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Recording and verification of educational documents in schools of Lviv City with the help of designing of information and reference system

Summary. The article deals with the problem of introduction students' recording and verification of personal data for the issuance of a duplicate in the case of loss of educational documents. The authors propose to change the manual search technology to the electronic by designing the information system on the basis of the Access DB program. The proposed database contains a convenient system interface, reports, macros, the ability of creating queries and issuance references based on the found information.

Key words: information reference system, automation, recording, verification, document template, queries

Problem definition

One of the important aspects of the work of successful institutions is information and communication technologies. An increase in the volume of documents for any enterprise, institutions of education extremely complicates the process of information retrieval and analysis. The use of information technology will automate the processing of data in the work of the employee with the information-document array either at the enterprise or in general education institutions.

The urgency of the topic is determined by the processing of a large number of information inquiries from employers to confirm the personal data of graduates who are trying to find employment or obtain a duplicate of educational documents that have been lost and are necessary for entry into further educational institutions. Hence the search for information is carried out through paper data media and it greatly complicates and slows down the work of the employee, it is proposed to change the manual search technology into the electronic one.

The purpose of the paper is to investigate the automation of search, checking large volumes of information inquiries in schools of Lviv, as well as substantiation of the necessity of the information and reference system using by the design of the database, as expedient and operational work with documents.

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Analysis of recent research and publications. The study of the problems and prospects of automating the archival activity of the institutions was performed by many researchers. In particular the article "Means of automation of search and analysis of archival information in secondary comprehensive schools of the city of Lviv" presents information about the advantages of automated search for documents in the school. The advantages of the information and reference system in the school in the search for certificates and record keeping of students are analyzed[1]. The article "Means of automation of work of archive divisions of the organization" contains information about automation of archivist's workplace, advantages of electronic archive and free software. Advantages of free programs are shown on the concrete examples, which are convenient and essential in use. The review of systems of electronic document circulation is also given in the article and these systems are provided with the archive service "LandDocs", "Megapolis.DocNet", "ASKOD" and other software. The article covers all problems and needs of archivist's productive work[2]. The authors of the article 'Integration processes in the archival section of Lviv Polytechnic National University" consider the problems of implementation and benefits of archival information retrieval system for processing information requests of citizens in the structural units of higher educational establishments. It is proposed to automate the delivery of services in pursuance of biographical and factual queries by archival departments of universities through issuing archival information, excerpts and copies. For effective search in the collections of higher educational institutions' archives, the paper considers adjustment of ISS to the needs of archival industry and international standards ISAD (G). In addition to this the use of ISO 9001 for the improvement of higher educational institutions archives departments is investigated[3]. In the article "Electronic archives, features of their functioning", the main features of the work of electronic archives and the advantages and disadvantages of their use for automating the work of archival institutions are analyzed[4]. In the article "Information retrieval system with feedback operation algorithm" the problem of information search is described. Detailed analysis of existing retrieval systems with feedback is given. The authors propose a classification of such systems: systems with explicit feedback and systems with implicit feedback. Systems with explicit feedback attract users to the process of finding relevant information, i.e. user indicates its information needs individually[5]. The aim of the article "Planning, development and imple-

[1] Т. Білущак, І. Ящишин: Засоби автоматизації пошуку та аналізу архівної інформації в середніх загальноосвітніх шкіл міста Львова, ICS-2017, Львів 2017, С. 335–336.

[2] Т. Білущак, Р. Лужецька, В. Ольховик: Засоби автоматизації роботи архівних підрозділів організації, ICS-2016, Львів 2016, С. 332–333.

[3] T. Bilushchak, Zh. Myna, U. Yarka, O. Peleshchyshyn: Integration processes in the archival section of Lviv Polytechnic National University, CSIT-2017, Lviv 2017, p. 200–203.

[4] Н. Мельник, О. Марковець: Електронні архіви, особливості їх функціонування, ICS-2015, Львів 2015, С. 336–337.

[5] Н. Ткаченко, В. Воропаєва: Алгоритм роботи інформаційно-пошукової системи зі зворотним зв'язком, Наукові праці Донецького національного технічного університету. Серія: Обчислювальна техніка та автоматизація 2014, Випуск 2(27), С. 120–127.

mentation of a digital archive" is to explain available options, to compare them and to make recommendations based on assessment of capabilities of the organization which the potential digital archival information system is to be planned and designed[6].

Research methodology

Methods of research are due to the subject of the analysis of scientific work. To determine the relevance and development of the topic system-activity approach as the general scientific principle of research was applied. During the design process at the external level and during the writing of the work, methods of qualitative and quantitative analysis, elements of content analysis were used. In this work the method of conceptual modeling was used, which consists in replacing the real object with another, specially created for this purpose and using the model as a means of research.

We also used the structural-logical method of forming a query for working with databases of structured information. The selection criteria in which is constructed as a logical combination of simple queries that are reduced to checking the condition for the presence or absence of words in the document. With the help of one of the types of method of factographic search, namely documentary-factographic search of the search for fragments of text containing facts was made in the documents[7]. This information reference system can be used in any school to automate the process, search and verification of personal data for the issuance of a duplicate at the loss of educational documents.

The expediency of creating information and reference system for students' recording and issuance of certificates

For citizens who have completed general educational establishments of the city, the issuance of duplicates instead of lost certificates on complete comprehensive secondary education and certificate of basic general secondary education is determined by the *Regulation on the order of ordering, issuing and recording of state-issued documents.*

A duplicate of the certificate is issued only to people who are confirmed in the book of records of issued education documents that they have actually studied in a particular educational institution. There are two such books in the school, a book about those graduates who completed the 9th grade education, and the other about the graduates who completed the 11th form. In these books, in alphabetical order, there is indicated surname, name, patronymic, year of issue and marks. Books are kept at school for 75 years, this is a general statistical age of a person then they are disposed.

To obtain a duplicate of the certificate, you must write an application for issuance, after that an order is issued, and copies of the order and applications are stored in the school archive. The duplicate must contain the number of the lost or damaged

[6] A. Rajh: Planning, development and implementation of a digital archive, Bulletin d'archives 2010, Vol. 53, No. 1, p. 41–62.

[7] С.В. Шибанов, М.В. Яровая, Б.Д. Шашков: Обзор современных методов интеграции данных в информационных системах, НиКа 2010, No. 1, С. 292–295.

certificate, which is also in the archive from the moment of issue. The data on the duplicate is stored namely the serial number, the code, the date of issue, and the record of the issuance of the duplicate must be certified by the head of the educational institution and by the seal. If the data in the archive is not preserved, then the school has the right to refuse to issue a duplicate. Then you need to go to court to find out the circumstances of the disappearance of data from the school archive. Given the above procedure for obtaining a duplicate of the certificate and keeping records of pupils who during all the years of the school's existence studied there is carried put in a large volume of document-information arrays that somewhat complicates the search work.

Thus, it is proposed to create an information and reference system for recording students, graduates and checking educational documents. Designing a reference system facilitates the workload and routine of finding information. In addition, the system will be implemented as a means of reliable data storage, which makes it convenient and quick to find the necessary information. The reference system is intended for input, storage, search and output of school information according to the user's request.

Results of the research

The designed information and reference system "Student's Recording and Verification of Educational Documents of the School No. 92 Lviv" was created with the help of Microsoft Access 2010. The built database received the following capabilities: the creation of on-line forms that display and show information, queries that allow the user to get the required data according to certain criteria, macros, reports and the ability to issue a certificate based on the information found.

In the database "Student's Recording and Verification of Educational Documents of School No. 92 Lviv" the following tables are allocated (Fig. 1):

- "Book of Orders";
- "Alphabetic Book of Students' Record";
- "Graduates' Reference Data";
- "Diploma/Certificate Recording Book";
- "Student's Personal Dossier";
- "Duplicate Document Issuance".

Between the tables "Alphabetic Book of Students' Record", "Book of Orders"; "Graduates' Reference Data", "Diploma/Certificate Book" and "Document Duplicate Issue" have been created by „one-to-many" connection. Since, one value of the field of the first table may correspond to several values of the field of the second table, and each value of the field of the second table corresponds to only the single value of the first field. One-to-one connection is between the "Alphabetic Book of Students' Record" (the table completed in Fig. 2) and "Graduates' Reference Data" tables, because the single value of the field of one table "Student's Personal Dossier" corresponds to a single field value in the second table "Graduates' Reference Data".

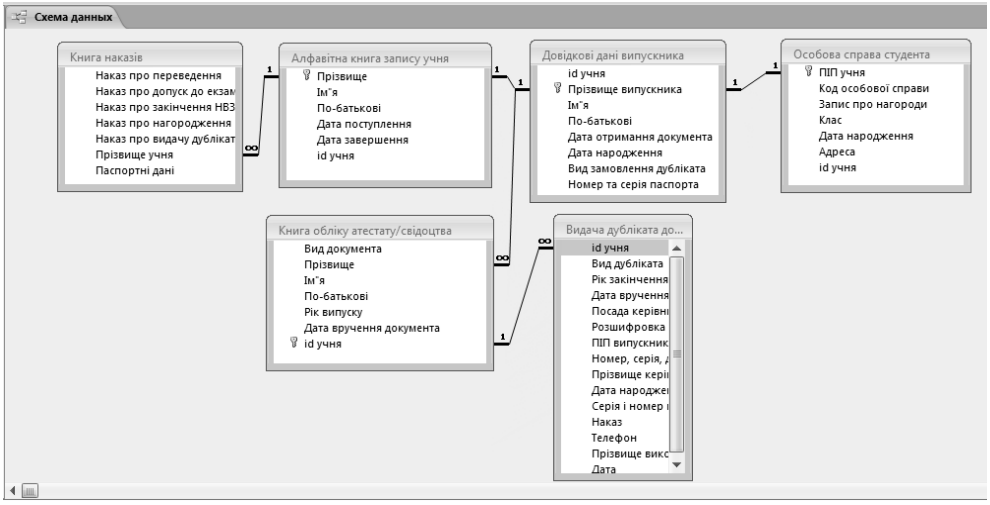

Figure 1. Database schema

Source: developed by the authors on the basis of data obtained at school.

Алфавітна книга запису учнів

Код учня	випускник	Прізвище	Ім'я	По-батькові	Дата поступлення	Дата вибуття
101	101	Барлій	Ігор	Ігорович	01.09.2000	25.05.2011

Код випускника	Прізвище ви	Ім'я	По-батьков	Дата отрим	Дата народ	Вид замовл	Номер пасп	Серія паспс
101	Барлій	Ігор	Ігорович	25.05.2011	25.08.2004	атестат	356785	КС

Код особової справи	Клас	Запис про нагороду
Б/101	11Б	срібна медаль

102	102	Гук	Микола	Миколайович	01.09.2004	29.05.2013
103	103	Гук	Оксана	Володимирівна	01.09.2002	27.05.2013
104	104	Гладкий	Степан	Ігорович	01.09.2008	25.05.2017
105	105	Дахович	Соломія	Вікторіна	01.09.2005	30.05.2016
106	106	Дуткевич	Ольга	Степанівна	01.09.2004	28.05.2013
107	107	Жуковський	Олег	Миронович	01.09.2000	23.05.2011
108	108	Клименко	Назар	Іванович	01.09.2007	30.06.2016
109	109	Кохановська	Марта	Олегівна	02.09.2001	31.05.2012
110	110	Левко	Ірина	Дмитрівна	02.09.2003	30.05.2014
111	111	Мартинюк	Василь	Назарович	01.09.2005	30.05.2016
112	112	Морозенко	Катерина	Петрівна	02.09.2000	28.05.2009
113	113	Назарова	Олена	Ігорівна	01.09.2003	25.05.2011
114	114	Омельченко	Андрій	Остапович	03.09.2006	26.05.2017
115	115	Павник	Марія	Олегівна	01.09.2002	23.05.2011
116	116	Парижак	Максим	Іванович	01.09.2008	26.05.2017
117	117	Постоєнко	Юлія	Максимівна	03.09.2005	30.05.2014
118	118	Посувайло	Ірина	Олегівна	01.09.2002	28.05.2013

Figure 2. View of the completed “Alphabetic Book of Students’ Record” table in the database

Source: developed by the authors.

After designing tables, query requests and cross-references request were created in SQL. Here is an example of one of the sample query request and its result of performance that is shown in Figure 3–4.

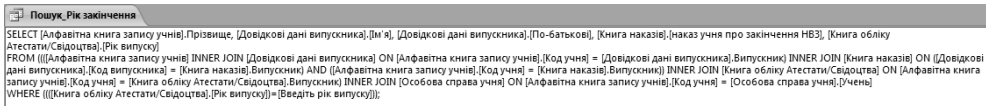

Figure 3. The structure of the request for the "The Year of Finishing" sample in SQL

Source: developed by the authors.

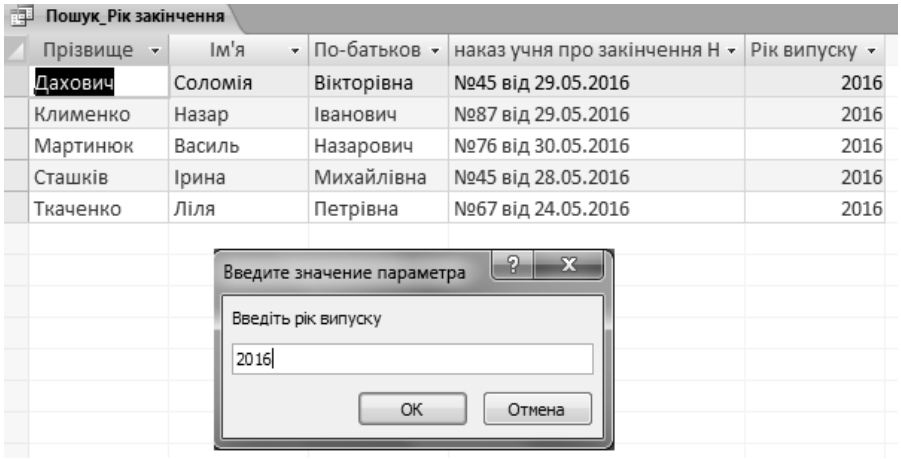

Figure 4. Example of entering a query and its result

Source: developed by the authors.

Also one of the database objects like a form was created. To process the information search, tabular forms and a subordinate form were created. For the purpose of high-speed analysis and for comparison of the information there was created a form with a subordinate form, which contains data from three tables of the database (Fig. 5).

The main objects that can serve as the basis for database analysis are forms, reports and created template for the duplicate order on diploma /certificate of complete secondary education for an educational institution.

Among the documents that must be submitted for the production of a duplicate of the lost document about education is the creation of a confirmation of the order for the production of a duplicate of the document on education for a comprehensive educational institution. Whereas the information and referral system developed by us has all the information about a student and using established queries and with the help of certain criteria we find this graduate and his education in this school is confirmed so to automate filling orders for manufacturing duplicate of a lost document of education is necessary to create a template in the DBMS Access system, which will speed up and facilitate the work of the school employee (Fig. 6–7).

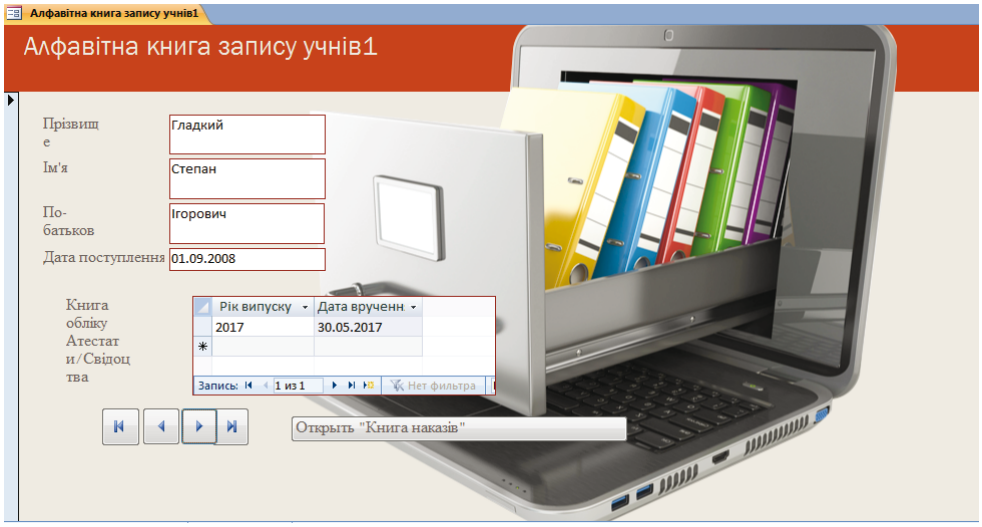

Figure 5. Form “Alphabetic Book of Students’ Record” with a subordinate form

Source: developed by the authors on the basis of data obtained at school.

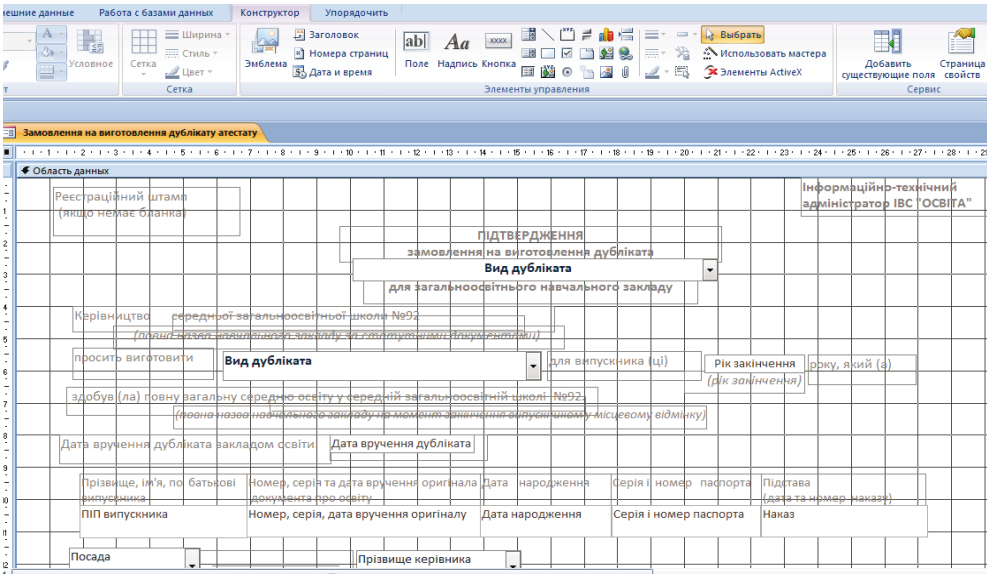

Figure 6. Design view for configuring certain properties and for the location of the reference information

Source: developed by the authors.

In order to see how the document looks after the printing, choose the command “Preview” through the “Print” (Fig. 8).

Figure 7. Sample of filling up a duplicate order confirmation template in the form of a database

Source: developed by the authors.

Figure 8. Preview the document before printing

Source: developed by the authors.

The main result of the implementation of the information and reference system for the confirmation of the order for the production of a duplicate diploma/certificate of complete secondary education at an educational institution was the computerization

of students' recording and complete automation of the calculation of the quantitative indicators of the institution. As a result, the process of creating reports and documents for confirming the order of duplicates has been greatly simplified.

Conclusions

So, as a result of the analysis of the search problem among the large volumes of document and information arrays, an information and reference system was created in the form of a database implemented in the Access database. The developed information and reference system allows to significantly automate the process of finding the students, school graduates, taking account of the issuance of certificates of full secondary education, certificates of the completion of 9^{th} and 11^{th} grades and the issuance of their duplicates, that greatly facilitates the work of the school staff while processing a large amount of diverse information regarding to existing data. This software package gives you the ability to get the most relevant information for specific queries, reports, forms, macros, as well as to output this information into the screen or if necessary to print.

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