Educational Management in University on the Basis of Database Management System

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Abstract. In research article process of informatization of education from the point of view of automation of document flow in higher education institution is considered. Management of the office-work process proceeding in higher education institution treats the sphere of educational management. A technical basis of educational management in higher education institution is the unified information system (UIS) allowing to operate all processes proceeding in him. One of the UIS functions is administrative and information management within which UIS integrates means of IT support and automation of management of educational institution. The purpose of article is consideration of technology of system development automation of office-work on the basis of the database management systems (DBMS). At design of the database the special software of MySQL Workbench which application has allowed to accelerate working processes was used, and the issue of reliability of data storage has been resolved thanks to their storage on the server possessing high technical characteristics and working at uninterrupted food. The organization of the specialized interface is shown on the example of SQL-of inquiries to the database. Article can be of interest to experts of the sphere of the information technologies which are engaged in development of means of informatization in the context of development of the information and education environment of educational institution.

Introduction

In research article process of informatization of education from the point of view of automation of document flow in higher education institution is considered. Office-work process control, proceeding in higher education institution, belongs to the sphere of educational management. A technical basis of educational management in higher education institution is the unified information system (UIS) allowing to control all processes proceeding in it. One of the UIS functions is administrative and information control within which UIS integrates means of IT support and control automation by educational institution. The purpose of article is reviewing of technology of system development automation of office-work on the basis of the database management systems (DBMS). The analysis of two database management systems of Microsoft Access DBMS and MySQL DBMS allowed to select their merits and demerits and to give preference last as it is capable to ensure functioning in the multi-user mode, thanks to existence of the client server mode that is one of decisive factors in case of automation of process of document flow in higher education institution. In case of design of the database the special software of MySQL Workbench which application allowed to accelerate worker processes was used, and the issue of reliability of data storage was resolved thanks to their storage on the server possessing high technical characteristics and working in case of uninterrupted power. The organization of the specialized interface is shown on the example of SQL-of database requests.
Within the real research the technology of development of the database for automation of document flow of three structural subdivisions of the Ural Institute of Economy, management and the law with use of MySQL DBMS is described: selection committee, human resources department, dean's offices. As an example in article the technology of development of the interface of the database with use of MySQL DBMS for one subdividing of higher education institution is described. The approach offered in article can be used for enhancement of educational management on the basis of means of information and communication technologies in other educational institutions. Article can be of interest to experts of the sphere of the information technologies which are engaged in development of means of informatization in the context of development of the information and education environment of educational institution.

Relevance of the Research

One of the priority directions of process of informatization of modern society is education informatization – introduction of means of new information technologies in an education system. It gives the chance to improve mechanisms of management of an education system on the basis of use of the automated databanks scientifically – pedagogical information, information and methodical materials, organizational and administrative resources, and also communication networks. Management of educational institution on the basis of the information technologies (IT) is the key mechanism which will allow to create advantages in the competitive environment. In this regard creation of reliable and effective infrastructure, introduction of the unified ways of access to corporate data, improvement of controllability of all complex of information resources, and also ensuring compliance of infrastructure to strategic objectives of higher education institution [1] become the main actions in development of informatization.

In this article the analysis of two database management systems (DMS) of the Microsoft Access and MySQL for the purpose of use of one of them for development of the database for document management in higher education institution is carried out (on the example of subdivisions of the Ural Institution of Economics, Management and Law (Yekaterinburg).

Theoretical Bases of Design of Databases

According to the typification of electronic editions of educational appointment which is carried out Robert I. V., [2], one of their functions is automation of office-work in educational institution. Management of the office-work process proceeding in higher education institution treats the sphere of educational management [3,4,5]. Educational management of higher education institution is understood as purposeful organization of events, the processes promoting ensuring quality of educational activity by the rational organization, including management of education and effective use of personnel potential, development of technical and technological base [6,7,8,9,10,11].

Technical basis of educational management in higher education institution is the unified information system (UIS) allowing to operate all processes proceeding in higher education institution (administrative management and management accounting, finance, management of educational process, management of information resources, actually educational process, scientific research, etc.). UIS of higher education institution is the reliable and effective infrastructure providing introduction of the unified ways of access to corporate data, the improving controllability of all complex of information resources of higher education institution [3].

For high-quality and productive functioning of UIS it is important to define structure of categories of users which depends on the UIS functions. Traditionally carry to the UIS functions: function of electronic training (UIS is intended generally for realization of processes of electronic training), function of administrative and information management (UIS integrates means of IT support and automation of management of educational institution), directory function (UIS acts as the open information system focused on users whose interests are connected with education).
As a research objective is development on the basis of the DBMS of system automation of office-work in some subdividings of the Ural Institution of Economics, Management and Law (UIEM&L), which choice is restricted to article volume, the analysis of materials according to databases was carried out.
The database - a set of the data which are stored some ordered method. In other words, the database is a data store. Without the database management system (DMS) databases in itself aren't of interest. The DBMS is a set language and software which provides data access allows to create them, to change and delete, ensures data security. In other words, the DBMS is the system allowing to create databases and to manipulate the information which is stored in them. The data access of the DBMS is provided by means of the special SQL language.

SQL - a structured query language which main objective is provision of an easy way of reading and data recording in the database [12]. For creation of system of automation of document flow two large Microsoft Access and MySQL DBMS [13, 14] on purpose detections of their advantages and shortcomings were analyzed in [15]. The carried-out analysis of two Microsoft Access and MySQL DBMS allowed to make a choice in favor of last. The principal argument of this choice was the fact that it is capable to ensure functioning in the multi-user mode provided with existence of the client server mode that is one of decisive factors in case of automation of process of document flow in higher education institution.

In the modern higher education institution the information flows connected to document flow considerably increased. Data bulks shall be at the same time available to a great number of employees. Therefore the option with a possibility of multi-user operation in the best way responds research problems. Advantages of the centralized data storage which are as follows are obvious: data handling becomes simpler and accelerates, their updating on different computers isn't required, these functions are performed by the server and the software; instead of a large number of computers of users only one machine (server) needs more reliable information security; data handling is shifted from the user personal computers to the server that attracts cut in expenditure on the equipment for users.

Practical Part

In the course of document flow of the modern higher education institution there is a storage and processing of large volumes of information with which operation requires to their constant systematization, extraction, adjustments and deletings. At the same time dataful operation is carried not by one structural subdividing. In structure of UIEM&L there are following subdividings: library; accounts department; human resources department; dean's offices; selection committee; postgraduate study; computer service; command center quality of education, licensing, accreditation and monitoring.

In case of design of the database the purpose to automate document flow in all structural subdividings wasn't set. Within the real research three structures of higher education institution were considered: selection committee; human resources department; dean's offices. In case of design of the database the special software of MySQL Workbench was used. This tool allows to project diagrams of databases visually. Primary benefits of MySQL Workbench following: the product allows to present database model in the graphic form visually; the product possesses the evident and functional mechanism of installation of cross-table relationships, including "many to many" with creation of the table of communications; existence of Reverse Engineering allows to recover structures of tables of already existing DB on the server, connection needs to be established manually; presence of the convenient editor of SQL queries, allows to send at once them to the server and to receive the response in the form of the table; there is a possibility of editing data in the table in the visual mode. Thanks to a functionality of MySQL Workbench there was an opportunity to construct evident graphic model of the database.

As process of automation of three above-named structural subdividings is considered, it is possible to select key tables, to assign each of them primary key and to establish connection in between. We will analyze the designed graphic model consisting of nine tables in which specific data are stored [15].

Primary key — in a relational data model one of potential keys of the relation selected from quality of the main key (or a key by default) [9]. The foreign key is a column or a combination of columns which is applied to forced link establishment between data in two tables.
Thus, all tables are connected among themselves. At all tables, except for the table students, the id field is created automatically, that is, value one bigger previous is added and never repeats. In the table students number of the record book is taken as a basis of primary key.

One more important feature which can't be ignored is type of "one-to-many" communication. In case of this type of communication record from one table communicates with several records of other table, but records from the second table communicate only from one of records of the first table. An example are the tables "teachers" and "positions" figured in [15].

This type of communication is inherent, for example, in the teacher of institute which has one position (for example, the associate professor), but at the same time the position the associate professor can concern to many teachers. Acceleration of processing of data is reached, on the one hand, thanks to the fact that it is carried out on the server. On the other hand the comfortable, evident and "friendly" interface of the user can accelerate processing of data. If correctly designed interface isn't developed, the user won't be able quickly to work with the database as on each database request it should create specialized SQL queries for receiving, editing, deleting data.

Within the research the specialized interface was created. Further its operation directly on SQL-database requests will be considered. In the database there are nine tables which detailed description is given above. The most main table is the table institutions which stores in itself the name and the address of institute. How it is provided in the specialized interface, is figured in [15].

**Development Assessment**

The created database which is information basis of the developed service of automation of process of compilation of the schedule in higher education institution as mobile application allows to review append queries, deleting and data sampling. So, to add data on objects and departments structural subdividing "Dean's offices" can, add data on positions and teachers - structural subdividing "Human resources department", to add data on students, groups and specialties - structural subdividing "Selection committee". The structure and the interface of the created database allows to parallelize the operation connected to document flow between structural subdividings. At the same time reliability of data as they are concentrated on the server that promotes an acceleration of process of document flow of subdividings is provided and increases quality of their operation.

**Summary**

Technological development process of service of automation of document flow in higher education institution as mobile application, being an informatization process step, allowing to improve controllability corporate data and processes in operating conditions of the Unified Information System (UIS) of institute is described. Existence of complete UIS of higher education institution will give the chance to control knowledge that will allow to develop innovations, to improve a staff susceptibility (to quicker solve originating problems), to increase labor productivity (to reduce search time of the necessary decision in control and amount of completed work in educational process), to develop competence of a staff.

Document management in higher education institution on the basis of the proposed solution requires transition to such status of UIS of higher education institution upon which users get access to necessary, up-to-date, complete, incorrect and consistent information, and IT solutions are so interwoven into the main business processes of higher education institution that a staff and students won't be able to do without services provided by the information environment any more. At the same time functions are executed by a staff with bigger efficiency, and quality of training of students increases that makes investments into IT economically justified.

Implementation of the offered approach is directed to enhancement of educational management on the basis of the information and education environment of higher education institution which is understood as set of purposefully created conditions of interaction of all categories of users and the UIS interactive program resources (educational, administrative, information, educational) on the basis of network technologies, program and technical means providing uniform technological
means of information support of students, teachers, parents, administration of educational institutions and the public.

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