THE EFFECTIVE DECISIONS OF MODEL'S CONSTRUCTION OF INFORMATION RESOURCES MANAGEMENT ON DISTANCE LEARNING

Volodymyr MESYURA[1], Oleksandr HOSHABA,[2]
Serhiy YUHIMCHUK[3], Natalia MESYURA[4]
Vinnytsia National Technical University
Khmelnitske shose, 95,
Vinnytsia, 2102, Ukraine
[1]*vimes@vstu.vinnica.ua*
[2]*hoshaba@hoshaba.org*

Abstract. *The description of model and methods of management by access to information resources by distance learning are offered. In work the model which is based on the organization of information resources by a principle the column of conditions is described. The basic criteria of management are determined by information resources: localization of a source site, days of logins for users which working with information resource, duration and time of a session for group trained or each user. It is given an example for creation of software structure in distance learning systems.*
Keywords: *distance learning, intellectual technologies, testing of knowledge, computer networks.*

Introduction

The using of modern information technologies is the effective decision in the field of development of software on distance learning [1,2]. In this case, the advantage of the information resources' using of computer networks on companion other means of training is obvious: a high degree of scope of students, operative information updating, the opportunity of the development of the high quality user interface etc. However, the distance learning puts essentially new requirements not only to learning process' organization, results in necessity of the new methods creation of study of an learning material, forms of the control and mastering the knowledge, but also causes to access operation of an learning material [3-5].

Description of model

For maintenance of flexibility and universality of distance system on the foreground the task about organization of politics both rules of inter-action Web-server and trained is put. One of the variants of such politics is the model of manage-ment of information resources on distance learning.

The construction of distance learning system should be based on such organizational principles [6-9]:
- individual choice of means of training;
- student's differential access to methodical materials;
- constant contact between the teacher and a student;
- testing of knowledge trained in a real mode of time;
- extended access to information resources of learning system.

The distance learning system can consist of registration blocks, interactive training and testing. The registration block is intended for registration of a student, formation and filling of the user's actions in an electronic magazine (file protocol).The block of interactive training realizes the training process by means of acquaintance of an user with an learning rate and carries out an operative control of knowledge. The block of final testing carries out the function of student's testing for quality check of a material and observation of not acquired elements of knowledge.

The learning rate can be submitted as directed graph, in which the elements of distance learning system are served units, and edges are transitions between them. A student can get on an other unit with the help of edges from any unit. The system defines correct transition on the basis of a student's and current condition of an learning process. First of all, the protocol of work and student's model is use when accepting the decision about correctness of the transition. The choice of concrete transition (direction of the further development of learning process) is carried out on the basis of the rules connected to each of these edges. In this case, there can be a necessity of modification in rules of transitions with the help of means of visual designing without the necessity of input of the text' rules manually.

The information in units of the graph representing an learning rate, is broken into small semantic parts - structure, which can be informative and interactive. The information structures consist only of the objects of display of the textual and graphic information, reproduction audio- and video fragments, buttons of management of a course of learning process. The interactive structures, except the listed objects, can also contain elements realizing various kinds of the test tasks for organization of a feedback with a student, operative control of mastering of knowledge, getting the necessary skills.

An electronic magazine (file protocol) should represent a database of the actions of the user. It is possible to find out intensity of employment of the user on the basis of the analysis of the protocol, and if it is necessary, to correct student's model. The model of the training should contain the answers to correct and erroneous questions, time and duration of the test interrogations.

The high-grade functioning of distance learning systems is impossible without using of mechanisms of the control access to information resources and data protection. The using of these mechanisms basically is connected with management of the data flows in computer networks. The control of access to information resources of distance learning systems should provide definition of such important characteristics of the connection with Web-server as inquiries localization on a range or one IP address, duration of connection, time and day of the connection expectation. The given requirements are important as for used Web - server, and for the separate processes produced by training system. Thus flexible resource management of distance student's system is provided.

Realization of model

When defining effective decisions of the model's construction of information resources management on distance learning it is necessary to take into account a number of the factors, most important of which are: the organization of a model, interface of an user, management of flows of the data, an information protection.

The large importance has the organizational structure of the model's training process for the realization of the model. In this case, the description of the model should be connected with the plan of the construction of learning process (fig. 1).
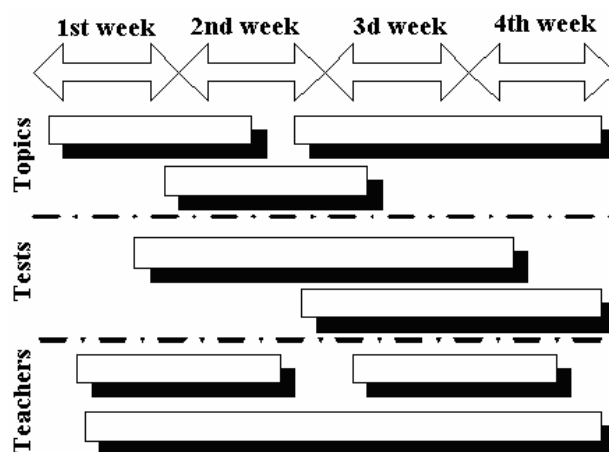

Figure 1. The circuit of the learning process construction in a section of one rate

A curator or responsible for realization of a cycle must form the subjects of lecture and practical (laboratory) lessons and the test tasks. In some cases it is necessary to show a responsible work realization. It is important to provide an opportunity of an assignment of the several teachers for one group of the students.

The realization of the common circuit of interaction of the basic making elements of a distance process can have complex network structure (fig. 2).

The special attention should also be given to the test interrogations. Thus, the basic components of the test tasks should reflect the following elements:
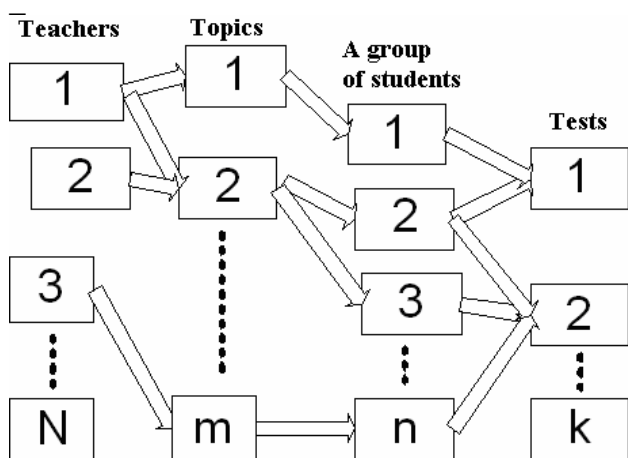

Figure 2. Realization of the common circuit of the basic elements interaction of the distance process

- opportunity of definition of the casual and strict order of following questions;
- estimation of each question with the instruction (indication) of the minimal and maximal weight characteristics;
- opportunity ranging sums of the test answers estimations with a conclusion of the appropriate results (for example we can take 12 ball estimations);
- opportunity of restriction on the test performance time;
- opportunity of display of the correct answers during performance and after end of the tests;
- presence of the protocol of the answers and results on test questions.

The important place when realizing the model's of information resources management on distance learning occupies the user interface. Color scale, quantity and combinations of colors, which should be picked up in view of the long work of the users have the special importance. Now, the solving of similar questions is generated in a separate direction

representing interest for many researchers in the field of psychology, physiology natural and engineering science.

The construction of systems on management of flows given in the field of remote systems is a new and perspective direction. In our opinion a management of duration and time of a session for the user or students' group, days of visiting of information resources, localization of a student's place, regulation of speed of receipt of the data there should be in a basis of these methods. In a fig.3 the common circuit of processing of information flows proceeding from the set forth above requirements is resulted, where the common and specific features for various operational systems and tasks of server construction [10-12] are marked. It is necessary to note, that a number of common and specific parameters exist. They can be better realized on various clones of operational systems: Unix (FreeBSD, Solaris, Sun, Linux) or Windows (Windows NT/XP/2000). At the same time common and specific parameters of the management of flows of the data are applied for the tasks of corporate and international Internet servers construction [13-15].
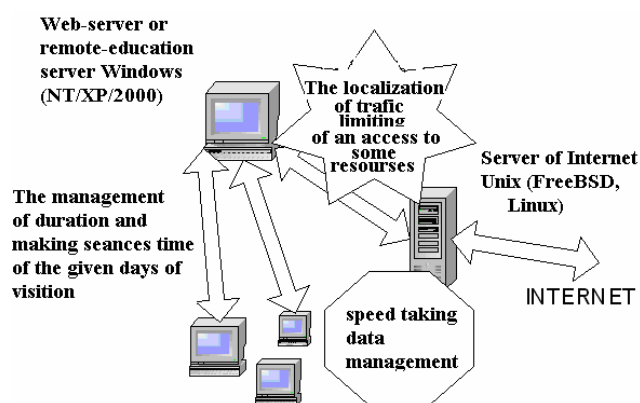

Figure 3. The common circuit of information flows processing

We can apply the intellectual technologies for the effective realization of the considered model's information resources management on distance learning. Let's consider these technologies in detail. The process of interaction with the user (fig. 4) is created when functioning Web-server. The result is an opportunity of the qualitative control of the created process

concerning localization of the executed inquiry on IP to the address, time and days of visiting, duration of interaction with a trained resource.
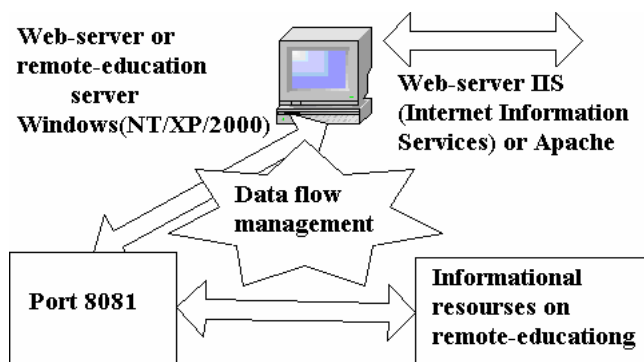

Fig. 4. The common circuit of information flows data management at a Web-server level

Such technology of interaction with process on distance control by information resources is intellectual. The similar receptions of interaction with processes are not standard methods because of their absence in the utilities of operational systems.

As the result, the data flows management of information leads to the effective protection of information resources on distance learning.

Program realization of model.

Such software as Distance Learning System and Outpost Firewall Pro were used for the construction of system on distance learning training in a view of management of flows given in computer networks. In this case, it is more expedient to apply division of a program complex on a server and a client part. The client part represents Web-page, inside which there was a code written on Java-applet. Management of browser work is in function of a program code. The server part represents the script written on Java-servlet. The program code of a server part is carried out in operational system Windows XP, and results transmit to the users on a computer network as Web-pages.

There is an opportunity of processes control, which were created at work Web-server (fig.4) when realizing the system Distance Learning System with the help of the program Outpost Firewall Pro. It enables to control the data on

localization of IP addresses sources, installation of the diagram of work on time and days of visiting, duration of interaction with a trained resource.

The advantage of using the given software is: cross platform of Java language, support of the advanced means of protection and corporate databases, high-grade support of means multimedia and network opportunities, flexible management of flows of the data.

Conclusions

Thus, in the work:
1. The model of information resources management on distance learning is described.
2. The common approaches to realization of the offered model are offered.
3. The model of interaction learning and distance learning system are described.
4. The study of processes of information flows management in computer networks is executed when functioning distance learning system.
5. The model of information resources management on distance learning is offered.

References

[1] Хошаба О.М., Савчук О.О. (2000) *До рішення проблеми побудови систем по дистанційному навчанню на основі Web-технологій міжнародної комп'ютерної мережі* Internet, Вимірювальна та обчислювальна техніка в технологічних процесах №2 Хмельницький.-С.121-123.
[2] Khoshaba O.M., Mesyura N.V. (2003), *Creating and Defining of the Main Function Characteristics of the Multiagent Systems in the Computer Networks*, 1-а Міжнародна науково-технічна конференція ACSN-2003: Мат. допов.-Львів,.-С. 75-78.
[3] Хошаба О.М, Месюра Н.В. (2003), *Практика решения проблем контроля и управления поттоком данных в компьютерных сетях, Контроль і управління в складних системах*. Тези доповідей міжнародної науково-технічної конференції. - Універсум. - Вінниця,.-С.110.

[4] Хошаба О.М, Войцех О.А. (2003), *Використання мультиагентних систем та інтелектуальних агентів в управлінні складними системами*, Контроль і управління в складних системах. Тези доповідей міжнародної науково-технічної конференції. - Універсум. - Вінниця,.-С.224.

[5] Хошаба О.М, Месюра Н.В. (2003), *Обзор исполь зования интеллектуальных технологий при управлении сложными объектами*, Международная конференция «Теория и техника передачи, приема и обработки информации»: Мат.докл.-Харьков, С. 282-283.

[6] Dolinsky M. (2000), *High-level design of embedded hardware-software systems*, Advances in Engineering Software , Vol 31, No 3, ISSN 0965-9978, UK, Oxford, "ELSEVIER"

[7] Looijen R, Maarten L. (1999*). Information Systems Management, Control and Maintenance*. Kluwer Bedrijfsinformatie, Deventer, Holland,

[8]. Carlo Batini, Stafano Ceri, Shamkant B. Navathe, (2002), *Conceptual database design: an entity-relationship approach*, The Benjamin/Cummings Publishing Company, Inc., Redwood City, 498 p.

[9] Jacobs O.L. (1998), *Introduction to Control Theory*. Oxford University Press, 390 p.

[10] Хошаба А.М. (2003), *Использование мультиагентных систем для защиты информационных ресурсов компьютерных сетей*, Правове, нормативне та метрологічне забезпечення систем захисту інформації в Україні, Випуск 6,.-Київ.-С.28-33.

[11] Хошаба А.М., Силагин А.В. (2003), *Использование интеллектуальных систем в области защиты информационных ресурсов компьютерных сетей*, 4 міжнародна науково-практична конференція "Право і суспільство: актуальні проблеми взаємодії": Мат. допов.-Вінниця,.-С. 195.

[12] Хошаба А.М., 2003), *Решение проблем создания или изменения существующих правил Firewall в операционной системе Unix*, Защита информации: Сборник научных трудов.-Киев: НАУ.- С.5-9.

[13] Хошаба О.М. (2003), *Организация безопасной работы локальных и корпоративных компьютерных сетей на базе системы Firewall*, Науково-технічний журнал "Захист інформації" №2 (15),. - С. 17 - 24.

[14] Alexander Hoshaba, Natalia Mesyura, Elena Voitseh, (2003), *The Definition of the Efficiency of the Multiagent Systems' Using in the Field of Management by the Data Flow of Computer Networks*, Advances in Electrical and Computer Engineering, Volume 3(10), Number 1(19), University of Suceava, Romania,.-Р.94-98.

[15] Хошаба А.М., Месюра Н.В., Войцех Е.А. (2003), *Методы построения систем управления и мониторинга потоков данных в компьютерных сетях на основе интеллектуальных технологий*, Вестник Херсонского государственного технического университета №2(18),.-Херсон.-С.172-178.