



Submitted on: 08.02.2022

DOI: 10.5281/zenodo.6011732

Digital transformation in the service of knowledge and information

Ivana Pešić

Procurement planning department, Public Library Radislav Nikcevic, Jagodina, Serbia.
pesic.jagodina@gmail.com

Suzana Tanasijević

Registry office, Public Library Radislav Nikcevic, Jagodina, Serbia.
suzanatanasijevic@gmail.com

Ivica Lazarevic

Registry office, Public Library Radislav Nikcevic, Jagodina, Serbia.
lazarevic.ivica@gmail.com



Copyright © 2021 by Ivana Pesic, Suzana Tanasijevic and Ivica Lazarevic. This work is made available under the terms of the Creative Commons Attribution 4.0 International License: <http://creativecommons.org/licenses/by/4.0>

Abstract:

We are pleased to present the Moodle platform for e - learning. Such platform is created for organizing seminars for librarians covering topics such as programming and digital technologies by way of uploading the materials that are used for conducting the remote seminars. The goal is to introduce to librarians the whole new world of coding and creative thinking which will contribute to development of their digital literacy and acquiring digital competencies that could be used to produce more innovation. Such a librarian will have potential to transform his library into innovational and educational center around technology that includes: micro:bit, robotics, 3D modelling, use of free open source platforms.

Moodle, as a free open source software, matches the philosophy of knowledge sharing that is promoted by libraries. The system is a LMS platform created primarily for schools, but the modular software architecture allows the system to be adapted to the needs of various organizations. Standard modules of the platform offer creation of multimedia content, tasks, quizzes, forums, wiki pages, document sharing, viewing calendar events, sending instant messages, etc. Moodle supports open standards (such as xAPI), which allow its users to



Submitted on: 08.02.2022

share previously created educational content amongst different LMS systems. As a result of open standards, integration with other systems has been simplified, such as with H5P interactive content. Moodle could be additional tool that libraries may use to connect authors and users with a view of making a content much more accessible to their members. With this, we have responded to the challenge that librarians are facing due to the Covid - 19 pandemics, and we directly impacted professional development in the digital era. We can be proud of the fact that we are initiators of positive social change which, as a result, has digital transformation of how librarians do their work in the ``new normal``.

Keywords: Digital transformation, Moodle platform, e – learning, free software, programming

Digital transformation Public Library in Jagodina

The Public Library in Jagodina is a cultural institution with longest tradition in the city. The first written record of it dates back to the distant 1851. Today, in the modern era, digital transformation is an imperative for all businesses, from small to the enterprise. Digital transformation as a process is especially important for the business of cultural organizations such as libraries. Digital transformation is a crucial issue important for the survival of libraries and their transformation from a traditional - passive to a digital - proactive system. It's a survival issue in transitional period for public libraries all over the world. Digital transformation is the integration of digital technology into all areas of a business, fundamentally changing how you operate and deliver value to customers. It is also a cultural change that requires organizations to constantly question the status quo, experiment and innovate in order to make positive changes in the community.

Digital transformation is a necessity for the development of a new level imposed by the constant need of library users for professional development in the digital era.

The Public Library in Jagodina is keeping pace with world trends in the development of librarianship, all with the aim of timely meeting the growing needs of library users, which are conditioned by the accelerated digital development of society in all spheres.

The library in Jagodina started its digital transformation years ago. Beyond its cultural and educational mission, the library also has the role of a guardian of the local heritage. In this context, during 2008, the library began to develop the digitization process in the Native Department and has been constantly improving its software development ever since.



Submitted on: 08.02.2022

The goal of all implemented projects of the digital inclusive library is to improve the quality of life of people in the local community. As a part of the all project activities, the library has developed problem - solving services and improved the lives of different categories of people in the community.

Digitally inclusive library projects

The chronology of the most important library services are:

1. Digitization of native material

During 2008-2009, the Library developed the construction of software for digitization of native material and a program for reviewing digitized material, called *Textbook*.

During 2008, the goods were completed: adaptation of the Native Department, procurement of technical equipment for digitization, construction of software for digitization of native materials, development of a program for review of digitized material called *Textbook* and development of software for processing scanning materials

During 2009, in cooperation with the National Library of Serbia, the first digitized collection from the Native Department of the Jagodina Library was presented within the Digital National Library of Serbia.

"The first digitized collection of the Native Material of the Library in Jagodina included:

1. Collection of books of the Public Library in Jagodina - contained 84 digital documents with a total of 13,261 pages.

2. Photo album of Jagodina in the past - contained one digital document with a total of 21 pages.

3. Jagodina on old postcards - contained 28 digital documents with a total of 28 pages.

In the first phase of the development of digitalization, 165 monographs, 72 postcards, 1 photo album and 2 pictures of old Jagodina were scanned in the Public Library in Jagodina. In the same period, 17,490 scanned digital documents were created."¹

The first version of the Digital Library in Jagodina was launched in 2010 within the AgroLib website. The Digital Library is based on the original software for organizing digital collections called *SOFKA*. Existing digital collections available online are being

1

Tanasijevic, S. "Digitalna transformacija jagodinske biblioteke - bibliotečke usluge u novoj paradigmi, UN agenda za održivi razvoj 2030", Montenegro - Libraries, Archives and Museums LAM 2019 conference, 140



actively supplemented with new content.

The current version was published in 2011 and contains digital collections available within the Digital Public Library in Jagodina section on the official website² of the Library.

2. AgroLib – Ja (Agricultural Library in Jagodina)

In the period from 2010 to 2019, the Library implemented the project *AgroLib - Ja*, the most successful and most awarded project for digital inclusion and economic support to agricultural producers. The AgroLib project was invented with aim to improve the lives of people in the villages through the creation of a network of rural libraries that provide information and communication services for farmers. The AgroLib has revitalized and transformed four village libraries in the municipality of Jagodina, Pomoravlje region of central Serbia, into communication, information and educational center, which leads to economic and social changes in the community and beyond. The service was launched in 2010, with support of the EIFL Public Library Innovation Program (EIFL-PLIP), combining free computer and internet access and skills training, a web portal and online marketplace for farmers, books and articles on agriculture and expert lectures for farmers. You can read more about the service in the Case study published on the EIFL / PLIP website.³

Awards and expansion:

- "In October 2012, Public Library Radislav Nikcevic was awarded a Beyond Access Libraries for Development grant in the category Economic Opportunity.
- In May 2013, Public Library Radislav Nikcevic won a World Summit on the Information Society (WSIS) Project Prize for excellence in contributing to the WSIS goal of creating an inclusive and development-oriented information society. The library won in the category Access to Knowledge and Information.
- In June 2013 Public Library Radislav Nikcevic won an award for social integration from the ERSTE Foundation, for including rural communities into their services.
- In June 2014, Public Library Radislav Nikcevic won an American Library Association (ALA) Presidential Citation for Innovative International Library Projects.

2

Digitalna narodna biblioteka u Jagodini, <http://www.jabooka.org.rs/katalog/> , accessed 01.06.2021. at 15,00

3

□ https://www.eifl.net/sites/default/files/resources/201411/case_study_serbia.pdf , accessed 01.06.2021. at 15,10



Submitted on: 08.02.2022

- In 2015, the Library received funding to extend the service to two more regions of Serbia and to redesign their popular website and online market for farmers⁴.

3. Electricity letters

From the 2012 - until now Library is implementing *Electricity letters* project, online literary magazine for children and youth. „The magazine was founded in 2012 and posted on the official website of the library. It is published quarterly on about 250 originally illustrated pages. The magazine publishes literary works by eminent domestic and foreign authors. Each issue has its own topic and permanent⁵.

„Within service Electricity letters, Library educates the youngest users through the new media. Library provides quick access to an e-publication for children and youth who do not have access to libraries. In this way, the Library reduces the inequality of children in rural and urban areas in terms of equal access to information and education⁶.

By publishing this magazine, the library offers education and training to the youngest users through new media and provides quick access to e-publication for children and youth who do not have access to libraries. This reduces inequality between children living in rural areas and children living in urban areas in terms of free access to knowledge sources.

4. Program 65+

The program Program 65+ was implemented during 2013. The turnout was excellent, so the participants were divided into seven groups of six participants. The workshops were held every day for an hour and a half, for a total of a week. After this period, the participants mastered basic IT skills. The education itself included basic use of computers, opening and creating e-mail accounts, communication via Skype, as well as for those who wanted to, they learned to create and use Facebook

4

Eifl, AWARD-WINNING LIBRARY SERVICE HELPS FARMERS INCREASE THEIR INCOMES, Public Library „Radislav Nikcevic“ Jagodina, Serbia, <https://www.eifl.net/eifl-in-action/award-winning-library-service-helps-farmers-increase-their-incomes>, accessed 1. June 2021. at 16,00

5

□Tanasijevic, S. "Digitalna transformacija jagodinske biblioteke - bibliotečke usluge u novoj paradigmi, UN agenda za održivi razvoj 2030", Montenegro - Libraries, Archives and Museums LAM 2019 conference, 144

6

IFLA Library, Changing yourself will change the World – Public Library in Jagodina by developing the library according to the users' needs will become a part of global changes worldwide <http://ifla.org/274>, accessed 1. June 2021. at 16, 20



profile.

5. 2015 - Biblioteka++ (coding, robotics - Lego Mindstorm)

Biblioteka++, an innovative solution of the library was the introduction of extramural, practical teaching of informatics in the library and in schools. With a small grant from the EIFL Public Library Innovation Programme⁷ (EIFL-PLIP), the library equipped a computer lab with laptops and Lego Mindstorm Education EV3 robotics kits and trained librarians to teach young people computer coding skills. The library has launched a programme (Public Library Dusan Matic Cuprija⁸) of workshops in cooperation with teachers from local primary and secondary schools. The teaching methodology is interactive and fun. Using equipment and free and open source coding software, the children learned how to create troubleshooting problem solving software, web applications, as well as to write computer code to robots move.

6. Biblioteka - youth school programming - Code platform

In 2016, the Public Library Radislav Nikcevic organized a free programming school for elementary school students from 4th to 8th grade. The goal of the project was for children to fall in love with programming and to learn through play, in an easy and fun way, because programming is the profession of the future and affects all spheres of social life, and also to motivate children to continue with independent programming after the workshops. The workshops took place in the Youth corner of the Internet Center of the Public Library in Jagodina, and due to the huge interest, they were organized into two groups. The first group included students from 1st to 4th grade, and the second included their older friends. Teaching coding to children at an early age has a long-term impact on the development of a welfare society. According to the statistic after the evaluation of the project "About 70 young IT specialists from Jagodina primary schools were carried out through programming steps. With the help of the CODE platform (<https://code.org/>), they learned the

7

EIFL, BUILDING A NEW GENERATION OF TECHNOLOGY EXPERTS, Public Library 'Dušan Matic' Cuprija, Serbia, <https://www.eifl.net/eifl-in-action/building-new-generation-technology-experts> , accessed 1. June 2021. at 16,30

8

The Public Library Dusan Matic in Cuprija has conducted the programme in cooperation with the librarians of the Public Library in Jagodina who created and implemented the program. Biblioteka ++, <https://bpp.rs/ciljevi-projekta>



basics of programming logic through visual components and were introduced to the analytical and algorithmic way of thinking.⁹

7. Biblioteka - Web design

During the winter break in 2017, the Library was an incubator for creative children eager for knowledge in the field of modern technologies. As a part of the program Biblioteka - Web design , students aged 10 to 15 learned to make web pages. Open source software was used and with the help of available tools, children learned to create a website.

8. Digital citizen – Public Library in Jagodina

The need for the application of digital technologies has become imperative for all cultural institutions and thus for the development of new services that are adapted to new media and users. The accelerated daily development of the IT sector has conditioned the library paradigm to change, increasing the quality of services in line with the growing and changing needs of the modern library users. The Public Library of Jagodina follows new trends in the development of the librarianship by applying numerous digitally inclusive programs aimed at educating and improving the lives of users. One of such projects that is the subject of this paper is the Digital Citizen, which the Library has been successfully implementing since April 2019 until now. Digital Citizen is a regional project of transforming public libraries into Digital Maker spaces in Croatia, Serbia, Bosnia and Herzegovina and Kosovo. The project is supported by the Google company with the aim of transforming public libraries in the region into digital, innovative and educational centers that contribute to the development of a digitally advanced society.

The basic idea of the project implemented by the Library in Jagodina is to create a new subculture of library users - IT experts, trained in programming. The target group consists of children in primary and secondary schools. The basic training tools are micro: bit programming devices (for free workshops and for borrowing, packed in book form), Boson electronic extensions kits and a 3D printer. The Digital Citizen project, in addition to developing students' programming, also aims to apply the principles of STEM (Science, Technology, Engineering, Mathematics), while developing skills such as problem solving, algorithmic thinking, critical thinking and

9

Pesic, Ivana, "Library as a center of non-formal education for the of the new age generation - Digital natives", Montenegro - Libraries, Archives and Museums LAM 2019 conference, 181



Submitted on: 08.02.2022

collaboration, communication and creativity skills. As a part of the project, Library is developing the STEM competencies necessary to be equal citizens of 21st century, providing not only equipment, but also education and other activity workshops. The libraries are the central places of knowledge in local communities and represent the best places for learning new skills and competencies. Also, libraries are being transformed into public spaces for learning new technologies and into digitally-innovative and non-formal education centers. The project enables libraries, librarians and citizens to improve lifelong learning through the use of new technologies. The project is innovative, because it is especially focused on children and young people who do not have access to new technological equipment. The goal was to educate as many children as possible of different ages, financial status and educational profile from urban and rural areas through workshops. The workshops are designed in accordance with the level of knowledge and interests of students. The ultimate goal of the project was to show how small library programs can have a profound impact on society as a whole.

Programming permeates all spheres of social life, software technology is ubiquitous, it is evolving with incredible speed and there is a constant need for expert programmers and these are the highest paid occupations. By learning programming, the necessary knowledge and skills are acquired to prepare children and young people for future IT occupations and the increasingly demanding labor market. Libraries thus become the initiators and carriers of development as well as positive changes in society.

The Digital Citizen project was realized in two phases. In the first phase of the project, educational equipment was donated to libraries, which contained 20 micro:bit computers, five do-it-yourself Boson electronic kits and 3 free educational workshops for librarians. Part of the microbits that are packed in boxes, like books, libraries should lend to users, and part was donated to hold free workshops for the population. In addition to the device, the boxes also contain general instructions for using the device and a link to a website that is specially tailored to users. Information can be found on it: how to start work, how to make the first programs and where to find more detailed information about other projects in which microbits are used. Librarians from the awarded libraries were also trained to use donated equipment in order to train them to independently organize and conduct free workshops for the population.

Second phase of the project, among other things, included competition and awards. All interested libraries could apply to win the 3D printer award. The condition for applying for a 3D printer was to submit performance indicators (data on the total number and quality of workshops held, the number and age category of trained



Submitted on: 08.02.2022

users as well as a motivation letter on future program improvement). In addition to 3D printers, the donated equipment also contained filaments, ie biodegradable material needed to make 3D models, as well as education on the use of equipment. The Public Library in Jagodina was one of five Serbian libraries awarded with the 3D printer.

During 2019, within the project, it was realized in 56 workshops with 1026 students. There were more of them in primary school - 721 students. In total of 239 micro: bit and do-it-yourself electronic kits for home use were borrowed. During 2020, due to the COVID effect, ie due to the self-isolation of the majority of the population, the number of leased DIY kits by young library users increased¹⁰. The pandemic has enabled the library to adapt to the "new normal" situation and to provide services that are online and available to a wider audience. Due to the effects of COVID, the number of micro:bit loans has increased, as shown by statistics.

The knowledge gained through the implementation of the Digital Citizen project led us to create seminars for librarians. We will teach librarians how to use these educational equipment technologies so that they can organize free coding workshops and create digital objects for the public in their libraries, using the Moodle platform.

Education of educator

The traditional librarian was focused on the library building and its physical collection, unlike the digital educator librarian who focused on people's skills, offering and exchanging knowledge, building relationships with users. The educational role is the primary goal for the librarian in the future. The digital revolution has changed the paradigm of libraries and librarians. Over the past century educational role of the librarian has been developing and evolving. A successful librarian of the future must be able to combine traditional skills with digital, hardware and software skills, as well as the educational ability to apply technology in the most acceptable way during the teaching and learning process.

Role of a librarian

The main role of a librarian is to provide access to information to members of a library. The role of a librarian is constant, but means to achieve its goals are changing through time. Digital age puts demand on librarians to learn and develop

10

According to statistics from the Library's Annual Report, from 2019 and 2020



new digital skills in order to give instructions on information literacy and organize digital workshops for library users.

Digital workshops and training programs are traditionally organized in library facilities, dedicated maker spaces or reading rooms. Maker spaces are usually equipped with computers, 3D printers and various educational kits, such as Micro:bits, Lego Mindstorms etc. The biggest challenges libraries are facing are the lack of trained staff that can use educational digital equipment and develop training programs.

Learning through collaboration

Modern technology can be used to overcome challenges and organize education of educators. Thanks to various online learning systems, educators are not limited to library staff. Library users can become educators too. Both librarians and users can acquire new digital skills and after they become proficient enough, they can develop demonstrational and educational content. Such content can be shared with other colleagues and users inside the same institution, or with users and librarians from other libraries.

Online learning systems are used to overcome physical limits and reach a broader audience. Those systems are particularly important in the pandemic conditions.

Moodle LMS system

"Moodle is a free, online Learning Management system enabling educators to create their own private website filled with dynamic courses that extend learning, anytime, anywhere".¹¹ As free open source software, it matches the philosophy of knowledge sharing that is promoted by libraries. The system is a LMS platform created primarily for schools, but the modular software architecture allows the system to be adapted to the needs of various organizations. "The standard Moodle distribution includes Moodle core and a number of plugins of each type, so that a new Moodle installation can immediately be used to start teaching and learning. After installation a Moodle site can be adapted for a particular purpose by changing the default configuration option, and by installing add-ons or removing standard plugins".¹²

11

<https://docs.moodle.org/311/en/Features>, accessed 27. June 2021.

12

https://docs.moodle.org/dev/Moodle_architecture, accessed 27. June 2021.

Among numerous modules, the most important Moodle features include: user management, course management, content delivery and sharing (text, video, interactive content), collaboration (instant messages, forum, wiki pages) and user assessment (test, assignment, workshop, feedback). In order to showcase the Moodle system, authors of this paper implemented an online Moodle course - "Create Your Digital World". It consists of five sections: Introductory section - Digital world in the Library, Micro:bits basics, Micro:bit advanced, 3D printing and Evaluation section. In addition, the main page has announcements forum, forum for Micro:bit discussion and forum for 3D printing discussion. Forum and interactive chat enables users that are physically distant to communicate and share ideas. Its purpose is to connect users and libraries from different towns in Serbia.

The central part of any learning management system is educational content. Moodle offers a large amount of standard resources and activities and even more (hundreds of) 3rd party plugins, which enable librarians to create digital content. Showcase course relies heavily on simple resources such as Page and Forum, but in addition it uses H5P resources in order to make the course more interactive and appealing. *H5P is a plugin for existing publishing systems that enables the system to create interactive content like Interactive Videos, Presentations, Games, Quizzes and more.*¹³ It is integrated with Moodle and allows content creation within the system. H5P content can be exported and embedded in other LMS and CMS systems.

How to start using Moodle

Libraries have several options to implement and start using the Moodle system. One option is to lease the system from a service provider. Creators of the system have paid offering, available at address: <https://moodle.com/moodlecloud>. Since Moodle is open source system, another option is to lease the system from a local service provider. Local service providers can tailor the system to library needs. The most flexible option is a self-hosted solution. This option requires technical staff among librarians that will administer operating systems, web servers and databases. Moodle is written in PHP programming language and can use MySQL, PostgreSQL, MS SQL and Oracle databases. MySQL and PostgreSQL databases are free and open source software and fits perfectly with Moodle. Linux comes as a natural choice for server operating systems running Moodle applications.

At the end Moodle is just another tool in a librarian's toolbox. It can be used to help librarians in their everyday job, providing information to library users.



Instead of a Conclusion:

Libraries serve humanity.

Respect all forms by which knowledge is communicated.

Use technology intelligently to enhance service.

Protect free access to knowledge.

Honor the past and create the future¹⁴

References

1. Crawford, Walt. & Gorman, Michael. "Future Libraries: Dreams, Madness, & Realities". Chicago: American Library Association, 1995.
2. Pestic, Ivana. "Library as a center of non-formal education for the of the new age generation - Digital natives", u Zbornik radova sa Druge međunarodne konferencije bibliotekara, arhivista i muzeologa održane u Cetinju 16-17. maja 2019. godine, urednica Dragana Markovic. Cetinje: Nacionalna biblioteka Crne Gore "Djurdje Crnojevic", 2019.
3. Tanasijevic, Suzana. "Digitalna transformacija jagodinske biblioteke - bibliotečke usluge u novoj paradigmi, UN agenda za održivi razvoj 2030" u Zbornik radova sa Druge međunarodne konferencije bibliotekara, arhivista i muzeologa održane u Cetinju 16-17. maja 2019. godine, urednica Dragana Marković. Cetinje: Nacionalna biblioteka Crne Gore "Djurdje Crnojević", 2019.

Web references:

1. Biblioteka ++. (<https://bpp.rs/ciljevi-projekta>).
2. Digitalna narodna biblioteka u Jagodini (<http://www.jabooka.org.rs/katalog/>).
3. https://www.eifl.net/sites/default/files/resources/201411/case_study_serbia.pdf .
4. Eifl, AWARD-WINNING LIBRARY SERVICE HELPS FARMERS INCREASE THEIR INCOMES, Public Library „Radislav Nikcevic“ Jagodina, Serbia (<https://www.eifl.net/eifl-in-action/award-winning-library-service-helps-farmers-increase-their-incomes>).
5. EIFL, BUILDING A NEW GENERATION OF TECHNOLOGY EXPERTS, Public Library 'Dusan Matic' Cuprija, Serbia. (<https://www.eifl.net/eifl-in-action/building-new-generation-technology-experts>).
6. TANASIJEVIĆ, Suzana and PESIC, Ivana (2019) *Changing yourself will change the World – Public Library in Jagodina by developing the library according to the users' needs will become a part of global changes worldwide*. Paper presented at: [IFLA WLIC 2019 - Athens, Greece - Libraries: dialogue for change](#) in Session 113c - IFLA Poster Session. (<http://library.ifla.org/2742/>).



Submitted on: 08.02.2022

7. <https://docs.moodle.org/311/en/Features>.
8. [https://docs.moodle.org/dev/Moodle architecture](https://docs.moodle.org/dev/Moodle_architecture)
9. <https://h5p.org/getting-started>