

## LIBRARY SYSTEM DIGITIZATION STUDY OF THE PUBLIC UNIVERSITY

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**Abstract:** This paper is focused to implementation of RFID tags to Library and Information System at the University Library of Alexander Dubcek University in Trencin (Slovakia). The execution of this draft will simplify the rental process of library. The main goal of whole proposal is to reduce the time for revision of fund in library. Process will run on the RFID tags inserted in books through which will all system parts communicate together without any need of human assistance.

**Key words:** RFID, Library University, Library system, Quality control, Rental process

### 1. INTRODUCTION

The University is a complicated complex of components whose common goal is to provide quality education. This aim is not possible realize without support of quality and integrated information system. For such integrated information system to work, close cooperation between the creators and operators of all its components is required. It is often used by several software systems that cooperate together. In the University environment, we can identify four relatively distinct types of information systems:

- *Administrative and operational information system* - supports the management of human resources, financial and material resources, planning, logistics, etc.
- *Information system to support the educational process* - supports the management of educational process - the registration of candidates, students and graduate degree, study programs, courses, learning outcomes, scheduling etc.
- *Information system for scientific research* - supports the management of scientific and research projects, creating documents for the accreditation and evaluation.
- *Library and Information System (LIS)* - supports the management of information resources, processing and distribution of information and documents for the education and research, supports the operational management of academic libraries (Kimlička, 2005).

### 2. RFID AND THE LIBRARY ENVIRONMENT

Implementing of RFID into existing library system will bring many of advantages such as detailed statistics; simplify the rental process; prolongation without need to Library employee intervention and many others.

There is already many existing studies and examples how to implement RFID into library, but decision makers still do not know the main advantages for them and their customers (readers). The main goal is the shorter time for the Library fund revision. For example in the University library of Alexander Dubcek University of Trencin, with nearly 14 000 titles in the fund, it will take approx. one weeks to count every book by two people. During this time Library will have to be closed, or with reduced services. If there would be RFID implemented, it will take a bit longer time to do the "starting" revision to fit up every item with RFID tag and input required data into database

system. But each other revision can be done within few minutes, moreover on line without any need to physically touch even one title.

Another huge advantage is the anti-theft system. Location of necessary RFID readers and antennas in building(s), will allow to controll every title coming or leaving the building. Increasing this system to all other University buildings will increase the monitored area. Then if the title rental time is expired, system will simply inform the personel to remove the title from the holder, if this title will appear in University properties. Taking in count the words of the library personel that most of the lost titles are in hands of University personel not the students. By connecting the RFID tag of rented item with students/personel RFID cards (ISIC, ITIC, etc. - RID) will clear whole "travel route" of each title within University area. There might be voices saying about following the human rights and monitoring the human being using such system, but the fact is, that the system is not monitoring persons, only the RFID tags of titles, which are property of University Library. In fact, anybody can handle the title during the rental time, and therefore, there is no possibility to monitor the route of concrete person. Moreover, the only entry about connecting of title's RFID tag with readers RFID Identification Card is staying in the Library database system.

RFID will also allow to mark multimedia disks as CD's, DVD's, Blue-ray's, USB flashes and others as well as books or periodicals. Therefore all publications and media in library fund will be marked as titles.

### 3. POSSIBLE PROCESSES

Whole system would consist of these 5 processes:

#### 1. Book Tagging

The first step of title lifetime in the LIS. All necessary information (see chapter 5) are written into the database and RFID tag is stacked on the title.

Steps of Book tagging process:

1. activating RFID
2. RFID answer its unique ID
3. data written into database

#### 2. Title rental

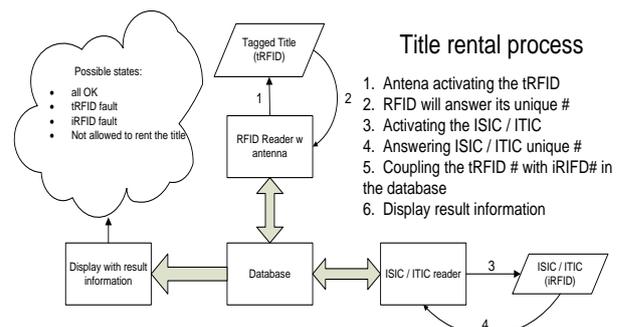


Fig. 1. Data flow diagram of title rental process.

### 3. Self check-in/out

Customer (reader) is able to rent or drop the book without invention of the Library personnel.

### 4. Title Roll-over

It is necessary to have present RID and title at the same time. When reader discovers the title, user will be prompt to present RID. If it is possible by following the Library basic principles to roll over the title, new rental period will be written into the database, otherwise Library personnel will be informed about problem at self check in/out.

### 5. Shelf control

Library personnel will be able to control shelf content using handheld RFID reader (HR). Employee will first set up the required section in the HR. When title, which does not belong to selected section is discovered, employee will be prompt to pick the title and return it to correct section.

## 4. TECHNICAL SPECIFICATIONS AND REQUIREMENTS

In order to apply this method it is necessary to put enough RFID readers with antennas to cover all windows and entrance doors of the building to secure the anti-theft system. Every shelf has to be equipped by reader with sector antenna to cover exact shelf area. Employee check-in/out stand will be equipped with RFID reader and computer connected to the library database system. It is also advised to have one EAN bar code reader for cases, when lost title will arrive into library facility after conversion in to RFID system has been done. Self check-in/out station for prolongation and self rental equipped with one reader and one computer system connected to the Library database system. All problems are directly prompted to the Library personnel. One (or more) handheld RFID reader connected to the Library database system for shelf control. Ensure enough RFID tags with sufficient reserve for testing and training purposes. It would be enough to use passive RFID tags with pre-programmed RFID ID# without ability for further write. Taking in count that price of such passive RFID tag might be around 5 USD cents per piece; there is no need to use expensive reprogrammable RFID tags with big memories for data storage (Lahiri, 2005).

## 5. CONVERSION OF EXISTING SYSTEM

TNUNI University Library belongs to the users of DAWINCI information system, which currently integrates the latest features of the server applications and database systems of Document Management. Based more on knowledge and experience also automates and streamlines all the information flows and processes libraries \*\*\* (2009). Currently, like most libraries in Slovakia, the EAN barcode database is used to record the publications and periodicals. Barcode is linked to LIS based on which each publication has its unique serial number, even if there are multiple copies of the publication in the fund. The problem occurs in the case when a user rent a title, but does not follow the rental time. Furthermore, if the title is returned to the library but the library will lose it, or it is rented to an University personnel for a longer time, especially if the library fund consist of only one or two title prints. If the TNUNI Library will in the future still use the DAWINCI LIS, it will be able to easily align and sort the information needed only in MARC21 records format and those which are needed for RFID tags on titles. MARC21 fields are:

*General information:* Author, Name of title, UDC, Subject heading, Year of issue, Publisher, Language, ISSN, ISBN, record ID number, Accession number.

*Additional information:* Date, Issue no., Number of pages, Date of acquisition.

Our recommendation is to add two more fields into the MARC21 records:

Level of item "wear" (will be filled every time title arrives back to the Library).

RFID issue number (amount of RFID tags already issued for this title – faulty tags, broken tags etc.).

During the EAN to RFID data conversion, operator will have to read the EAN code of each title, add other required information into the database and write the data to the RFID tag.

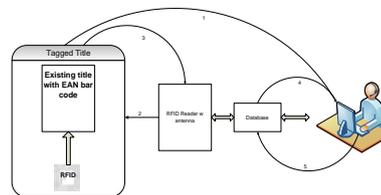


Fig. 2.EAN to RFID conversion data flow chart (1.read the EAN, 2.activate RFID, 3.RFID answer its ID#, 4. RFID ID# written to read EAN data file, 5. additional data written into database)

## 6. CONCLUSION

In conclusion we would summarize all the goals achieved in this paper. The pre-step of implementation of RFID technology in smaller libraries is current use of Library Information System. The pre-step also includes the record of whole fund in library. When these preliminary terms are done, it is possible to start with real implementation of RFID tags to LIS. The start taking the new technology will be for librarians much harder than normal revision of the fund. After the implementation and launching the process will have library better overview about book circulation and even the every year fund revision will be much faster. Otherwise if there is any possibility to use all the developed RFID tags with rewriteable fields. It will be more useful for this kind of library, because the rewriteable fields can be used for data about reader. In order of future steps it is possibility to count the correlation of mass titles borrowed in the field of scientific research results. This is one of future steps, which can be helpful to university pedagogues to identify the surplus and shortage of learning materials in University Library. At all it can help disappear the hole of fields of study without print study materials.

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