. Thus, library automation utilizing the latest technology is indispensable.

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