A comparative study of two open source Integrated Library Systems (ILS): PhpMyBiblio (version. 3.5.1) and NewGenLib (version. 3.0)

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Abstract:

In this paper, we conducted a comparative study between two well known open source integrated library management systems, i.e. PhpMyBiblio (version. 3.5.1) and NewGenLib (version. 3.0), to inform librarians about what considerations to be taken when choosing an open source integrated library management system (ILMS) for their libraries. The paper provides a detailed comparative analysis of both types of software, i.e. PhpMyBiblio (version. 3.5.1) and NewGenLib (version. 3.0), which are undertaken in the study. The methodology used for the study is "Evaluation method" which is followed with the help of structured evaluation checklist prepared after the thorough study of reference tools, reference statistical data available and related literature. Both types of software are evaluated and compared qualitatively and quantitatively. Our findings showed that both types of software are web-enabled and support library automation. PhpMyBiblio (version. 3.5.1) has more specific characteristics of open source ILMS. PhpMyBiblio (version. 3.5.1) needs to upgrade, modify and improve its features. PhpMyBiblio (version. 3.5.1) requires very little hardware and it is easy to install. PhpMyBiblio (version. 3.5.1) has advanced database features. NewGenLib (version. 3.0) has better functionality of modules than PhpMyBiblio (version. 3.5.1). More formats and standards are supported by PhpMyBiblio (version. 3.5.1). Digital library functionality of NewGenLib (version. 3.0) is more specific in terms of technology, data structure and programming. Also NewGenLib (version. 3.0) provides more user help and support whereas PhpMyBiblio (version. 3.5.1) provides more user-friendly downloads and a documentation facility. NewGenLib (version. 3.0) has more enhanced features which are significant for ILMS while selecting software for automation. The practical implications of the comparative analysis of the open source ILMS done in this study will help librarians in making necessary considerations while choosing an open source software for their libraries.

Introduction:

The recent advancements in the field of information technology have compelled librarians to embrace automation as the facilities provided by automated libraries go far beyond the activities of traditional libraries. In developed countries computerization of libraries started in early of 50s. The use of computers in library and information centers in Jordan was reported in 1980s at Shoman library in Amman. The public Universities in Jordan established the center of excellence in 2006 for services to manage the information network of official university libraries in Jordan. The center of excellence coordinates services in order to rationalize expenditures and participate in the information sources, and standardize mechanisms for library work and its tools between libraries. To achieve these goals, agreed to work to unify the system of university libraries in one system that serves the public interest for all. The library information system Horizon has been applied at the beginning of the year 2006 in the public Universities in Jordan. These Universities are paying approximately eighty thousands JOD per year for the maintenance of the system. Many encountered problems have been reported recently about horizon by the center of excellence. It looks essential to look for a new open source library information system. Many comparison studies have been reported [(1) , (2) , (3)] between different open source library information systems. Open source has been the center of attention in the library world for the past several years. Koha and Evergreen are two open-source integrated library systems (ILSs), and they continue to grow in maturity and popularity. The question remains as to how much we have achieved in open-source development toward the next-generation catalog compared to commercial systems. Little has been written in the library literature to answer this question. This paper reported a comparative study between two well known open source integrated library management systems, i.e. PhpMyBiblio and NewGenLib, to inform librarians about what considerations to be taken when choosing an open source integrated library management system (ILMS) for their libraries. The rest of this paper is organized as; objectives of the study**,** the discussion, the result and finally the conclusion.

(1) Faleh, A. Alhawary etal, "Building a Knowledge Repository: Linking Jordanian Universities E-library in an Integrated Database System", International Journal of Business and Management Vol. 6, No. 4; April 2011.

(2) Sharon Q. Yang and Melissa A. Hofmann, "The Next Generation Library Catalog: A Comparative Study of the OPACs of Koha, Evergreen, and Voyager, The Journal of the Information Technology and Libraries, September 2010.

(3) Kiruthika, D. "Design and Development of the Bibliographic Database of Ph.D theses at Bharathidsan University using Koha", Master theses, 2011.

Objectives of the study:

This paper has been undertaken with the following objectives:

Main objective: The objective of this study was to identify usable Open-source ILS and evaluate if one could suit the university of Jordan needs. If so, the software may be installed and used to hold the university of Jordan collection and allow users to easily identify and borrow books.

Sub objectives:

1. Inform librarians about what considerations to make when choosing an open source integrated library management system (ILMS) for their library.

2. Provides a detailed comparative analysis to find out the various services provided by both PMB & NewGenLib software's.

3. Help librarians in making necessary considerations while choosing an open source integrated library management system (ILMS) for their library.

Scope of the Study:

The following central points are related with the comparative study:

1. Historical information such as initiation, developed by and country.
2. Environment such as software, architecture, requirements.
3. Traditional service such as cataloguing, circulation, acquisitions, OPAC, serial control, management, report, SDI and authorities.
4. Formats and standards are supported by both PhpMyBibli & NewGenLib softwares.
5. Common components such as license, security, backup, maintenance and Data migration.
6. Advanced components such as RFID, RSS, LDAP, OAI and ILL.
7. Additional components such as E-document management, multiple languages, remote access capability, user friendly, documentation (help & manuals), multiple types of media and ability to customize.

Hypothesis :

Hypothesis is usually considered as the principal instrument in research. The following point have been considered for the hypothesis of the study:
NewGenLib is suitable to academic Library because it has better functionality of modules and standards, while PhpMyBiblio is suitable to public and school library because it user-friendly.

Methodology :

The methodology used for the study is "Evaluation method" which is followed with the help of structured evaluation checklist prepared after the thorough study of reference tools, reference statistical data available and related literature.
We first elaborated a components-list: which functions would be necessary? Which function would be a nice to have? Considering the hardware already in use at our university, some technical criteria's were also identified (full list available on request).
Then testing by installation both software's on a test server: a standard PC running Windows XP Professional Service Pack2.
Both types of software are installed, data migration testing, evaluated and compared qualitatively and quantitatively, after that, viability scores are defined for each step (section) in the components-list by using following table (Figure A):

Result	Term & Mark		
Viability Indicator Result Term	Bad	Good	Very good
Viability Indicator Result Mark	0	1	2

Figure A (viability indicator)

At the end, multiply each value we have obtained, the value we gave it to each component in the components-list depending on library management system software components, which we are suggested it according the needs of the Library of Jordan University. Total marks results will help us to indicate the viability indicator which software is suitable for Library of Jordan University (academic Library). Components-list and Max values of components-list depending on library management system software components according the needs of Jordan University Library is presented in Figure B, BB, BBB.

No	1	2	3	4	5	6	7
Component	Information History	Environment	Traditional Services	Formats and Standards	Common Components	Advanced Components	Additional Components
Max Mark	0	1.5	2.0	2.0	2.0	0.5	2.0
Total	10						

Figure B (Max values of components-list)

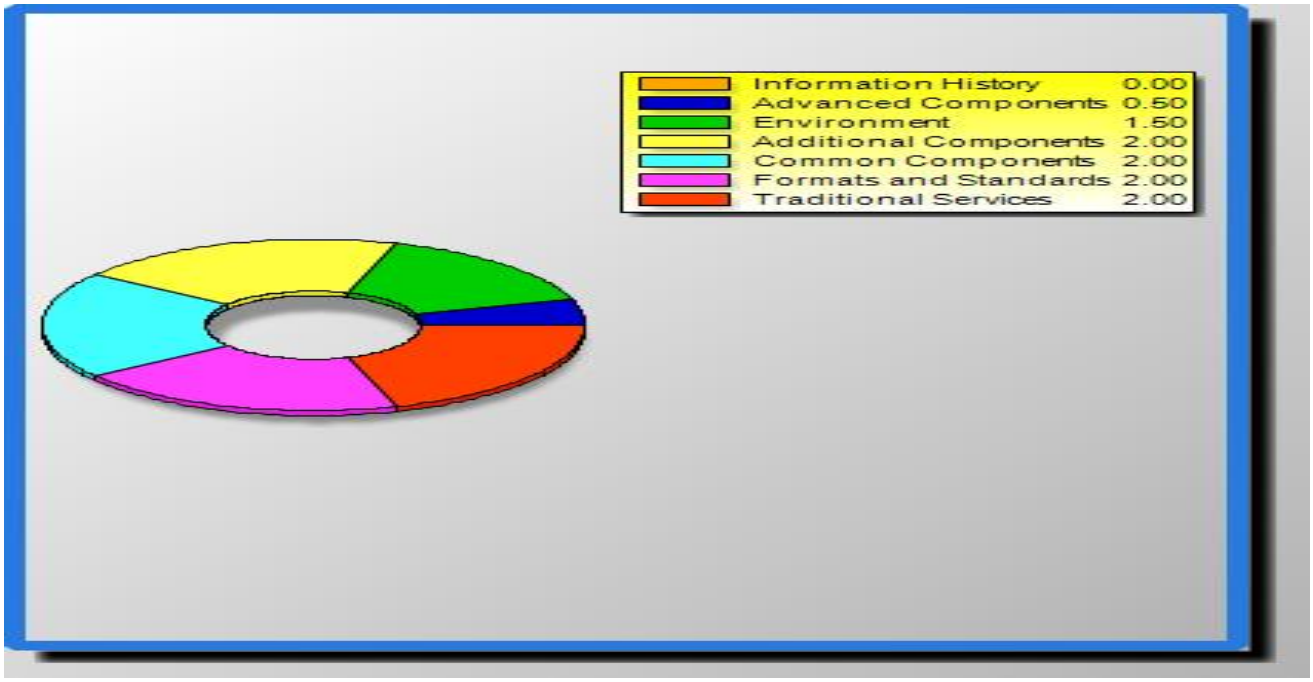

Figure BB (Max values of components-list)

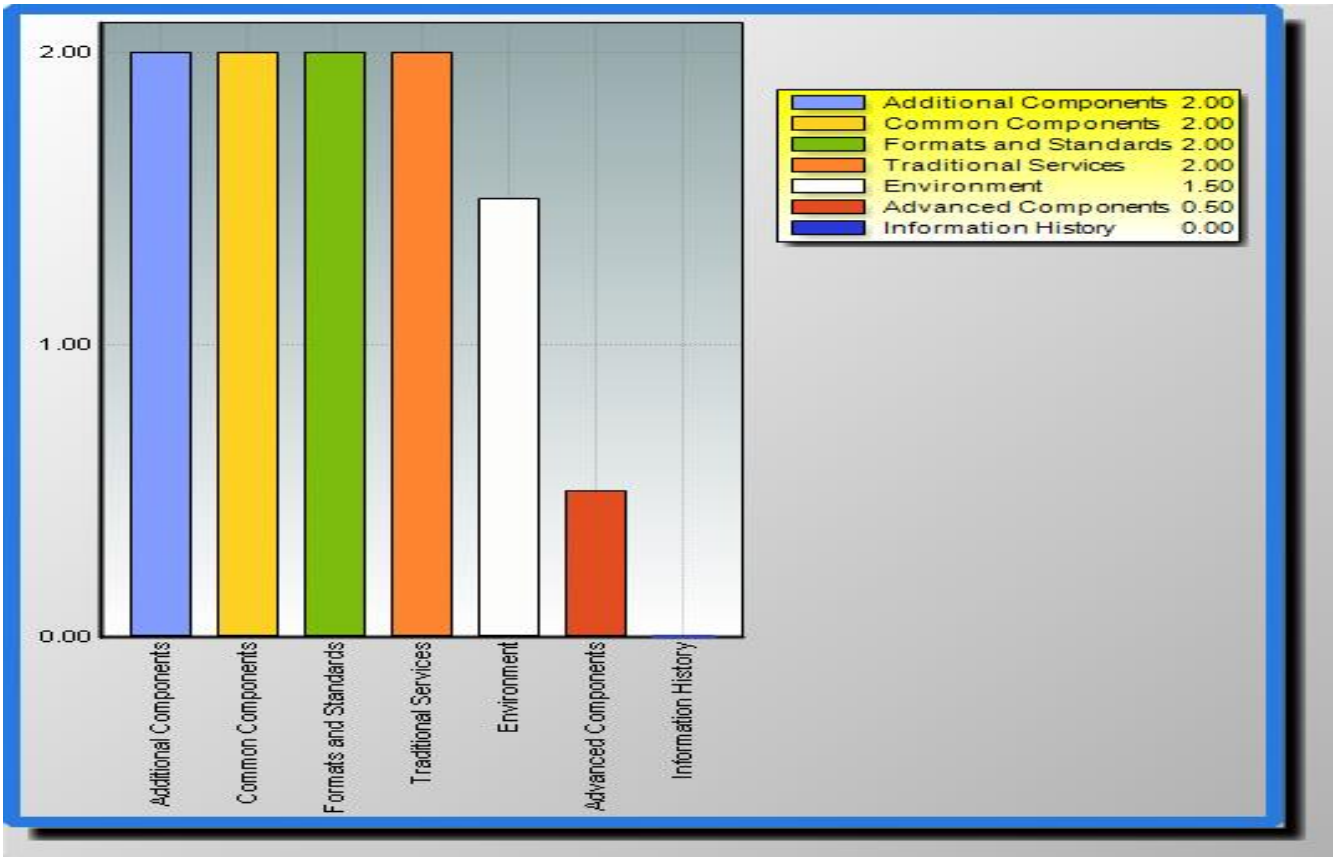

Figure BBB (Max values of components-list)

Definition of Terms:

• OSS (OPEN SOURCE SOFTWARE). Open source is a software development model as well as a software distribution model. In this model the source code of programs is made freely available with the software itself so that anyone can see, change, and distribute it provided they abide by the accompanying license.* [(4)]

• OAI (OPEN ARCHIVES INITIATIVE). The OAI develops and promotes interoperability standards that aim to facilitate the efficient dissemination of content. Its major contribution is the OAI Protocol for Metadata Harvesting (OAI-PMH), a set of guidelines that enable repositories to expose the metadata describing their content to service providers who harvest the metadata into large aggregations.* [(5)]

• OPAC (Online Public Access Catalog). The OPAC is the gateway to library's collection. It is an electronic database that contains the same information: that is; author, title, and subject information about the materials that a library owns. Some OPACs are union catalogs meaning that several libraries share the same database. It is an "knowledge access system whereby the catalog is both a finding and access tool".* [(6)]

• SDI (Selective Dissemination of Information). The success of any library is dependent upon numerous factors, among these are getting users to use the library and making them aware of the library's services such as SDI service. It is notifying individual users about materials that will interest them. Making the library indispensable has been called the secret to library marketing.* [(7)]

ISBD (International Standard Bibliographic Description). The International Federation of Library Associations (IFLA) issued the International Standard Bibliographic Description (ISBD), produced as a means for the international communication of bibliographic

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(4) The Open Source Definition, [Available online: http://www.opensource.org/docs/osd] & [Available online: www.opensource.org/docs/definition.php].

(5) Lagoze, C., Van de Sompel, H., Nelson, M., and Warner, S. The Open Archives Initiative Protocol for Metadata Harvesting, 2002. [Available online: http://www.openarchives.org/OAI/2.0/openarchivesprotocol.htm].

(6) ODUWOLE (AA), OYESIKU (BA) and LABULO (AA) On-line public access catalogue (OPAC) use in Nigerian Academic libraries. Library herald March 2002, Vol. 40, No.1, 195-210.

(7) Block, M. "The Secret of Library Marketing: Making Yourself Indispensable," American Libraries, Sept. 2001, Vol. 32(8) p. 48.

information. The ISBD's objectives were to make records from different sources interchangeable, to facilitate their interpretation against language barriers, and to facilitate the conversion of such records to machine-readable form.* [(8)]

• RFID (Radio-frequency identification). It is the use of a wireless non-contract system that uses radio frequency electromagnetic fields to transfer data from tag attached to an object, for the purpose of automatic identification and tracking. RFID is a well established technology. It is a versatile technology. It can be used to tag assets so that information about them can be collected. It can be used to identify individuals in order to allow or prevent access or to provide information about their whereabouts. It can be used as part of systems for logistics and delivery tracking, security or for managing safety inspection.* [(9)]

• Z39.50 is a client–server protocol for searching and retrieving information from remote computer databases. Z39.50 is widely used in library environments and is often incorporated into integrated library systems and personal bibliographic reference software. Interlibrary catalogue searches for interlibrary loan are often implemented with Z39.50 queries.* [(10)]

• The Apache HTTP Server commonly referred to as Apache, is web server software notable for playing a key role in the initial growth of the World Wide Web.* [(11)]

• MySQL ("My S-Q-L", officially, but also incorrectly called "My Sequel") is the world's most used relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. It is named after co-founder Michael Widenius' daughter, My. The SQL phrase stands for Structured Query Language. The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL is an open source database management system and is used in some of the most frequently visited

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(8) ISBD, [Available online: http://www.ifla.org/publications/international-standard-bibliographic-description].

(9) RFID, [Available online: http://rfidanalysis.org/].

(10) National Information Standards Organization, Information Retrieval (Z39.50): Application Service Definition and Protocol Specification, Retrieved: January 23, 2011, [Available online: http://www.loc.gov/z3950/].

(11) Apache, (2009), About the Apache HTTP Server Project, [Available online: http://httpd.apache.org/ABOUT_APACHE.html].

websites on the Internet, including Flickr, Nokia.com, YouTube and as previously mentioned, Wikipedia, Google, Facebook and Twitter.* [(12)]

• IIS (Internet Information Services) – formerly called Internet Information Server – is a web server application and set of feature extension modules created by Microsoft for use with Microsoft Windows.* [(13)]

• OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting) is a protocol developed by the Open Archives Initiative. It is used to harvest (or collect) the metadata descriptions of the records in an archive so that services can be built using metadata from many archives. An implementation of OAI-PMH must support representing metadata in Dublin Core, but may also support additional representations. The protocol is usually just referred to as the OAI Protocol.* [(14)]

• CeCILL (from CEA CNRS INRIA Logiciel Libre) is a free software license adapted to both international and French legal matters, in the spirit of and retaining compatibility with the GNU General Public License.* [(15)]

• WIPO (The World Intellectual Property Organization) is one of the 17 specialized agencies of the United Nations. WIPO was created in 1967 "to encourage creative activity, to promote the protection of intellectual property throughout the world.* [(16)]

• FSF (The Free Software Foundation) is a non-profit corporation founded by Richard Stallman on 4 October 1985 to support the free software movement, a copyleft-based movement which aims to promote the universal freedom to create, distribute and modify computer software.* [(17)]

• MARC (MAchine-Readable Cataloging), is an international standard digital format for the description of bibliographic items developed by the Library of Congress during the 1960s to facilitate the creation and dissemination of computerized cataloging from library to library within the same country and between countries. There are several versions of MARC in use

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(12) MySQL, [Available online: http://www.mysql.com/].

(13) IIS (Internet Information Services), [Available online: http://www.iis.net].

(14) AI (Open Archives Initiative), [Available online: http://www.openarchives.org].

(15) CeCILL, [Available online: http://www.cecill.info/index.en.html].

(16) WIPO, [Available online: http://www.wipo.int/about-wipo/en].

(17) FSF, [Available online: http://www.fsf.org].

in the world, the most predominant being MARC 21, created in 1999 as a result of the harmonization of U.S. and Canadian MARC formats, and UNIMARC, widely used in Europe. MARC uses the ISO 2709 standard to define the structure of each record. This includes a marker to indicate where each record begins and ends, as well as a set of characters at the beginning of each record that provide a directory for locating the fields and subfields within the record.* [(18)]

• BerliOS (short for "Berlin Open Source") is a project founded by FOKUS, a Fraunhofer Institute located in Berlin, to coordinate the different interest groups in the field of open source software (OSS) and to assume a neutral coordinator function.* [(19)]

• PostgreSQL, often simply Postgres, is an object-relational database management system (ORDBMS) available for many platforms including Linux, FreeBSD, Solaris, Microsoft Windows and Mac OS X.* [(20)]

• JBoss Application Server (or JBoss AS) is an open-source Java EE-based application server. An important distinction for this class of software is that it not only implements a server that runs on Java, but it actually implements the Java EE part of Java.* [(21)]

• Unicode is a computing industry standard for the consistent encoding, representation and handling of text expressed in most of the world's writing systems.* [(22)]

• The Metadata Object Description Schema (MODS) is an XML-based bibliographic description schema developed by the United States Library of Congress' Network Development and Standards Office. MODS was designed as a compromise between the complexity of the MARC format used by libraries and the extreme simplicity of Dublin Core metadata.* [(23)]

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(18) Library of Congress, MARC standard, [Available online: http://www.loc.gov/marc/].

(19) BerliOS, [Available online: http://www.berlios.de].

(20) PostgreSQL, [Available online: http://www.postgresql.org].

(21) JBoss, [Available online: http://www.jboss.org].

(22) Unicode, [Available online: http://www.unicode.org/].

(23) MODS, [Available online: http://www.loc.gov/standards/mods].

• The Metadata Encoding and Transmission Standard (METS) is a metadata standard for encoding descriptive, administrative, and structural metadata regarding objects within a digital library, expressed using the XML schema language of the World Wide Web Consortium.* [(24)]

• RSS (originally RDF Site Summary, often dubbed Really Simple Syndication) is a family of web feed formats used to publish frequently updated works—such as blog entries, news headlines, audio, and video—in a standardized format. An RSS document (which is called a "feed", "web feed", or "channel") includes full or summarized text, plus metadata such as publishing dates and authorship. RSS feeds benefit publishers by letting them syndicate content automatically. A standardized XML file format allows the information to be published once and viewed by many different programs. They benefit readers who want to subscribe to timely updates from favorite websites or to aggregate feeds from many sites into one place. RSS feeds can be read using software called an "RSS reader", "feed reader", or "aggregator", which can be web-based, desktop-based, or mobile-device-based. The user subscribes to a feed by entering into the reader the feed's URI or by clicking a feed icon in a web browser that initiates the subscription process. The RSS reader checks the user's subscribed feeds regularly for new work, downloads any updates that it finds, and provides a user interface to monitor and read the feeds. RSS allows users to avoid manually inspecting all of the websites they are interested in, and instead subscribe to websites such that all new content is pushed onto their browsers when it becomes available.* [(25)]

• ILL (Interlibrary loan), (abbreviated ILL, and sometimes called interloan, document delivery, or document supply) is a service whereby a user of one library can borrow books or receive photocopies of documents that are owned by another library. The user makes a request with their local library, which, acting as an intermediary, identifies owners of the desired item, places the request, receives the item, makes it available to the user, and arranges for its return. The lending library usually sets the due date and overdue fees of the material borrowed. Although books and journal articles are the most frequently requested items, some libraries will lend audio recordings, video recordings, maps, sheet music, and microforms of all kinds. In many cases, nominal fees accompany interlibrary loan services. The term document delivery may also be used for a related service, namely the supply of journal articles and other copies on a personalized basis, whether these come from other libraries or direct from publishers. The end user is usually responsible for any fees, such as costs for postage or photocopying. Commercial document delivery services will borrow on behalf of any customer willing to pay their rates. Interlibrary loan, or resource sharing, has two operations: borrowing and lending. A borrowing library sends an owning library a

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(24) METS, [Available online: http://www.loc.gov/standards/mets].

(25) RSS & RDF, [Available online: http://www.whatisrss.com] and [Available online: http://www.rdfabout.com].

request to borrow, photocopy, or scan materials needed by their patron. The owning library fills the request by sending materials to the borrowing library or supplies a reason why it cannot fill the request.* [(26)]

• SQL ("S-Q-L"; sometimes referred to as Structured Query Language) is a special-purpose programming language designed for managing data in relational database management systems (RDBMS).* [(27)]

• CQL (common query language). It is a formal language for representing queries to information retrieval systems such as web indexes, bibliographic catalogs and museum collection information.* [(28)]

• XML (Extensible Markup Language) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. It is a textual data format with strong support via Unicode for the languages of the world. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services.* [(29)]

• LDAP (The Lightweight Directory Access Protocol) is an application protocol for accessing and maintaining distributed directory information services over an Internet Protocol (IP) network. Directory services may provide any organized set of records, often with a hierarchical structure, such as a corporate electronic mail directory. Similarly, a telephone directory is a list of subscribers with an address and a phone number.* [(30)]

• ISO 2709 is an ISO standard for bibliographic descriptions, titled Information and documentation—Format for information exchange.* [(31)]

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(26) Buchanan, Sherry, "Interlibrary Loan is the New Reference: Reducing Barriers, Providing Access and Refining Services," Interlending & Document Supply 37, no. 4 (2009): 168-170.

(27) SQL, [Available online: http://www.sql.org].

(28) CQL, [Available online: http://www.loc.gov/standards/sru/specs/cql.html].

(29) XML, [Available online: http://www.w3.org/XML].

(30) LDAP, [Available online: http://www.openldap.org/].

(31) ISO 2709, [Available online: http://www.iso.org].

• Java is a programming language originally developed by James Gosling at Sun Microsystems (which has since merged into Oracle Corporation) and released in 1995 as a core component of Sun Microsystems' Java platform.* [(32)]

• PHP is a general-purpose server-side scripting language originally designed for Web development to produce dynamic Web pages. It is one of the first developed server-side scripting languages to be embedded into an HTML source document, rather than calling an external file to process data.* [(33)]

• UTF-8 (UCS Transformation Format8-bit) is a variable-width encoding that can represent every character in the Unicode character set. It was designed for backward compatibility with ASCII and to avoid the complications of endianness and byte order marks in UTF-16 and UTF-32. UTF-8 has become the dominant character encoding for the World-Wide Web, accounting for more than half of all Web pages.* [(34)]

• The GNU General Public License (GNU GPL or simply GPL) is the most widely used free software license. It was originally written by Richard Stallman for the GNU Project. The GPL is the first copyleft license for general use, which means that derived works can only be distributed under the same license terms. Under this philosophy, the GPL grants the recipients of a computer program the rights of the free software definition and uses copyleft to ensure the freedoms are preserved, even when the work is changed or added to. This is in distinction to permissive free software licenses, of which the BSD licenses are the standard examples. The GPL was written by Richard Stallman in 1989 for use with programs released as part of the GNU project. These licenses contained similar provisions to the modern GPL, but were specific to each program, rendering them incompatible, despite being the same license. Stallman's goal was to produce one license that could be used for any project, thus making it possible for many projects to share code.* [(35)]

• A GPL linking exception modifies the GNU General Public License (GPL) to create a new, modified license. Such modified licenses enable software projects which provide library code, to be "linked to" the programs that use them, without applying the full terms of the GPL to the using program. Linking is the technical process of connecting code in a library to the using code, to produce a single executable file. It is performed either at compile time or

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(32) Java, [Available online: http://www.java.com/en].

(33) PHP, [Available online: http://www.php.net].

(34) UTF-8, [Available online: http://www.utf8-chartable.de/].

(35) GNU, [Available online: http://www.gnu.org].

run-time in order to produce functional machine-readable code. Many free software libraries which are distributed under the GPL use an equivalent exception, although the wording of the exception varies.* [(36)]

• BSD licenses are a family of permissive free software licenses. The original license was used for the Berkeley Software Distribution (BSD), a Unix-like operating system after which it is named. The original owners of BSD were the Regents of the University of California because BSD was first written at the University of California, Berkeley. The first version of the license was revised, and the resulting licenses are more properly called modified BSD licenses.* [(37)]

• The MIT License is a free software license originating at the Massachusetts Institute of Technology (MIT). It is a permissive free software license, meaning that it permits reuse within proprietary software provided all copies of the licensed software include a copy of the MIT License terms.* [(38)]

(36) GPL, [Available online: http://opensource.org/licenses/gpl-license].

(37) BSD, [Available online: http://opensource.org/licenses/BSD-3-Clause].

(38) MIT, [Available online: http://opensource.org/licenses/MIT].

Components Of OSS For Library Management

The comparative is focusing on seven main components in a library management system. The following central point are related with the study, and they are the main comments of library management system software packages. The first component is historical information such as initiation, developed by and country. The second component is environment such as operating system (i.e., Linux, Windows, MacOS), programming language (i.e., Java, SQL, PHP), database (i.e., PostgreSQL, MySQL), software, architecture, and requirements).The third component is a traditional service such as acquisitions (i.e., ordering, receiving of materials), cataloging (i.e., classifying and indexing of materials), circulation (i.e., lending and receiving of materials) and serials management (i.e., managing magazine. The forth component is formats and standards such as MARC, Z39.50, ISO2709, UNICODE and ISBD.

The fifth is common components such as license (i.e., GNU, GPL, BSD, MIT, CeCILL), security, maintenance, and Data migration (Import & export).The sixth is advanced components such as RSS, RFID (barcode support), LDAP, OAI, and ILL. The last component is additional components such as E-document management (i.e., full text searching), multiple language support (i.e., Arabic, English, French language support), Remote access capability, User friendly (i.e., interface & attractive, multi styles), documentation supporting, multiple types of media (i.e., books, magazine, video, sound record) and ability to customize.* [(39) , (40)]

Thus, the comparative of the seven main components of a library management system software package is presented in Figure C and CC.

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(39) Bainbridge, David. How to Build a Digital Library/ David Bainbridge .- LONDON: Elsevier Inc, 2010 .- P 285-360 ; 21cm.

(40) Soohyung Joo and Iris Xie. Evaluation Constructs and Criteria for Digital Libraries: A Document Analysis .- (2013) .- P126-140 , [online: www.igi-global.com/chapter/evaluation-constructs-criteria-digital-libraries/74326].

No	Components	Features
1	History	Initiation
		Developed by
		Country
2	Environment	Operating System
		Programming Language
		Database
		Software
		Architecture
		Requirements
3	Traditional Services	Cataloguing
		Circulation
		Acquisition
		OPAC
		Serial control
		Management
		Report
		SDI
		Authorities & Thesaurus
4	Formats and Standards	MARC
		Z39.50
		ISO 2709
		ISBD
		UNICODE
		XML
5	Common Components	Copyright & License
		Security & Backup
		Maintenance
		Data migration (Import & export)
6	Advanced Components	RFID support
		RSS support
		LDAP support
		OAI
		Interlibrary Loan (ILL)
7	Additional Components	E-document management
		Multiple language support
		Remote access capability
		User friendly (Interface & attractive)
		Documentation Supporting (help & manuals)
		Multiple Types of Media
		Ability to customize
		Portal
		Portable

Figure C (Library management system software components)

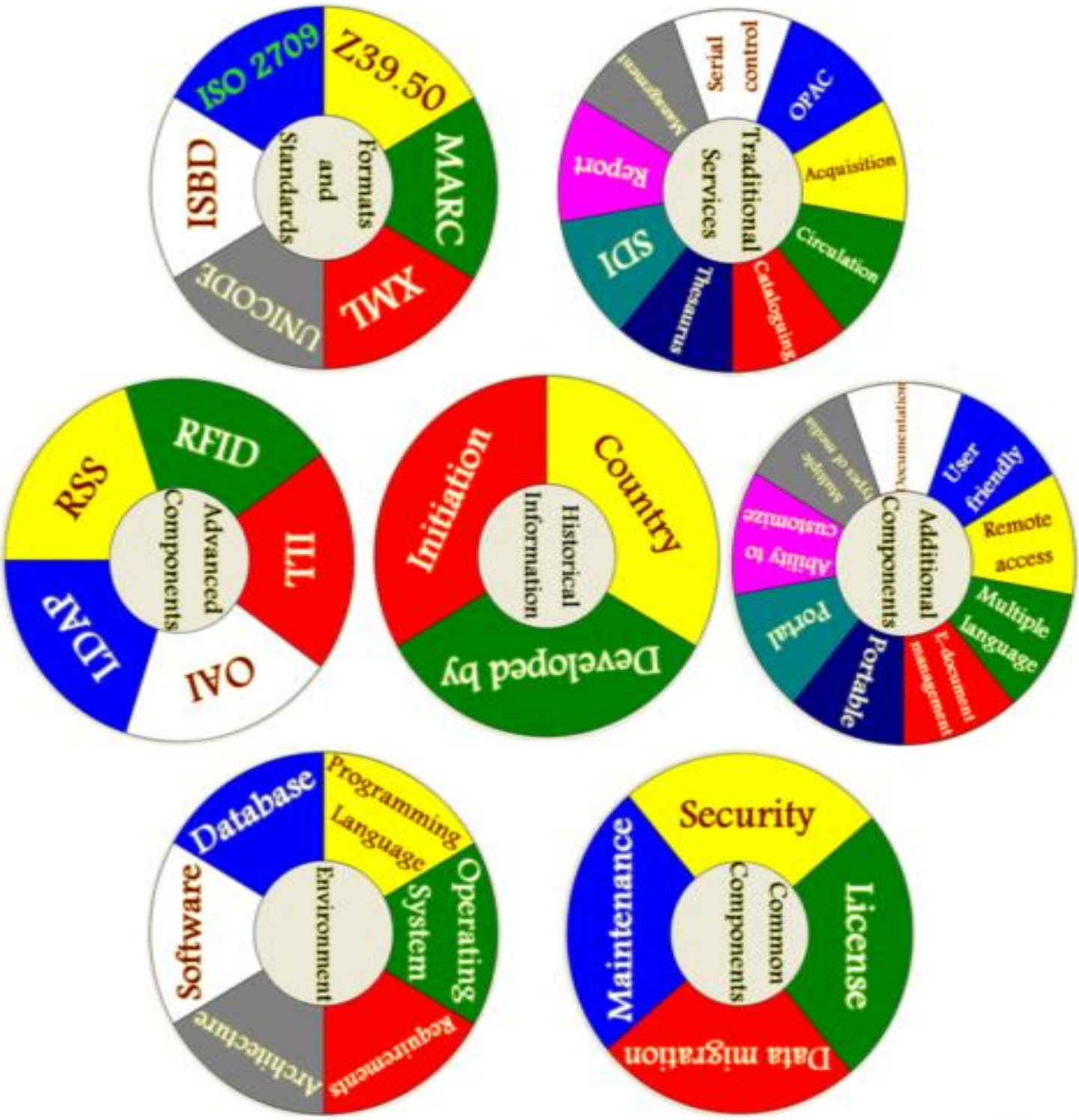

Figure CC (Library management system software components)

FEATURE AND COMPATIBILITY

The comparative results are grouped by components and features. Section 1 is devoted to environment for both software's. Section 2 is devoted to environment for both software's. Section 3 contains comparative results of basic traditional library management system services. Section 4 contains results of formats and standards are supported by PhpMyBiblio & NewGenLib. Section 5 presents comparative results of common library management services. Section 6 presents comparative results of advanced Components. Section 7 presents comparative results of additional components & features.

Section 1 (historical information):

PhpMyBiblio project was initiated by François Lemarchand, Director of the Public Library of Agneaux; it is now maintained by PMB Services (a French Company) in October 2002, While in march 2005, NewGenLib version 1.0 was released by Verus Solutions Pvt Ltd and the Kesavan Institute of Information and Knowledge Management, India. * [(41) , (42)]
Thus, the comparative of historical information components is presented in Figure D.

Features	PhpMyBiblio	NewGenLib
Initiation	2002	2005
Developed by	PMB Services Company	Verus Solutions Pvt Ltd and the Kesavan Institute of Information and Knowledge Management
Country	France	India
Viability Indicator Term	Good	Good
Viability Indicator Result	1	1

Figure D (historical information component)

Section 2 (Environment):

Background :

Both PhpMyBiblio and NewGenLib are web-based solutions. By this is meant that they are distributed applications; programs that run on more than one computer and communicate

(41) PMB Development Team. PMB: Documentation / PMB Development . - (June 2013) Accessed . - [Available online: http://www.sigb.net].

(42) Verus Solution main page, [Available online: http://www.verussolutions.biz/index.php].

through a network or server. Specifically, web applications are accessed with a web browser and are popular because of the ease of using the browser as a user client. For the enterprise, the ability to update and maintain web applications without deploying and installing software on potentially thousands of client computers is a key reason for their popularity. Both PhpMyBiblio and NewGenLib use programming languages which are designed for web applications and therefore are platform-neutral. Both are possible to be used on a single computer (localhost), an institutional LAN or WAN, as well as in consortium mode across several networked libraries via the worldwide web (Web). Both PhpMyBiblio and NewGenLib can be operated on Windows and Linux operating systems.

Architecture:

PhpMyBiblio is a 3-tier application based on a typical web environment; it is based on web technology. This is what we sometimes call a 'web-app'. PhpMyBiblio uses the Apache web server and the MySQL database server, two of the most popular open source tools in use worldwide.* [(43)]

On the other hand NewGenLib uses a number of well supported and widely-used, reliable and well tested open source components like PostgreSQL, Apache Tomcat, and Solr Lucene, It is entirely Java-based, platform-neutral. NewGenLib is based on the so called n-tier architecture with an Application Server that mediates between the client machines and the database server.* [(44)]

Software:

PhpMyBiblio is written in Php, It is a powerful side-server programming language witch successfully used in web applications. JavaScript is also used within pages. PhpMyBiblio also uses style sheets to control how data is displayed. While NewGenLib is entirely Java-based.

Requirements:

PhpMyBiblio requirements:

1. Server side :

A- Any web server capable of integrating the PHP scripting language.

B- The PHP language to execute the scripts.

C- MySQL 5 or higher database server.

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(43) same reference [41].

(44) same reference [42].

2. Client side: web browser.* [(45)]

On the other hand NewGenLib requirements are:

1. Server side:

A- J2SE Software Development Kit (SDK).

B- PostgreSQL for Windows.

C- JBoss Application Server.

D- Java Runtime Environment (JRE).

3. Client side: web browser.* [(46)]

Therefore NewGenLib architecture is complexes, while PhpMyBiblio structure is suitable and enough for our need. Thus, the comparative of environment components are presented in Figure E.

Features	PhpMyBiblio	NewGenLib
Operating System	Linux, Windows, MacOS	Linux, Windows
Programming Language	PHP	Java
Database	MySQL	PostgreSQL
Requirements	HTTP server, MySQL	PostgreSQL, JBoss ,Application server
Query language	SQL	CQL
Install	Easy to install on windows platform	Need experience to install on windows platform
Tech Processing	Strong	More stronger
Viability Indicator Term	Very Good	Very Good
Viability Indicator Result	2	2

Figure E (Environment of PhpMyBiblio & NewGenLib)

Section 3 (Traditional Services):

Traditional library management system services focused in this section include cataloging, circulation, OPAC, acquisition, serial control, management, report (statistical report generation), SDI, authorities and thesaurus.

---

(45) same reference [41].

(46) same reference [42].

PhpMyBiblio and NewGenLib provide a strong support for all traditional services listed here. Both PhpMyBiblio and NewGenLib are lack managing digital contents supporting, because they are not mainly designed for managing digital contents, but they are allowed digital attachments to metadata.

Both PhpMyBiblio and NewGenLib are supported statistical report generation and barcode management.

NewGenLib is more supported to the idiosyncrasies of serials and need for better control in their management. Also it is more supported to acquisition models. While PhpMyBiblio has excellent SDI and authorities models, it has the following thesauri and classification schemes:

1. Thesauri installed with PMB
1.1. The UNESCO Thesaurus
1.2. Agneaux Media Library Thesaurus
1.3. Environment Thesaurus
2. Decimal classifications installed with PhpMyBiblio
2.1. Chambery Public Library**.**
2.2. Dewey style.
2.3. 100 knowledge boxes or color wheel.* [(47)]

Thus, the comparative of Traditional Services are presented in Figure F.

Features	PhpMyBiblio	NewGenLib
Cataloguing	**Yes**	**Yes**
Circulation	**Yes**	**Yes**
OPAC	**Yes**	**Yes**
Acquisition	**Less**	**More**
Serials control	**Less**	**More**
Management	**Yes**	**Yes**
SDI	**Yes**	**Yes**
Authorities & Thesaurus	**More**	**Less**
Viability Indicator Term	**Good**	**Very Good**
Viability Indicator Result	**1**	**2**

Figure F (Traditional Services supported by PhpMyBiblio & NewGenLib)

Section 4 (Formats and Standards):

Both PhpMyBiblio and NewGenLib had compliancy of all features including in this component. Both of them are facilitated the conversion of records to machine-readable ISBD form, because they are supported machine-readable cataloging (MARC) standard. Both of

(47) same reference [41].

them are supported XML which is widely used for the representation of arbitrary data structures, for example in web services. Both of them are supported ISO 2709 for bibliographic descriptions and unicode standard.
More formats and standards are supported by PhpMyBiblio (version. 3.5.1) such as UNMARC, but NewGenLib has more compliant with data and access standard (MARC 21), also it has compliance with interoperability standards.* [(48)]

Thus, the comparative of formats and standards are presented in Figure J.

Features	PhpMyBiblio	NewGenLib
MARC	UNMARC	MARC21
Z39.50	Yes	Yes
ISO 2709	Yes	Yes
ISBD	Yes	Yes
UNICODE	Yes	Yes
XML	Yes	Yes
Viability Indicator Term	Good	Very Good
Viability Indicator Result	1	2

Figure J (Formats and Standards supported by PhpMyBiblio & NewGenLib)

Section 5 (Common Components):

Both PhpMyBiblio and NewGenLib are supported all features including in this component.
Both of them had ability to supported multiple security levels, importing and exporting of bibliographic records in several formats, migration of bibliographic data from winisis software. Both of them had good security features, backup option, and maintenance module. Also Both of them had compliancy with general public license.
Thus, the comparative of common components are presented in Figure Q.

Features	PhpMyBiblio	NewGenLib
Copyright & License	CeCILL	GNU / GPL
Security & Backup	Yes	Yes
Maintenance	Yes	Yes
Data migration (Import & export)	Yes	Yes
Viability Indicator Term	Very Good	Very Good
Viability Indicator Result	2	2

Figure Q (Common Components supported by PhpMyBiblio & NewGenLib)

(48) same reference [42].

Section 6 (Advanced Components):

Both PhpMyBiblio and NewGenLib are a good indication of the ability to support interlibrary loan management systems, because they are supported MARC and Z39.50 protocol. Both PhpMyBiblio and NewGenLib are provided RFID and RSS integration.
Both PhpMyBiblio and NewGenLib are complied with international OAI protocol.
Both PhpMyBiblio and NewGenLib had the ability to accessing and maintaining distributed directory information services over an Internet Protocol (IP) network, because they are supported LDAP protocol.
Thus, the comparative of advanced components are presented in Figure R.

Features	PhpMyBiblio	NewGenLib
RFID support	Yes	Yes
RSS support	Yes	Yes
LDAP support	Yes	Yes
OAI	Yes	Yes
Interlibrary Loan (ILL)	Yes	Yes
Viability Indicator Term	Very Good	Very Good
Viability Indicator Result	2	2

Figure R (Advanced components supported by PhpMyBiblio & NewGenLib)

Section 7 (Additional Components):

Several additional features such as E-document management, multiple language support, remote access capability, user interface, documentation, multiple types of media supported, ability to customize, Portal supported and Portable ability are selected to be compared.
Both PhpMyBiblio and NewGenLib are supported documentation and an active community.
Both PhpMyBiblio and NewGenLib are allowed digital attachments to metadata, but they are partially supported an electronic document, when we talk about full text searching. Both PhpMyBiblio and NewGenLib are supported multi types of media collection of books, journals, DVDs, CDs, Maps and video games, and available in multiple languages such as Arabic, French and English.
Note : The last versions of NewGenLib and PhpMyBiblio had Portal feature.
Both PhpMyBiblio and NewGenLib are provided email notification.
PhpMyBiblio looks quite intuitive. While NewGenLib looks less attractive for non-librarians

Thus, the comparative of Additional Components are presented in Figure S.

Features	PhpMyBiblio	NewGenLib
E-document management	Partially support	Partially support
Multiple language support	Yes	Yes
Remote access capability	Yes	Yes
User friendly (Interface & attractive)	More	Less
Documentation Supporting (help & manuals)	Yes	Yes
Multiple Types of Media	Yes	Yes
Ability to customize	Yes	Yes
Portal	New version of both software's have this feature	
Portable	Yes	No
Viability Indicator Term	Very Good	Good
Viability Indicator Result	2	1

Figure S (Additional components supported by PhpMyBiblio & NewGenLib)

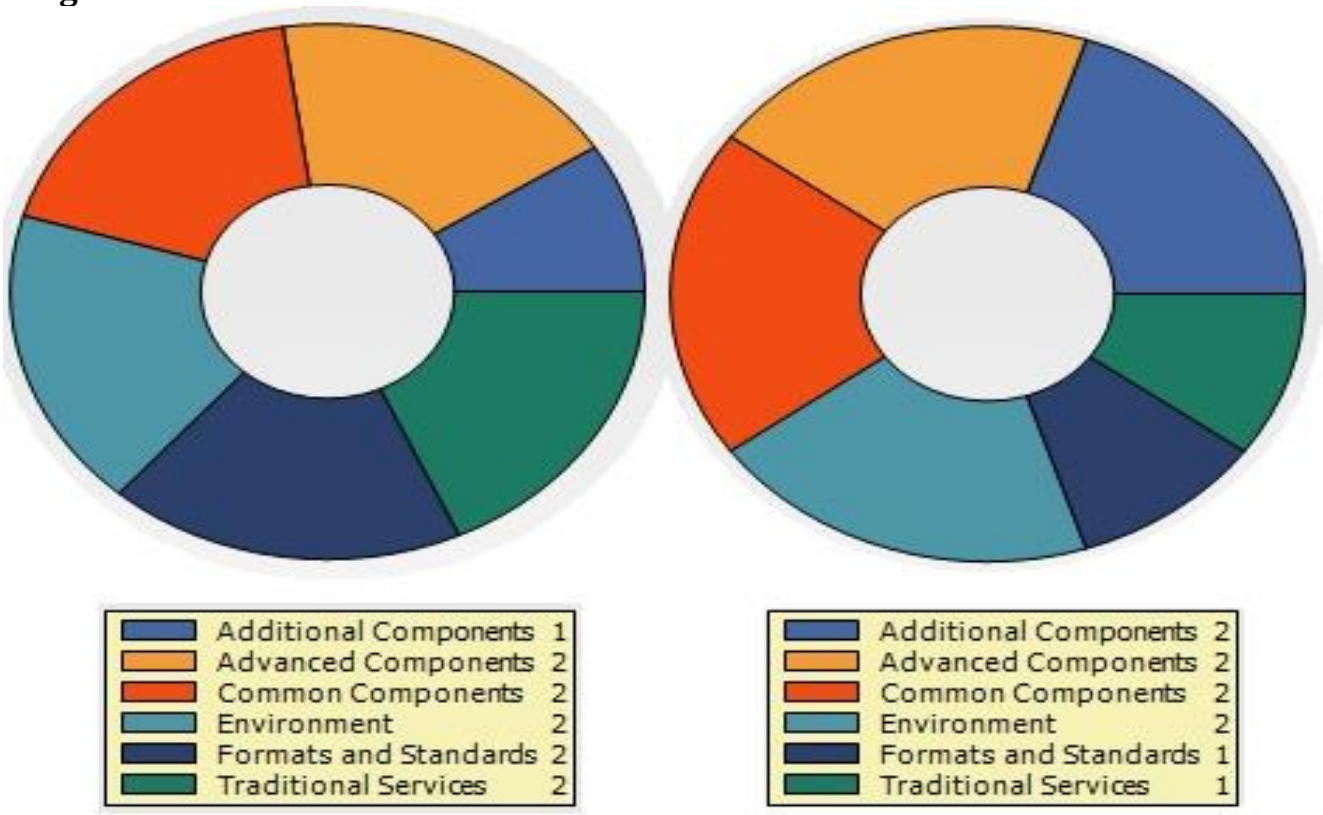
Result:

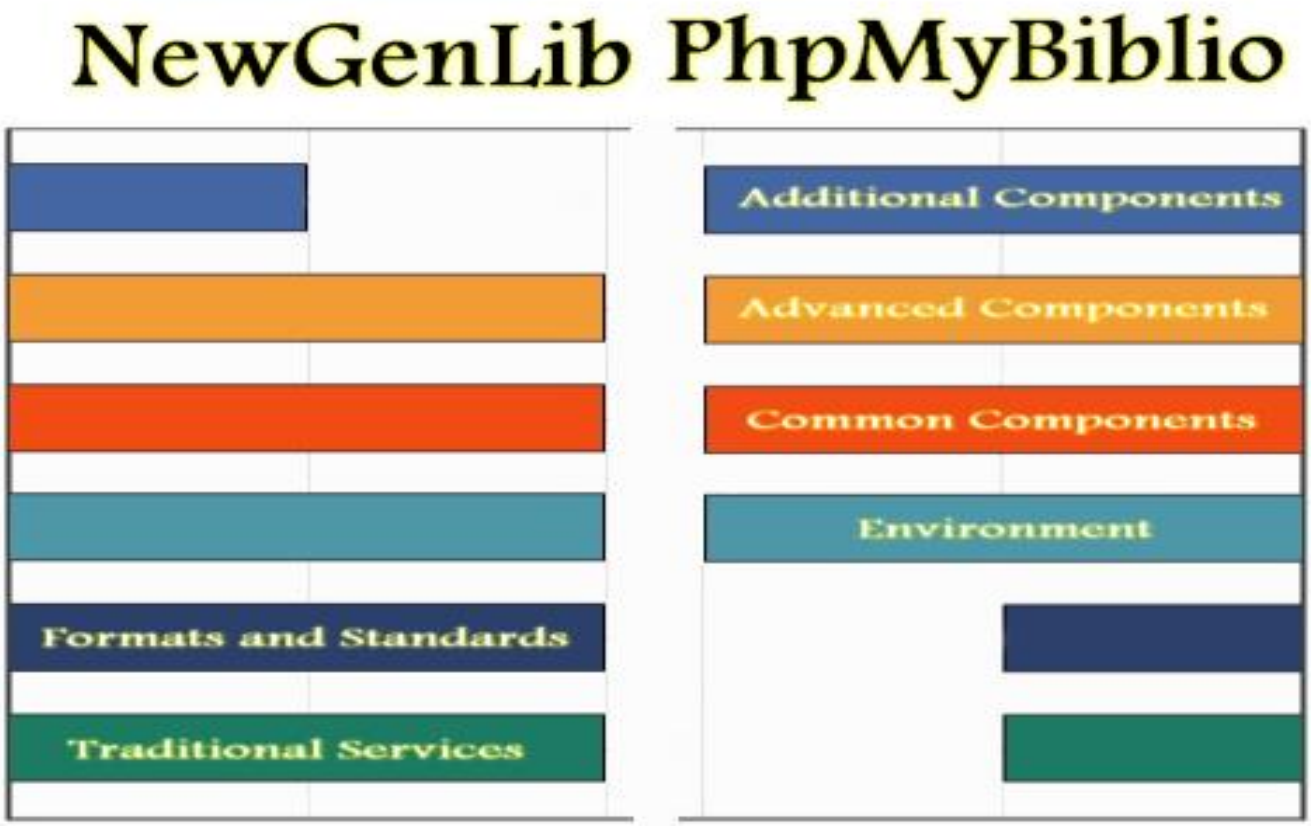
We got the percentages derived from multiplying each value we have obtained, the value we gave it to each component in the components-list depending on library management system software components, which we are suggested it according the needs of the Library of Jordan University. Figure T explain with details:

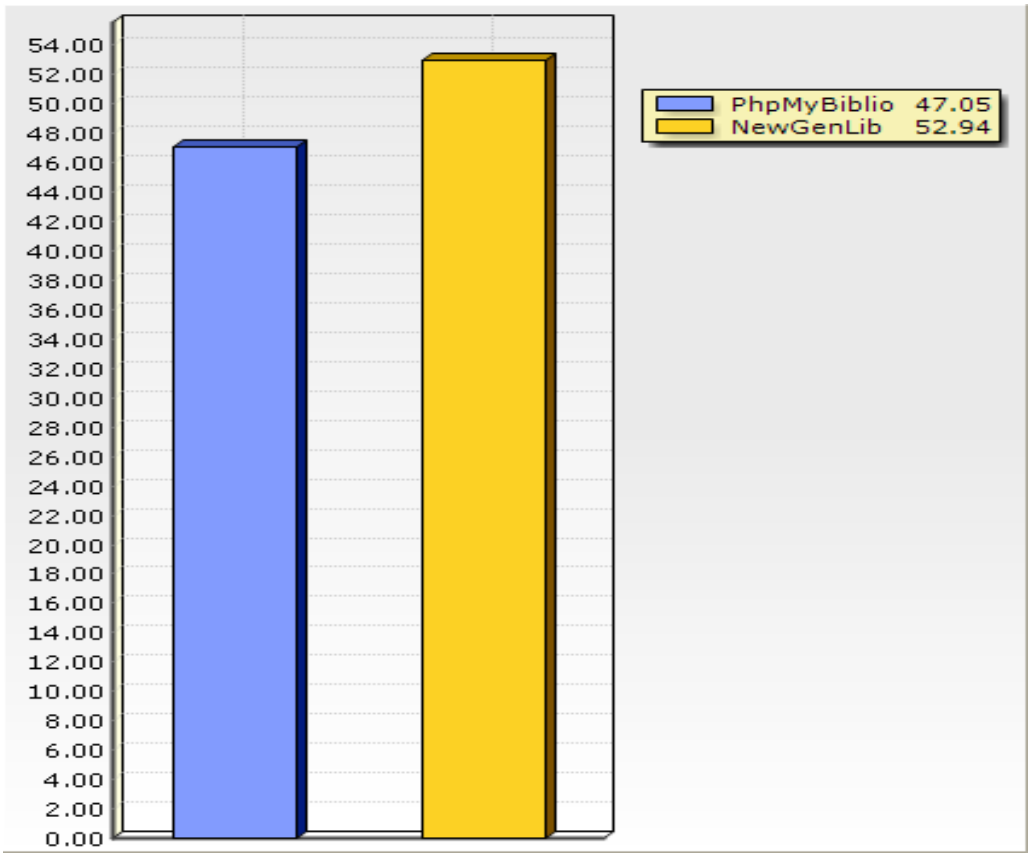
No	1	2	3	4	5	6	7	Total	Percentages Derived
Component	Information History	Environment	Traditional Services	Formats and Standards	Common Components	Advanced Components	Additional Components		
Max Components Values	0	1.5	2.0	2.0	2.0	0.5	2.0	10	
Max Viability Marks	2	2	2	2	2	2	2	14	
PhpMyBiblio Marks	1	2	1	1	2	2	2	11	
NewGenLib Mark	1	2	2	2	2	2	1	12	
Max Result Marks	(2*0)= 0	(2*1.5)= 3	(2*2)= 4	(2*2) = 4	(2*2)= 4	(2*0.5)= 1	(2*2)= 4	20	
PhpMyBiblio Result Marks	(1*0) = 0	(2*1.5) = 3	(1*2) = 2	(1*2) = 2	(2*2) = 4	(2*0.5) = 1	(2*2) = 4	16	(16*100)/34 = 47.05
NewGenLib Result Marks	(1*0) = 0	(2*1.5) = 3	(2*2) = 4	(2*2) = 4	(2*2) = 4	(2*0.5) = 1	(1*2) = 2	18	(18*100)/34 = 52.94

Figure T (percentages derived table)

Diagrams:


Additional Components 1
Advanced Components 2
Common Components 2
Environment 2
Formats and Standards 2
Traditional Services 2
Additional Components 2
Advanced Components 2
Common Components 2
Environment 2
Formats and Standards 1
Traditional Services 1


NewGenLib
PhpMyBiblio
Formats and Standards
Traditional Services
Additional Components
Advanced Components
Common Components
Environment


54.00
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2.00
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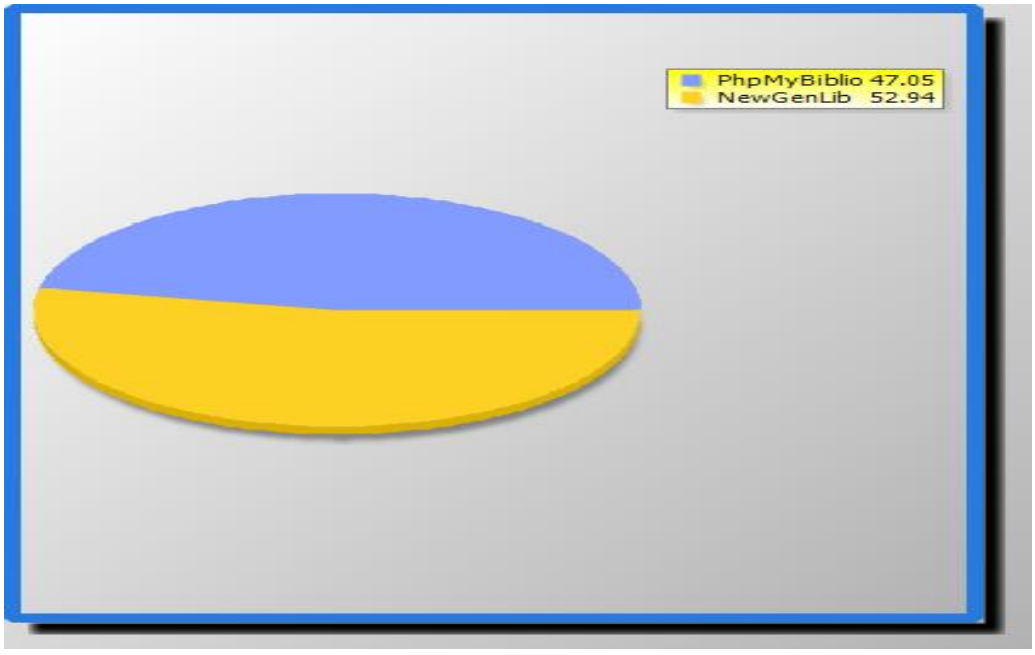
PhpMyBiblio 47.05
NewGenLib 52.94


PhpMyBiblio 47.05
NewGenLib 52.94

Conclusions:

According on components-list the theoretical study and installation tests found out both open source software packages (PhpMyBiblio & NewGenLib) related to library management systems are compared. The comparative is focusing on seven main components in a library management system including historical information, environment, traditional services, formats and standards, advanced features, common components and additional features.

Evaluation testing & the comparative study between PhpMyBiblio (version. 3.5.1) and NewGenLib (version. 3.0) refer to difference in environment, structure, standardized, customized, authorities, documentation support, installing, ability to personal customize and ability to be potable. PhpMyBiblio (version. 3.5.1) has more specific characteristics of open source ILMS. PhpMyBiblio (version. 3.5.1) needs to upgrade, modify and improve its features. PhpMyBiblio (version. 3.5.1) requires very little hardware and is easy to install.

PhpMyBiblio (version. 3.5.1) has advanced database features. NewGenLib (version. 3.0) has better functionality of modules than PhpMyBiblio (version. 3.5.1). More formats and standards are supported by PhpMyBiblio (version. 3.5.1). Digital library functionality of NewGenLib (version. 3.0) is more specific in terms of technology, data structure and programming.

NewGenLib (version. 3.0) provides more user help and support whereas PhpMyBiblio (version. 3.5.1) provides more user-friendly downloads and a documentation facility.

NewGenLib (version. 3.0) has more enhanced features which are significant for ILMS while selecting software for automation.

Depending on the percentages derived from the study NewGenLib is suitable to academic Library, this logical because it has better functionality of modules and standards, it has more compliant with data and access standard (MARC 21), also it has compliance with interoperability standards. While PhpMyBiblio is suitable to public and school library because it has attractive features, it looks more attractive for non-librarians.

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