IMPROVING THE PROCESS OF ONLINE EDUCATION BY INTRODUCING INNOVATION

Boris Kovačić

Pharmaceutical Chamber of the Republic of Srpska, kovacic3boris@gmail.com

Branko Latinović

Pan-European University APEIRON, branko.b.latinovic@apeiron-edu.eu

Abstract: The aim of this paper is to point out the information chain of supply to graduate pharmacists and masters of pharmacy, members of the Pharmaceutical Chamber of the Republic of Srpska. In addition, point to CRM in order to achieve greater satisfaction of members. Point out solutions and innovations that improve data exchange of associations that provide continuous education of graduate pharmacists and masters of pharmacy, members of the Pharmaceutical Chamber of Republika Srpska, as well as online platforms for online education of the Pharmaceutical Chamber of Republika Srpska and local databases.

Keywords: Information supply chain, CRM, Online education, Moodle, data exchange, data exchange difficulties.

INTRODUCTION

The Pharmaceutical Chamber of the Republic of Srpska is an independent, professional organization of masters in pharmacy, graduated pharmacists and graduated biochemists. As an independent professional organization, it first appears on the day of its founding. Previously, before gaining independence status, it was part of a unique Health Chamber. The Medical Chamber consisted of: doctors of medicine, dentistry doctors and graduated pharmacists. Within the Health Chamber were three councils that made up the basic structure of that chamber, with 21 elected representatives, each from the ranks of medical doctors, dentistry doctors and graduated pharmacists. Other bodies were selected in accordance with the legal regulations and the Statute and the Health Chamber. [4]

On May 17, 2003, the National Assembly of Republika Srpska adopted the Law on Health Chambers, which legally established the Pharmaceutical Chamber of Republika Srpska. [6]

At the assembly meeting held at the Medical Electronics offices in Banja Luka, the Pharmaceutical Chamber of Republika Srpska was established on July 9, 2003. On this occasion, bodies of the Chamber were elected: the Assembly, the Executive Board, the Supervisory Board and the Court.

The Pharmaceutical Chamber of Republika Srpska has a fundamental role to do to continuously educate pharmacists in Republika Srpska. Members of the Pharmaceutical Chamber of Republika Srpska are masters of pharmaceuticals, graduated pharmacists and graduated biochemists, and other health professionals. Members of the Pharmaceutical Chamber of Republika Srpska attend symposiums, vocational lectures, and thus collect certain points. After a certain period, when a member collects enough points, the Pharmaceutical Chamber of Republika Srpska issues a member a license to work for a period of one to five years. The specified license serves as a proof of the ability of a member, a healthcare professional, who has attended professional continuous educations for health professionals for a period of time, and meets the requirement that he can continue to work as a healthcare professional.

Education was carried out by the Pharmaceutical Chamber of Republika Srpska through lectures at professional meetings, organizing symposiums and

other forms of face-to-face education. In addition, the Pharmaceutical Chamber of Republika Srpska issued a printed yearbook of works.

The website was initially created in a html code and contained basic information about the Republika Srpska Chamber of Pharmacy.

Online education process

The initial project was done for just over half a year. When starting the initial part of the project, the request was quite confusing in terms of the layout and design of the website. The initial project was supposed to allow the transition from the HTML platform to php/mysql, with the CMS platform Joomla version 1.5 used in the specific solution. According to the fact that the production of the template for the Joomla platform was quite complex, and in the circumstances that it was not a definite strictly task, 3 solutions of the site design were made and the selected version, which was accepted, continued to be refined for another 3 months.

In the test period of one year, the news and database of pharmacies and wholesalers in Republika Srpska were updated and placed on the site electronic forms in doc and pdf format.

Forms that are electronically prepared allow you to fill in the requirements for issuing or renewing a license or changing the workplace. Within the forms there is a list of the necessary documentation that needs to be attached for the purpose of issuing a license or other document. These electronic forms in PDF format can be printed and then manually filled in, or filled electronically using the program "Acrobat Reader" which is a free program.

After registration in the register of members of the Pharmaceutical Chamber of Republika Srpska, an user profile for access to "online" education is opened.

Materials from professional lectures and Symposiums, e-books and publications, The Proceedings of Professional Papers have been entered.

No functionality of quizzes, forums, or other functionality is required when building, but only the above educational functionality, although the system has these functionality.

Lexi-Comp base has been incorporated into the system. The English-language database contains dosing and a way of issuing a particular drug given the patient's age and weight. Besides, this base provides information about the interaction of food and medicines, and medicine with medicines. The database is updated at any moment and provides the latest data. Data update, in English, is run by several thousand pharmacists worldwide and about 15,000 clinical pharmacologists, who update it daily. "Lexi-Comp" base in Serbian is much more modest and contained an incorporated registry of medicines of Serbia. The reason for writing in the past tense is that the license has expired, and according to the last available information that this version no longer exists.

Educations placed from multiple symposiums are in pdf format, not only a collection of papers, but also presentations of lecturers that are also set in pdf format, to protect the rights of authors. Updating "online" education is done during the Symposium or other professional meeting, or after the meeting, depending on the need for data processing. Namely, certain lecturers submit a presentation with video content within it, and require compression or separation from the presentation with a link to video content, for the possibility of display in the "online" system.

Planning and data collection

In order to make an improvement, it is necessary to collect the data, process it and then plan it. Information supply chain and CRM system. The first step in collecting data is the basic request of the Expert Team of the Pharmaceutical Chamber of Republika Srpska. After that, during planning, periodic meetings are additionally held to better interact and resolve segments of the system for the purpose of better planning.

Requirements

The first and basic request was the exchange of data between the local database of the Pharmaceutical Chamber of Republika Srpska and the Online Education of the Pharmaceutical Chamber of Republika Srpska. The exchange type would be done in a way that would be basic information such as personal data, with additional data such as license number, license expiration date, number of points and finances.

The second request was the exchange of data

between the local database of the Pharmaceutical Chamber of Republika Srpska and the Online Education of the Pharmaceutical Chamber of Republika Srpska with the expansion of functional display with the list of education of members of the Chamber. This type of education would be done as before, with an additional data series. Namely, this edited data set would be connected to each member individually. A data series would have to be tied to a separate table with a relationship of 1 to more, or more educations could have been had by each member. The education list is accompanied by data on the number of points, as well as other data that tracks each education individually.

The third request was the exchange of data between the local database of the Pharmaceutical Chamber of Republika Srpska and the Online Education of the Pharmaceutical Chamber of Republika Srpska and the exchange of education data of other professional associations, legal entities and higher education institutions that have the authority to hold this type of education.

MEETINGS

The meetings allowed for a better understanding of the topic, and the breakdown of data into finer parts and better description of metadata. Periodic meetings were held for the purpose of controlling the flow of the project, and as a form of fragments merged into a whole.

CRM

The term CRM comes from the English abbreviation "*customer relationship management*". So it arises that the CRM system is a system of data management with service users. The CRM system enables legal entities to collect, analyze, edit, and store information about potential and current users.

Art and science that ensures the right product or service enters the hands of the right customer in the right quantity and at the right time is known as supply chain management (SCM). [2]

The three elements of CRM success are:
- people (employed by the company);
- processes (reengineering of the process must be carried out in the company);
- technology (the company must choose the correct technology to conduct the process). [1]

This work discusses the MODEL CRM B2C, respectively dedicated user.

In order to gather as much data as possible when developing the system, a survey was conducted, then a system improvement was planned by adding chats and quizzes. Namely, the chat will enable direct interaction of the Pharmaceutical Chamber of Republika Srpska with users. Additional information can be obtained through short quizzes. The separate system of online education of the Pharmaceutical Chamber of Republika Srpska, which is of closed type, i.e. only for members of the Pharmaceutical Chamber of Republika Srpska, has additional functionality that the Moodle CMS system offers, which is to monitor interaction through clicks and visits of certain content. This enables maximum interaction and customer satisfaction.

By integrating all modules, processes, links into a single system, we get a high-level CRM system.

POLL

A sample of about 1,000 members was used to create this survey. At the time of this survey, which was taken from the master's thesis, only about 10% of the observed sample were users of the information system service. The rationale for such a low rate of use is politics and the general situation in the country, which is why there is a lack of interest and the need only for the necessary activities. The response to the aforementioned survey was some-
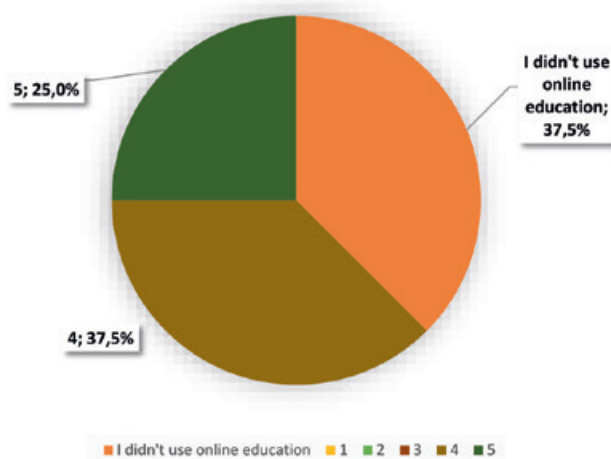

Figure: 1 *Author: Kovacic B, Diagram of simplicity of dealing with online education according to survey participants [3]*

where around 2% of users. From the above, the data processed are presented graphically in the form of diagrams in further work.

Only part of the survey is presented in this work.

After basic subject data, I singled out the part related to "*Online education*" of the Pharmaceutical Chamber of Republika Srpska.
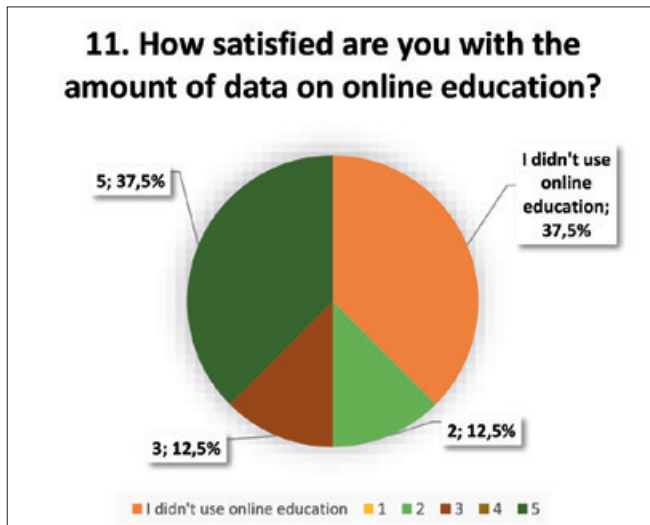

Figure: 2 *Author: Kovacic B, Satisfaction Diagram by amount of data on online education according to survey participants [3]*
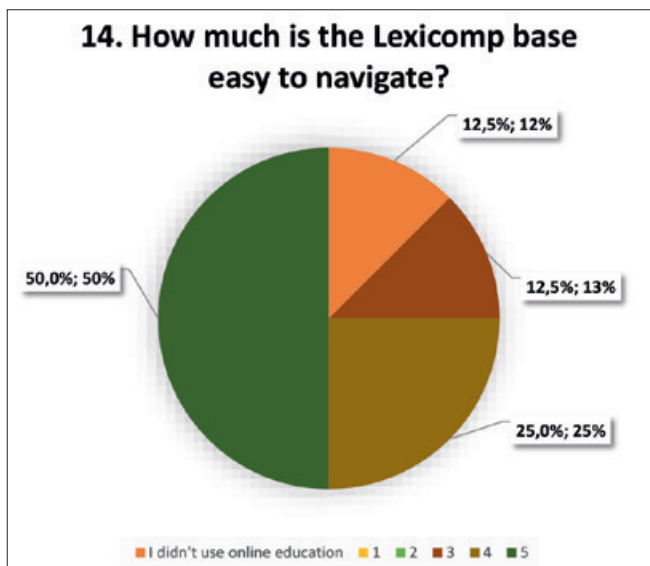

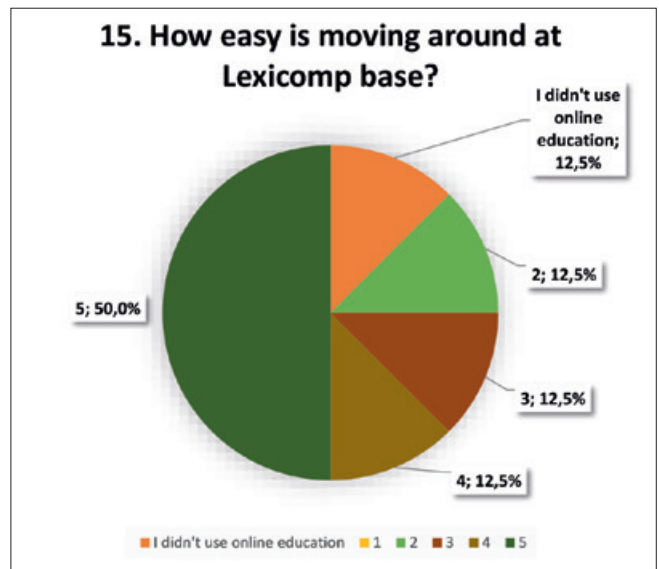***Figure: 3*** *Author: Kovacic B, Diagram of Simplicity in Lexi Comp database according to survey participants [3]*

Figure: 4 *Author: Kovacic B, Diagram of ease of movement in Lexi Comp database according to survey participants [3]*
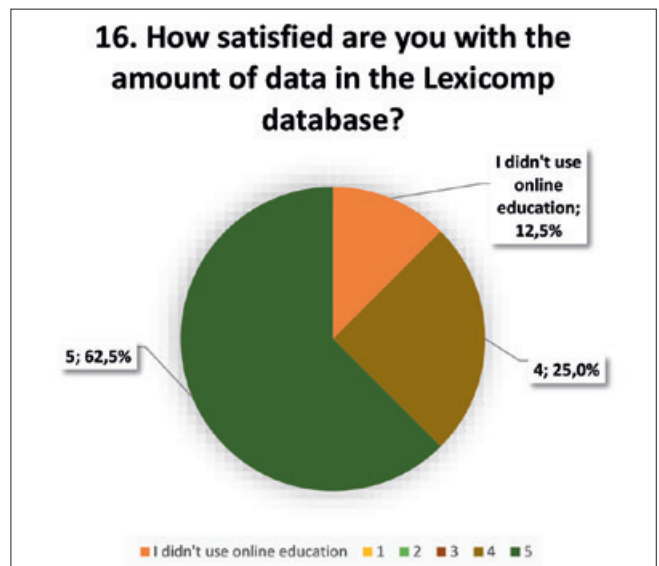

Figure: 5 *Author: Kovacic B, Satisfaction Diagram by Amount of Data in Lexicomp Database according to survey participants [3]*
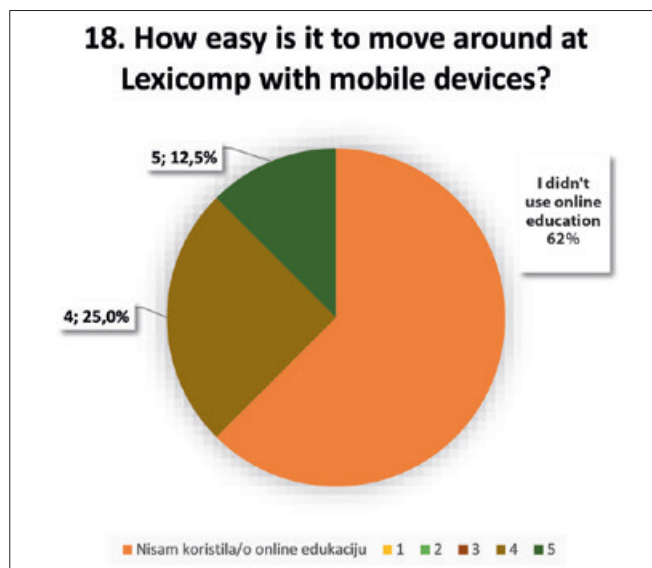
Figure: 6 Author: Kovacic B, Diagram of ease of movement in Lexicomp database with mobile phone according to survey participants [3]
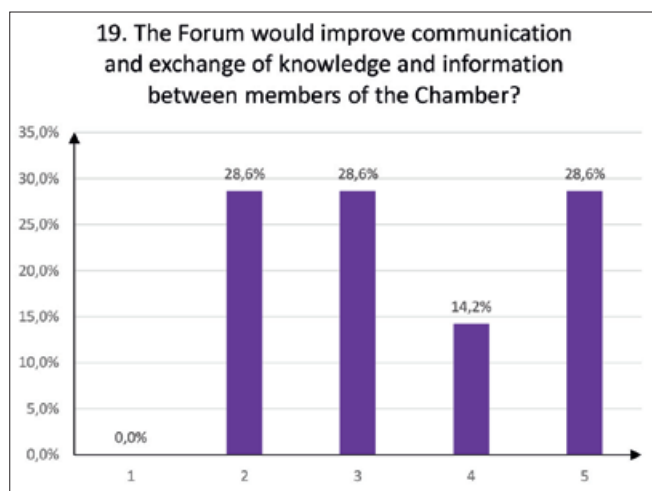

Figure: 7 Author: Kovacic B, Diagram of improving communication and exchange of knowledge and information through forum in the opinion of survey participants [3]

By reviewing the work, we come to the conclusion that although the path to the introduction of "online" education and its use is quite complex, it yields positive results.

When introducing "online" education, it is important to have management support, necessary resources and adequate external resources (adequate legal regulation and other parameters of society), and to use proven philosophies, adequate models and methods. Kaizen philosophy and Agile approach to software development should be used in development and planning for success. Toyota
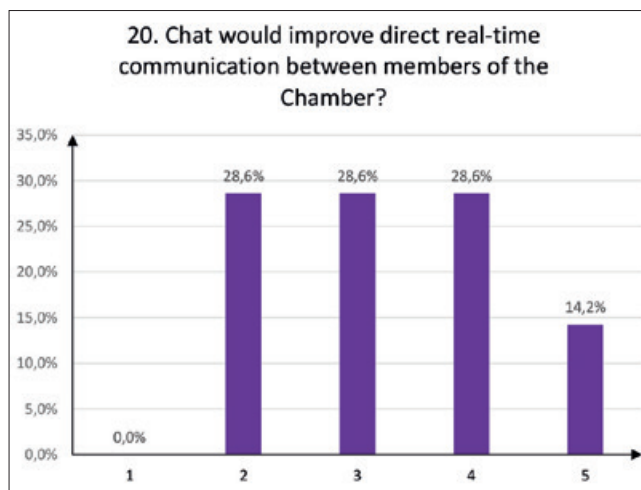

Figure: 8 Author: Kovacic B, Diagram of communication improvements between chamber members through the introduction of chat in the opinion of survey participants [3]

succeeded by using the Kaizen philosophy in its development. Many projects succeed, and businesses raise their quality and quantity with the help of this philosophy. The ISO 9001 stadard defines continuous improvement of business processes. With step-by-step improvement in the agile approach to software development if we use the Kaizen philosophy, which defines the continuous elimination of losses, success is almost guaranteed. In e-education it is necessary to apply the above mentioned methods and philosophies, e-education requires continuous improvement.

The insight into the survey concludes that the lifespan of this CMS system was at an end, and needed its reconstruction, which is currently under way.

Chat

In order to enable better interaction with users of the System of The Pharmaceutical Chamber of Republika Srpska, chat needs to be integrated. With the Moodle platform in use, it is possible to integrate multiple software solutions. I'll list some versions of chat that can be integrated into the Moodle platform, which are: Skype, We Chat, Microsoft Live Messenger, OpenMeetings, MyLiveChat, Global Chat, and other.

Chat, depending on the version, enables you to interact with users continuously or during the educational period. Depending on the solution, there are additional video communication restriction options.

QUIZ

There is an application part in the CMS system on the Moodle platform to create quizzes. The quiz not only has to play a role in testing knowledge after listening to a course or other form of online education, but may serve as a similar survey for users' interaction with the service provider. Namely, a quiz as well as a survey can serve as a feedback, a response and thus collect information.

SUPPLY CHAIN

When we mention the supply chain, we come across one of the definitions that suggests that the supply chain also includes all transfers of services and physical goods needed to produce and valorize goods on the market, i.e. to be provided, delivered to the end user.

In this work, goods are information and educational materials. Distribution of information and educational materials is done through printed materials, books, certificates, official acts, internet portals, educational pages, SMS services, e-mail, fax and other forms of communication. The focus of this work is on the timely supply of information by the Pharmaceutical Chamber of Republika Srpska. The information supply chain enables timely delivery of the information delivery service.

One form of information supply chain of the Pharmaceutical Chamber of Republika Srpska is the SMS system.

The SMS system offers an automated response, without the participation of the human factor, on the requested information of a member of the Pharmaceutical Chamber of Republika Srpska. The information requested in the query is data about the state of the points, the expiration of the license and the finances related to the cost of the membership fee, which are delivered in real time. This type of automatic SMS system response is because it is connected to the database. Query time is not limited, so at any time it enables a query about the requested data

and a real-time response about the state of the database data for the specified member. Instructions have been made for using sms systems. The above instruction was presented in several professional lectures, as well as at the Symposiums of Pharmacists. The instruction explains, step by step, how to use the system, and what is the number to which the SMS query is being sent. In this way, all members of the Pharmaceutical Chamber of Republika Srpska, as users of sms system, are aware of the use and functionality of the specified system.

In addition to the base, the SMS system is connected to the application, so that the Professional Service of the Republika Srpska Chamber of Pharmacy can inform its members in a particular region about professional lectures in the region. [3]

PROMOTION AND INNOVATION

Under the notion of innovation, we will find the definition that innovation is the use of something new or significantly improved, a particular good or service. In this work, the point of innovation is to exchange data at a higher level. For the notion of promotion, we have synonymous with progress or improvement. In this work, this term is used in terms of improving the existing system.

Initial solution:

The initial solution of "online" education of the Pharmaceutical Chamber of Republika Srpska is that the local application is related to the local base MSSQL, and "online" education on the Moodle platform is a separate system. Data synchronization is performed semi-automaticly through a daily report that is integrated manually through "Chron job" activity on the provider's server.

Innovation would mirror the rise of the local "web" server, by installing a Moodle platform with an MSSQL base in the background, and by connecting the local base and online education base, so that the enrollment process would be fully automated and integrated with the local base (application), SMS system.
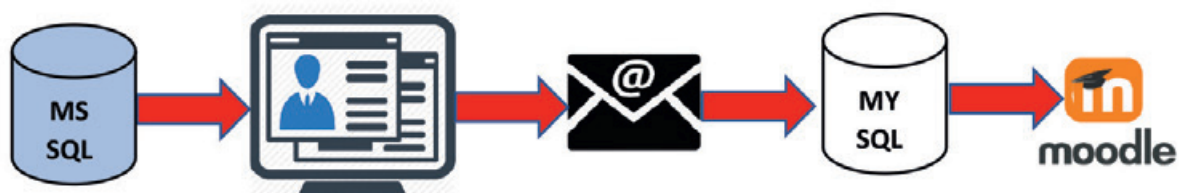

Figure: 9 Chain of information supplied by members of The Pharmaceutical Chamber of Republika Srpska
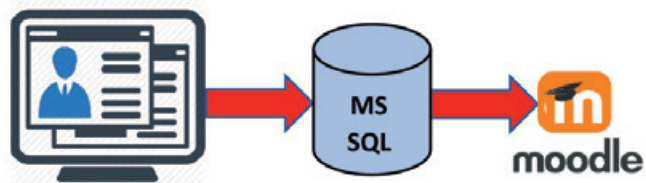
Figure: 10 Improved chain of information supply of members of The Pharmaceutical Chamber of Republika Srpska

The Moodle system enables import and export data in SQL, CSV, and TXT formats. The purpose of this export and import is to exchange data with other systems. In format CSV, it is possible to determine the partial used in the export document.

A CSV report is generated from the MSSQL database and the local application is sent daily via e-mail, then manually uploaded to Moodle data.

Future solution:

Phase 1

Data is typed into the same MSSQL database through a local application and automatically displayed in Moodle data because it is the same database. This type of improvement is the automation of the information exchange process.

Phase 2

However, there is a need for a step forward. Namely, pursuant to the role of the Pharmaceutical Chamber of Republika Srpska to support education by other legal entities that have the approval for education, there is an additional need for data exchange.

To achieve the final version of the supply chain, you need to even out the data exchange parameter, or key.
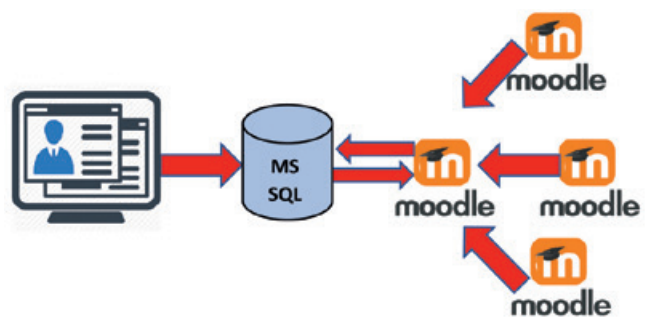

Figure: 11 Final version of the information supply chain of members of the Pharmaceutical Chamber of Republika Srpska

Figure: 12 Excerpt from local database Pharmaceutical Chamber of Republika Srpska [5]

Pursuant to the sending of ID from the local base would not make sense, nor the ID that is in the Moodle system of the Pharmaceutical Chamber of Republika Srpska, a unified solution had to be found, which was described in one of the previous works.

If we were to review such databases at the national level of Republika Srpska, or if we were to introduce a registry of all health professionals at the Bosnia and Herzegovina level, it would be necessary to restore the forms as at the beginning, when there was a Health Chamber in Republika Srpska. 01- was the mark for a doctor of medicine 02 - was the mark for graduate pharmacists or masters of pharmacy.

The solution is to normalize the license number, for example, in form 01-1111/2 in such a way that it is in the form of a 011111 and thus becomes a pharmacist's ID in the form that is the best solution for using the key in the database, and will not be repeated where all conditions are met. [5]

Adjusting license numbers with normalization in the example shown would be converted from a 01-458/II format to a 010458 format.

Figure: 13 View the future named Column PharmacistID in a local database [5]

A step further in the up-and-coming way allows me to stop Moodle by traveling his add-ons and sprayed syringes. The new mode of the Moodle syringe, in addition to offering an app for the cotton platform, also has syringes such as the provinciality of the validity of the certificate. Provincial is performed in 2 ways. One of the ways in which QR is loaded is to the website of the ma'am confirming the validity of the certificates. Another way is to load the website by figuring out the validity of the certificates by typed in a short code, which is given to maintained algorithms by random choice. This short code is visible in an image labeled 9DwSV9F2PD.

Figure: 14 Snippet of certificate appearance through advanced services (document is issued in Serbian)

CONCLUSION

Modern technologies in the pure supply chain of information enable real-time information supply. It is also important to note that the collaboration of data between the systems and their compatibility is important for data exchange, and makes it easier for the user to view the data in one place, at one point. CRM is important in response to the success of reingnostication and innovation in the system. Innovation in this work refers to the collaboration of data between systems to achieve a higher level of CRM and better information supply. Finally, let me emphasize that besides technologies, the key link in the human resources system are human resources.

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ABOUT THE AUTHORS

Boris Kovačić was born in Bihac in 1979. He finished elementary and technical school in Banja Luka. He graduated at the Faculty of Information Technology and the Faculty of Business Economics at Pan-European Apeiron University. He has a master's degree in economics from Pan-European Apeiron University. He is employed in The Agency for Medicinal product and Medical Devices of Bosnia And Herzegovina as IT consultant.

Branko Latinović was born on April 28, 1956, in Prijedor, Bosnia and Herzegovina. He graduated from the Faculty of Economics in Banja Luka in 1980. At the same faculty he enrolls a master's degree that ends in 1994, and in 1997 successfully defended his doctoral dissertation. He works as a dean of the Faculty of Information Technologies of Pan-European University "Apeiron" in Banja Luka.

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