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Corporate Information System « Educational Center»

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***Abstract*—**The given work is devoted to the description of Information Technologies NAS of Azerbaijan created and successfully maintained in Institute. On the basis of the decision of board of the Supreme Certifying commission at the President of the Azerbaijan Republic and Presidium of National Academy of Sciences of the Azerbaijan Republic, the organization of training courses on Computer Sciences for all post-graduate students and dissertators of the republic, taking of examinations of candidate minima, it was on-line entrusted to Institute of Information Technologies of the National Academy of Sciences of Azerbaijan.

Therefore, teaching the computer sciences to post-graduate students and dissertators a scientific - methodological manual on effective application of new information technologies for research works by post-graduate students and dissertators and taking of candidate minima is carried out in the Educational Center.

Information and communication technologies offer new opportunities and prospects of their application for teaching and training. The new level of literacy demands creation of essentially new technology of obtaining of scientific knowledge. Methods of training and development, social and professional requirements, globalization of the communicative economic and political projects connected with construction of a new society, depends on a level of application of information and communication technologies in the educational process. Computer technologies develop ideas of programmed training, open completely new, not investigated technological ways of training connected to unique opportunities of modern computers and telecommunications. Computer technologies of training are processes of preparation and transfer of the information to the trainee by means of computer. Scientific and technical progress as well as global spread of the technologies created in the most developed countries of the world is the main proof of the leading role of education in XXI century. Information society needs individuals having modern knowledge. In practice, all technologies, using special technical information means (computer, audio, video) are called information technologies of education.

***Keywords*—** Educational Center, post-graduate, database.

I. Introduction

SCIENTIFIC and technical progress as well as global spread of the technologies created in the most developed countries of the world is the main proof of the leading role of education in XXI century. Information society needs individuals having modern knowledge. Methods of training a training and development, social and professional requirements, globalization of the communicative economic and political projects connected with construction of a new society, depends on a level of application of information and communication technologies in the educational process[1].

In practice, all technologies, using special technical information means (computer, audio, video) are called information technologies of education. Term "new information technology of training" has appeared when computers began to be widely used in education. Generally speaking, any pedagogical technology is an information technology as the basis of technological process of training is the information and its transformation. To our opinion, more successful term for the technologies of training using a computer is the computer technology.

Computer technologies develop ideas of programmed training, open completely new, not investigated technological ways of training connected to unique opportunities of modern computers and telecommunications. Computer technologies of training are processes of preparation and transfer of the information to the trainee by means of computer.

The database is an objective form of representation and the organization of the data set, systematized so that these data could be found and processed with the help of the computer[2].

The relational database is a set of the relations containing the information which should be stored in a DB. However users can perceive such database as set of tables. Are used a database for the information frequently undergoing changes.

One of the basic advantages of the relational approach to the organization of databases (DB) is that users of relational DB receive an opportunity of effective work in terms of simple and evident concepts of tables, their lines and columns without need of knowledge of a real data structure for external memory[2].

- ♦ Definition of objects (sources of the data) which should be included in a database
- ♦ Revealing connections between objects
- ♦ Definition of the basic properties of objects
- ♦ Revealing connections between properties of objects
- ♦ Definition of relations between tables of a database, on the basis of connections between the objects of the data contained in them

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♦ Definition of the operations which are carried out at creation and change of the information in tables, including maintenance of integrity of the data

♦ Revealing the indexes necessary for acceleration of performance of inquiries

♦ The account of safety issues - what powers and to what users to give

♦ Development of procedures of creation of backup copies and restoration of initial files

The submitted list certainly is not full, but allows to make representation about those actions which are necessary for executing. Each design stage depends on results previous, and the more carefully it will be thought over, the it is less iterations to be necessary further.

Among the purposes the most important represent the following:

- An opportunity of storage in a database of all necessary data
- Exception of redundancy of the data
- Minimizing number of tables stored in a database
- Normalization of tables for simplification of the decision of the problems connected to updating and removal of the data

Some from the listed purposes are represented obvious, others are not so obvious, but it are not less important. We shall very shortly consider each of them.

Operation of association is supposed in control systems of relational databases because within the framework of this model it is possible to take the data from different tables, to create on their basis new tables to trace unforeseen beforehand dependences as they are shown at performance of inquiry, instead of at creation of the table.

It is possible to unit and display lines of different tables and to manipulate to the data with the help of the same instructions which are used at work with one table. Lines of several tables can be united differently. The first way refers to as natural association.

Natural association is carried out by selection of lines with identical values in general for several tables so that one of the first table was duplicated in the second then this column will be the common for both tables[3].

Support of indistinct inquiries also will demand serious researches in the field of productivity. Modern control systems of the relational data, basically, are designed for support of exact inquiries to the exact data and use such "exact" mechanisms of support of access, as indexation and sorting.

For support of indistinct inquiries in a context of state security, it is necessary to mean, that in various regions of the world different variants of a pronunciation of names of people, and descriptive names of automobiles, people, incidents, etc. which are necessary for supporting in certain « dictionaries of names » together with the rules determining conformity of names and descriptions are in use. Moreover, the certain types of the data in a database are necessary or for reorganizing according to a level of abstraction or categories of people, or to give support by search of an exact level of abstraction or a category. The relational model of the data containing a set of precise instructions to the base organization of any relational control system by databases (CSBD), allows users to work in not navigating manner, i.e. for sample of the information of a DB the person should specify only the list of tables interesting it and those conditions with which should satisfy the chosen data. CSBD hides from the user consecutive viewings of tables carried out to it, carrying out their most effective image. Very important feature of relational systems will be, that result of performance of any inquiry to tables of a DB is also the table which can be kept in a DB and-or in relation to which it is possible to carry out new inquiries.

The circuit of a database contains the description of all objects of a database: users, their privileges, tables, representations, indexes, clusters, restrictions, the packages, stored procedures, triggers, etc. Thus objects with which developers then work are created not only definitions of these objects, but also.

II. Methods

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• Revealing the indexes necessary for acceleration of performance of inquiries
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In most cases for creation of own information system it is impossible to do without use of databases. Than "database" differs from any warehouse of the data supported in files of operational system? The basic difference will be, that a data set, included in a database the special system program usually named operates " a control system of databases (CSBD) " which possesses knowledge concerning connection between the diverse data. For example, in case of warehouse system, CSBD, the manager of a corresponding database, should know, that for all units of any goods listed in the general warehouse sheet, should be submitted correct number in the document regulating receipt of the goods on a warehouse. Such type of property refer to as integrity of a database. At creation of a database of information system the developer informs CSBD, what sort of restriction of integrity the system should support in a database, and further the responsibility incurs CSBD, without the requirement of intervention of the applied program. Usually the mechanism of maintenance of integrity of databases is integrated with the mechanism of management of transactions - sequence of operations of updating of the database, perceived CSBD as one atomic operation. However principles of creation of any base should be the general:

• Systembility
• Flexibility
• Stability
• Efficiency

Systembility: CSBD should be considered system which structure is defined by functional assignment.

Flexibility: The system is adapted to possible reorganizations, thanking modular constructions of all subsystems and standardizations of their elements.

Stability: The principle consists that the system of CSBD should carry out the basic functions irrespective of influence on it of internal and external revolting factors. The serviceability of system is quickly restored.

Efficiency of CSBD , it is necessary to consider as an integrated parameter of a level of realization of the above mentioned principles, attributed to expenses for creation and operation of system

Second important feature CSBD is maintenance of performance so-called " unplanned (ad hoc) " inquiries to a database. We shall imagine, that at designing the information system intended for automation of management by a warehouse, performance of inquiries about presence in a warehouse of the goods, operations of updating of the goods given at holiday from a warehouse and their reception has been planned, and the information on total amount of deliveries from the given supplier subsequently was necessary. At absence CSBD alteration of information system would be necessary. However CSBD, possessing sufficient knowledge of a subject domain (for example, about structure and sense of the data of warehouse information system), can provide (and really provides) universal language of inquiries (usually, language SQL), allowing to formulate any inquiry about sample of the information from a corresponding database. Such inquiry can be sent at any moment from the terminal (without participation of information system) or is built - in one of the applied programs which are included in information system[4].

The technology of databases can be defined as methodology and program toolkit of modeling and storage of the big data files of any type and structure, and also processing of inquiries and operations of updating of the data. The technology of databases leaves far for frameworks relational CSBD, covering the techniques serving for support of storage and search of the multimedia data, the geospatial information, time numbers, text files of the any form, documents HTML and XML.

Establishments of authority of various levels support set of the various databases necessary for granting of services, and also for monitoring city and agricultural population.

Indexation - the major mechanism of reduction of space of

search at a finding of the required data in a large database, whether it be a corporate database, a database of federal department or World Wide Web as a whole. Systems of databases create and support indexes for the fields specified by the user in the table for acceleration of search which includes indexed fields. Similarly systems of extraction of the information create and support indexes as the list of the words meeting in text documents made in free style to speed up search of the documents containing certain words or their combinations. Mechanisms of search in Internet create the key words representing HTML-documents, and use then them as indexes in such documents. Now the big interest is caused with researches Semantic Web. The purpose of such researches - to enable to carry out search on the basis of semantics of the user inquiries and stored in Web documents.

At the intermediate stage the good technique of classification of the information which would serve as the powerful mechanism of indexation of " the top level » for support of fast and exact search of the text documents written in free style is necessary.

Extraction of the data is an automatic extraction of the information from the raw data stored in computer systems. it can be used for detection of illegitimate use of credit and telephone cards, counterfeit insurance requirements, forecasting of consumer demand, definition of categories of clients, etc. Taking into account as far as the data available in databases are incorrect, and necessity of the decision of task of maintenance of state security, methods of extraction of the data it is necessary to modernize and define for them the new purposes. In particular, stability to mistakes in the data should become the important criterion at a choice of algorithms of extraction of the data. Moreover, as algorithms of extraction of the data, as a rule, are used for revealing the latent tendencies and patterns, search of sources of threat of safety, the persons suspected in terrorist activity and movement of money resources, most likely will demand revealing non-standard or unusual patterns (exceptions). By virtue of it, probably, the most comprehensible will be algorithms of extraction of the data, focused on revealing and the analysis of exclusive situations. Moreover, it is necessary to make assumptions for incorrect given models extraction the data given at scoping for training. Without these assumptions results of extraction of the data can appear unreliable.

One of the most serious problems now consists that the state databases are based on the inherited systems of databases for desktop computers, such as Dbase, FoxPro, etc. These databases are not incorporated into a network with other sources of the data, and, in result, it is difficult to track the connected information which has been saved up by various departments. To simplify and speed up access to the information, to enable to trace connections between different sources of the data and to provide reliability of use of the inherited desktop databases in maintenance of national safety at all levels of the government, it is necessary to transfer and integrate this information into booths of the data or the storehouses of the data controlled relational CSBD of a corporate level.

To define threats of safety, to reveal potential terrorists, movement of money resources and so on, the organization of cross references between concrete data in the various databases available in the organizations, and, maybe, even in scale of all country is required.

However it is not necessary to expect, that all these diverse databases supported in thousand of the organizations, it will be possible to integrate into uniform homogeneous storehouse of the data. It is even less probable, that such databases can be integrated between the various countries. These systems will be always served independently. However it is completely necessary, that, at least, a part from independent systems have been incorporated into so-called "federation" of cooperating databases. In the scientific literature virtually integrated global circuit constructed above circuits of all independent data in federation is offered. Such model, as a rule, in practice taking into account that the various organizations use different technologies, and considering the difficulties connected to reception of the rights of access and a level of protection, appropriated for the sanction of access to various databases. Opportunities of a federal database for maintenance of national safety can be enough limited. Each of the organizations involved in formation of "federation", has circuits of other databases which allow it to initiate formation of cross references and inquiries to some from bases of other organizations, and also to receive answers to these inquiries, it is desirable operatively. The "Federal" level should cover CSBD which operate independent databases of all organizations possessing data, connected with national safety.

Attempts find the suspicious person can to be delayed, if, say, there are data on its address and a place of work of only two-year-old prescription.

The module of check of grammar can be applied to testing the text data (we shall tell, names and addresses). For check of a correctness of cross references the superfluous data can be formed. It is possible to create triggers which will be stored in a database and automatically to update the changeable data maximum quickly after occurrence of the certain events.

Computer technology is based on use of some formalized model of the contents which is presented by the pedagogical software which have been saved in memory of a computer, as well as opportunities of a telecommunication network.

At present the governments of the majority of the countries exert huge efforts for modernization of the education systems on the basis of information and communication technologies. In a number of the countries information and communication technologies are considered as basic component in improvement of quality of education by modification in training courses.

Information and communication technologies offer new opportunities and prospects of their application for teaching and training. The new level of literacy demands creation of essentially new technology of obtaining of scientific knowledge[5].

On the basis of the decision of board of the Supreme

Certifying commission at the President of the Azerbaijan Republic and Presidium of National Academy of Sciences of the Azerbaijan Republic the organization of training courses on Computer Sciences for all post-graduate students and dissertators of the republic, taking of examinations of candidate minima it was on-line entrusted to Institute of Information Technologies of the National Academy of Sciences of Azerbaijan.

Therefore, teaching to post-graduate students and dissertators of Computer sciences, a scientific - methodological manual on effective application of new information technologies for research works by post-graduate students and dissertators and taking of candidate minima is carried out in the Educational Center.

In connection with carrying out of training courses on Computer Sciences and the organizations of works on taking of candidate minima in the Educational Center below-mentioned works are carried out:

- Registration of letters, post-graduate students and dissertators in accordance with established form
- Registration of post-graduate students and dissertators on the basis of the filled in personal questionnaires and payments for training
- Distribution of post-graduate students and dissertators on scientific directions
- Formation of educational groups on specialties
- Definition and drawing up of the educational schedules
- Assignment of teachers on groups on the basis of scientific directions
- The organization of examinations upon termination of courses
- Preparation of examination reports
- Preparation of certificates for post-graduate students and the dissertators who have received a satisfactory mark at examination

III. Conclusions

For automation of works of the Educational Center, the Corporate Information System «Educational Center » (ECCIS «the Educational Center») has been created.

ECCIS «Educational Center» allows to reduce manual work, time of processing of the information, terms of decision-making, to protect the sensitive data, to increase reliability of work of system, to lead information association of divisions of the educational center.

The database of the system is created with the purpose of the filing of great volume of the paper information in memory of a computer, performance of necessary operations with the information as well as archiving and transfer of the information on a network.

Creation of ECCIS « the Educational Center » allows:

- To carry out fast and exact registration of post-graduate students and dissertators;
- To carry spend on-line registration of post-graduate students and dissertators (in particular, living in regions);
- Getting of information by scientific and educational establishments about participation of their post-graduate students and dissertators on Computer Sciences course and about results of a passing examinations of a candidate minimum;
- To carry out the statistical analysis of research works in the republic;
- To prepare necessary statistical reports for the Supreme Certifying Commission;
- To trace dynamics of development of preparation of the scientific staff on different scientific areas in republic.
- Also ECCIS «Educational Center» allows to see a global picture of an event in the educational center.

Functionalities of the system are:

- Maintenance of high efficiency and an opportunity of scaling within the framework of corporation.
- Transparency, i.e. an opportunity of integration with other components of information system - DBASE, control systems of electronic documents, communication programs, etc.
- Flexibility, i.e. ability of system to adjustment and re-customizing depending on structure and technologies of processing of the documents accepted in the organization.
- Simplicity in use, studying and service.

ECCIS «Educational Center» it is realized in Delphi 7 environment, work with it, is simple and convenient. Now ECCIS «Educational Center» is successfully maintained in Institute of Information Technologies of ANAS.

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