

Specific approach to the creation of an intellectual information system in the training of legal professionals

Enfoque específico para la creación de un sistema de información intelectual en la formación de profesionales del derecho

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ABSTRACT

In this article, we have tried to reveal the basic approaches in the development of intelligent information system of management of the educational process. By working out, it was considered the experience of some foreign and national high schools, taking into account the general principles of educational process. The analysis has shown that at IS development there is a necessity in the specific approach to system development. Since the systems of educational process management, where training specialises in the exact sciences differs from training in the humanitarian sphere. While in most cases the control of the educational process implies the management of the educational activities of higher education institutions, the system under development set us the task of developing an integrated system that includes other types of events in higher education institutions, emanating from the specifics of public education management in our country.

Keywords: information systems, education management system, education, intelligent systems

RESUMEN

En este artículo, hemos tratado de revelar los enfoques básicos en el desarrollo del sistema de información inteligente de gestión del proceso educativo. Al hacer ejercicio, se consideró la experiencia de algunas escuelas secundarias extranjeras y nacionales, teniendo en cuenta los principios generales del proceso educativo. El análisis ha demostrado que en el desarrollo de SI existe una necesidad en el enfoque específico para el desarrollo del sistema. Desde los sistemas de gestión de procesos educativos, donde la formación especializada en ciencias exactas difiere de la formación en el ámbito humanitario. Si bien en la mayoría de los casos el control del proceso educativo implica la gestión de las actividades educativas de las instituciones de educación superior, el sistema en desarrollo nos asignó la tarea de desarrollar un sistema integrado que incluya otros tipos de eventos en las instituciones de educación superior, emanando de los detalles de gestión de la educación pública en nuestro país.

Palabras clave: sistemas de información, sistema de gestión educativa, educación, sistemas inteligentes.

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Introduction

We live in the 21st century - the century of information technology. The emergence of a new management environment with the use of information space poses unique challenges and requirements to the educational sphere. Information management environment is based on network management technologies. Proceeding from the requirements of modern society, it is necessary to note that information systems and information technologies are the main components of educational process management. Networks in contemporary society are a new form of social interaction, the environment or, in other words, the space for joint activities and maintenance of mutual communication and communication. Networks support the dynamic exchange of data and information among the people who shape them. Systems are created as a form of social organisation that allows a group of people to increase resources and contribute to solving problems. The growth of information flows and the increase in the speed of information exchange requires more than just database management. The necessity of the use of intellectual systems and elements of artificial intelligence in reduction and simplification of process of acceptance of administrative decisions in education matures. Thus, information technologies put forward a new challenge to previously known management structures. They imply sufficient work and management of the organisation with the help of information and information and communication technologies.

If we look at the development and introduction of information-communication technology (ICTs) in the educational process in the Republic of Uzbekistan over the past three decades, we can distinguish three main approaches to the use of information and communication technologies in education. The first approach, in the late 1990s and early 2000s, was the emergence of computer classrooms and computer literacy training. This is evidenced by the normative and legal document, the Decree of the President of the Republic of Uzbekistan No. PD-3080 "On further development of computerisation and introduction of information and communication technologies" dated May 30, 2002. The second approach - mid-2000 and early 2010 - is the use of information and communication technologies for creation of databases and national information system, data transmission and information exchange. This is evidenced by the Law of the Republic of Uzbekistan "On Informatization", adopted on December 11, 2003, and other related legal, regulatory and by-laws. The third stage includes the last 5-6 years - the active introduction of information and digital technologies and SMART-technologies in all spheres of activity, which are evidenced by the ongoing reforms in the country in recent years and the adoption of regulatory legal acts in this area.

The word "smart", which means "clever" in translation, is now regularly used in many areas forming new terminology, such as Smart Education, Smart University, Smart Learning, Smart Classroom, Smart Learning Environment, etc. (Uskov et al., 2017; Roumen & Kovatcheva, 2017). Smart-Technologies, in other words, intelligent information systems imply the use of digital technologies to support learning, education and educational management. Intelligent information systems also provide a strong indication of how the future learning environment can be shaped. Thus, while in our republic there is rapid development and reform in all areas of human activity, an important point is the choice of the right course in reforming the educational sphere of the Republic of Uzbekistan. Our imperfect world is moving towards uncertain future scenarios, and we must try to redirect it towards sustainability, i.e., a new way of acting to improve our environment while achieving justice, social equality and economic stability. However, change is impossible without learning, just as knowledge is impossible without change. It is necessary to carefully analyse the need for a new form of education in modern society and identify the specific problems facing higher education in the XXI century, taking into account the regional and national characteristics of our state and the priorities arising from the Strategy of Action of the Republic of Uzbekistan. Besides, it should be noted that the use of digital educational technologies is also a subject of standardisation in the international committee ISO. (*Standards for smart education - towards a development framework. Tore Hoel and Jon Mason, Smart Learning Environments, 2018. <https://doi.org/10.1186/s40561-018-0052-3>*)

Thus, the following question follows from the above statements: "How does intelligent learning differ from traditional learning? Therefore, this question, in turn, raises other derivatives. How should the management system of "smart" education be constructed, what are the predominant aspects of the use of intellectual systems in education management?"

First of all, let us consider the difference between information systems and intellectual systems. The concept of "information system" can be interpreted in a narrow and broad sense. In a general sense, this concept represents the totality of technical, software, organisational and personnel support. In this case, it is intended for timely provision of all elements of the system with information. The broadest definition of information systems was given by M.R.Kogalovsky: "An information system is a complex that includes computing and communication equipment, software, linguistic means and information resources, as well as system personnel and provides support for the dynamic information model of a certain part of the real world to meet the information needs of users" (*M.R.Kogalovsky Advanced Technologies of Information Systems. - Moscow: DMK Press; Moscow: IT Company, 2003. - 288 c. ISBN 5-94074-200-9*).

The International Organization for Standardization (ISO), in turn, gives the following definition of information systems: “An information system is an information processing system that works in conjunction with organisational resources such as people, equipment and financial resources that provide and distribute information” (ISO/IEC 2382-1).

Russian legislation defines an “information system” as “an automated system which results in the provision of output information for subsequent use”.

The Informatization Act describes the information system as “an organisational ally organised a set of information resources, information technologies and means of communication enabling the collection, storage, retrieval, processing and use of information”. (*Law of the Republic of Uzbekistan “On Informatization”, December 11, 2003*)

In a narrow sense, the information system implies a set of information system components, which includes DBMS, databases and application programs. In this case, it is considered as a system designed for automated data processing related to data acquisition, modification and storage.

What is an intelligent system? A smart system is a type of knowledge-based automated information system. It represents a complex of software, mathematical, linguistic, technical and organisational means for the realization of set tasks. The main mission of the intellectual information system is to support human activity in decision making.

The fundamental changes taking place in the state and society, caused by the development of new information and digital technologies, have led to the need for change in the higher education system as a whole. The reforms did not bypass the Tashkent State Law University either. The need for highly qualified legal personnel meeting modern international standards has been the main impetus for the ongoing reforms within the university. Structural changes were made in the management of the University as a whole. Based on international experience, the activities and functions of many subdivisions, such as the dean’s office, educational and methodical department, etc., were abolished.

The main goal is to create in the Tashkent State Law University a single integrated information and intellectual management system of the university. The essence will lead radically change the management system of a higher education institution and to provide quality legal education. It is also necessary to ensure external uniformity of educational systems developed and functioning by international standards designed by such organisations as the Learning Technology Standards Committee and International Standard Organization (ISO).

If to take in general, management of education with use of information technologies develops in two directions: the first, control of educational processes. It is based on knowledge transfer and the second, management of educational institution as the organisation which represents management of the personnel, resources and the budget, and also planning, the account and the control of activity of all divisions of higher education institution as a whole.

Research

In the process of creating an intellectual information system, the experience of some foreign and national universities operating in the Republic of Uzbekistan was studied. Information systems of educational process management in different universities differ in their specificity. The specifics and directions of these HEIs require a particular individual approach to the high education institutions (HEI) management system. The similarity of the systems in these HEIs lies in the fact that the main goal is aimed at the automated management of the educational process, that is, mainly the transfer of knowledge to students.

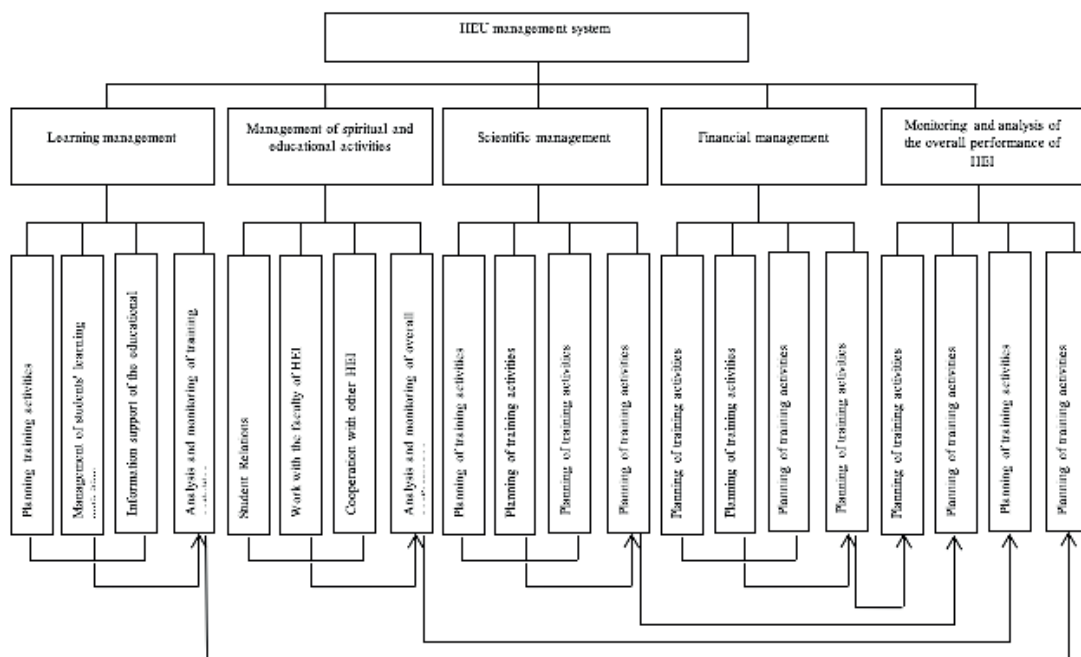
In the process of studying the experience of some foreign and national universities operating in the Republic of Uzbekistan, some comparative analyses of existing systems in these universities have been conducted.

Information systems of educational process management in different HEIs differ in their specificity. The specifics and directions of these HEIs require a particular individual approach to the HEI management system. The similarity of the systems in these HEIs is that the main goal is aimed at automated management of the educational process.

The problem of automation of the management of the educational process was and still is one of the actual problems of education. Many publications have been made on this topic; not a little research has been done. However, it is necessary to note that today higher educational institutions have other organisational and financial structure than it was the last two decades. The introduction of new state educational standards in the higher

education system, in turn, requires a new organisational and regulatory framework. Taking into account all this, the use of old methods and techniques in the educational process impedes the achievement of desired results. In turn, I think that the trend towards the formation of an information society in our country is becoming more and more relevant, and I believe that each higher education institution should automate the management of the educational process, based on its specifics and the existing information environment.

In many aspects of the automation of learning management, some specific aspects of the problem are discussed, such as scheduling of training sessions, development of curricula and courses, calculation of scholarships, etc. In these specific cases, the solution to these problems is solved without taking into account the connection between them. This prevents us from achieving an effective solution to the common problem facing us. Automation of the system is purposeful and productive when the most complex and labor-intensive processes of any system are automated, and leads to the achievement of the intended goal. The most complex subsystem of the university management system is the educational process management subsystem. In general, the university management system can be presented in the following schematic form (Pic.1):



Picture 1: HEU management system.

The introduction of an automated system of educational process control in universities should begin with the automation of the following subsystems:

- automation of the educational process planning;
- students' learning activities automation;
- the educational process to provide information resources Automation;
- Automation of system analysis and audit (monitoring) of the educational process.

In turn, as we know from practice, the most complex and labour-intensive part, which leads to many mistakes, is the planning process. At the same time, it plays an essential role in supporting the quality of qualification in the preparation of qualified personnel and the calculation of labour costs. It is important to note that the more accurate the structure of the curriculum, the more successful the automation and optimisation of educational management systems in higher education institutions. Therefore, a module or subsystem dealing with curriculum and workload generation should include the following tasks and functions, which should be fully and supported:

- (a) Automation of curricula by specialities (for bachelors and masters) and fields of study;
- b) automated planning of pedagogical load of the university, faculty, faculty, teaching staff, automatic calculation of educational works;
- c) electronic distribution of instructional weight among the faculty members of the department;

d) to formulate the curriculum of the higher education institution automatically, taking into account the employment of teachers and educational and laboratory base.

Also, it is vital to take into account several factors in the development of the educational process planning subsystem:

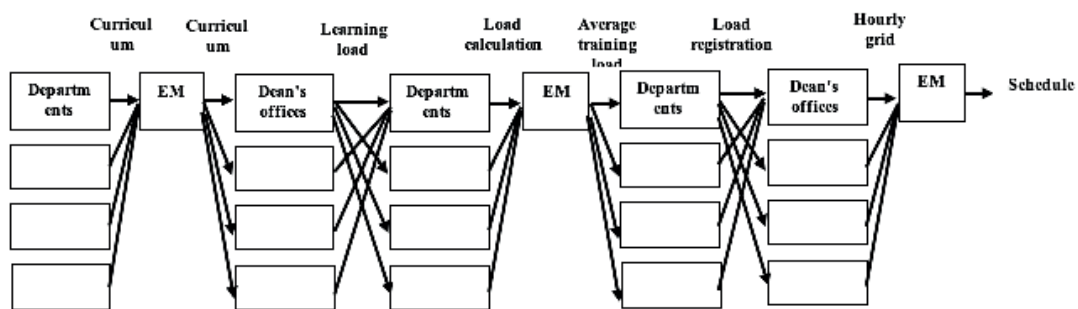
- The connectedness of theory and practice;
- Compliance of the volume of educational information with the state educational standards;
- the sequence of classes, taking into account the interdependence of subjects.

Only in case of observance of the necessarily listed problems, it is possible to reach optimum planning in higher educational institutions.

Research results and system implementation

The primary information flows of the educational process, such as the content and sequence of courses, documentation of the material and progression of scholarly information in the established forms, the formation of these forms and the organisation of automatic filling in of documents are additional conditions in achieving an optimal solution in educational planning.

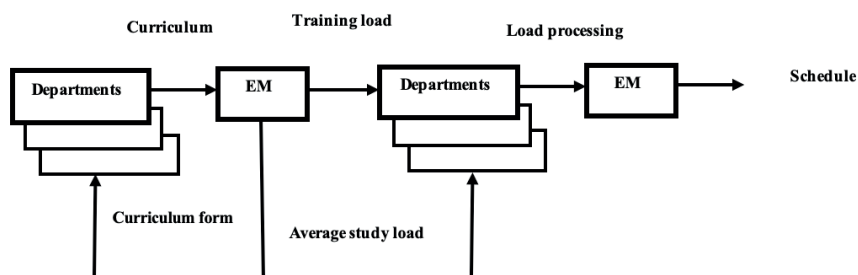
Currently, most higher education institutions operate according to the technological scheme presented in Picture 2.



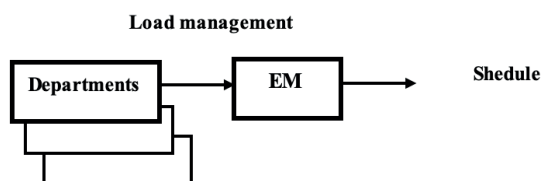
Picture 3: Existing schedule planning flowchart.

Analysing the existing system, it can be concluded that this system is very complex, non-automated, challenging to handle and can lead to specific difficulties in administration, low flexibility and insufficient quality of planning. Here are a few options for planning the learning process to eliminate the above-mentioned shortcomings, automate the scheduling process and reduce the risk of errors:

- a) Schematic diagram of schedule planning without optimisation (Picture 4);
- b) Schematic diagram of schedule planning with optimisation (Picture 5).



Picture 4: Technological diagram of scheduling without optimisation.



Picture 5: Technological scheme of schedule planning with optimisation.

For the intellectual information system to be successfully implemented in education management, each process and subsystem in the structure of the university must be optimised to be efficiently structured. In the beginning, this process is very time-consuming and requires a certain amount of time, and in the future, it requires constant improvement of the system.

The specificity of legal education is not only in the transfer of knowledge but also in the formation of legal consciousness, the upbringing of the younger generation in the spirit of patriotism and faithful service to the homeland. Moreover, the training of highly qualified authorised personnel following international standards. In this regard, the intellectual information system being created at the Tashkent State Law University assumes the coverage of not only educational activities but also includes the management of scientific, educational and methodical, organisational and spiritual and educational activities of the university. Over the past few years, the University has been working on the creation of an intelligent information platform at the university, which combines several software products that combine both areas, which are mentioned in the article above. These are the following:

- Functions of a generation of documents necessary for the activity of the university;
- Data recording, monitoring of order execution;
- electronic formation of the schedule of training sessions;
- Analysis of static data, employee productivity, etc;
- Creation of scientific, legal base in Uzbek language (diploma works, dissertations, etc.);
- Electronic textbooks, videos and teaching material;
- feedback mechanism with people from remote regions;
- A system of accounting for graduates and their achievements to address the issues of employment of graduates and to cover the needs of employers in legal personnel.

The introduction of these programs in the educational, research and development process, staffing will increase the effectiveness of the university, the personal responsibility of employees, as well as their practical skills in working with information and communication systems. This will also reduce the amount of paperwork, increase the potential of the university, by providing students, researchers, faculty members with remote access to the system and independently solve several issues and satisfy their needs.

The intelligent information management system should be built based on modern information technology. The concept of building a system involves solving the following main tasks:

Learning Management

The management of the educational process consists of the support of work typical of the educational department of any higher educational institution, such as the development of curricula, calculation and distribution of the load on teachers, and the preparation of work schedules for the educational process. The system should allow the use of information to all participants in the educational process.

Improve the concept “Student’s account” in the srs-system and include additional functions in it (review of results for all semesters, mobile application).

To improve the technical characteristics of the website, www.mytsul.uz, by creating three sections:

- training sessions (electronic class schedule, video classes in all specialised disciplines, including courses of foreign universities from youtube)
- educational material (modular folders as part of a complete list of educational material necessary for a student)
- questions for the control of students’ knowledge (the entire database of control questions since 2013).

Besides, the srs-system allows you to generate an identification number (ID) (must be decrypted) for different types of students’ examinations, enter assessments for teachers. This system should be integrated into a single

platform.

Student and staff information management

The system should ensure the accumulation of information about students, starting from the moment of applying for admission, ending with graduation, and about employees, from the moment of applying for employment, ending with dismissal. Using the system, it is necessary not only to obtain information on specific individuals but to conduct analytical studies, for example, on staffing or student performance.

Creation of an online job site where you can find information about vacancies and conditions of employment.

It will be advisable to install and use the messenger inside the university within the framework of the platform. Since all quick correspondence and chat are conducted in telegrams, the messenger should be pop-up or displayed in the lower right corner of the screen of a personal computer. The platform should optimise internal communications.

Currently, a portfolio of faculty members has been developed. The collection of the faculty reflects only educational and scientific activities. It is necessary to add spiritual and educational and organisational activities, since each teacher, within the framework of his duties, performs all tasks that are sent for execution by the leadership of these units. The teacher's page should display personal achievements, training certificates, photo galleries, should become a file repository, ensure ownership of the blog, forum, correspondence with colleagues, working groups.

Management of scientific and methodical activities

Management of scientific and methodical activities should include activities on scientific, methodological and research activities, provide an opportunity to record and monitor this area of activity, including the identification of promising areas for further research activities of the university.

Management of spiritual and educational activities

The management of spiritual and educational activities should include the ability to record and monitor activities in this area. As one of the main directions of the university is considered to be the spiritual and educational activity, which allows paying attention to the formation of patriotic views among students, which is one of the specific aspects of legal education in the country.

Financial and economical information management

Management of financial and business information includes accounting for the movement of material assets and financial resources, planning of cost estimates, calculation of various payments to employees and students. The system should contain information on the use of premises belonging to the university (classrooms, conference halls, dormitories, etc.).

It will be expedient to create an electronic system of monitoring of purchases in the university for making group decisions and qualification of suppliers, pricing policy and other conditions of investments.

Internal document management

The information system should support electronic document flow between university departments. Orders, orders, memos should be delivered to the addressees within a guaranteed period of time. The electronic archive of internal documents should allow access to the regulatory documents entered into the system earlier. It is necessary to introduce a modern form of corporate e-mail (tsul.uz) with the possibility of its use through a smartphone.

Support for management decision making

Support for management decision making consists of providing managers with tools for operational analysis of information reflecting the activities of the university.

The methodology for developing large information systems should be used in the design process.

Employees and students of the university should implement ID cards that will serve as identification tools and store necessary personal data of the employee and student. The card will contain a personal password to enter the territory of the university (the information will be immediately transferred to the personnel department or dean's office), information on the literature received in the library. In addition, the ID card will serve as a multifunctional means of payment, allow you to credit funds to pay for services (cafeteria, canteen, vending

machines, photocopying), as well as with the help of an ID card you will be able to determine the balance of the debt on the payment of tuition fees.

Principles of system construction:

Complexity. The information system should cover all the central departments of the university and support the main areas of activity. The principle of comprehensiveness makes it possible to eliminate duplication of information input and related problems - wasteful time consumption, untimely data updating.

Openness and scalability. An information system should allow for development and expansion and be capable of integrating new tasks and subsystems, including borrowed ones, into its environment. The increase in the size of the system, associated with the growth of the number of users, the territorial distribution of jobs should not disrupt the performance and not reduce the response time to user actions.

Safety and reliability. The system should be protected from unauthorised use and access to information. Only registered users can access the system. The nomenclature of functions should be defined by the powers of a particular user. Reliability should be ensured by the use of means adequate to the scale of the system for data storage and processing.

Composition of the automated control information system

Subsystem "Educational and methodical department."

Creation, accumulation, adjustment of curricula. Calculation and control of teachers' workload. Drawing up the schedule of the educational process, development of the program of classes and exams. Individual work plans of teachers. Encryption of intermediate and final control works of students. Statistical indicators of students' progress. Issuance of certificates at the request of the student in electronic form. Submission of applications (appeals, etc.) in electronic form, etc. Preparation of appendices to the diploma.

Subsystem "Admissions Committee"

Maintenance of the personal card of the applicant, the formation of examination papers. Preparation of current and final analytical materials based on the results of testing and other types of tests.

Dean's office subsystem

Work with student's card, motion control, the formation of orders, sheets, obtaining data on the results of current, intermediate and final control works. Accounting for deductions, restorations, academic leave.

Subsystem "Postgraduate Training Management"

1) on admission to postgraduate education institutes:

- Reception of documents from applicants (remotely);
- the organisation of remote pre-selection (in the form of essays);

2) on monitoring of applicants' activity

- applicant registration

Maintenance of personal card of the applicant, formation of examination lists, preparation of current and final analytical materials based on the results of quarterly, semi-annual and annual monitoring, the formation of orders, lists, obtaining data on the results of discussion of dissertation works. Accounting for deductions, restorations, and vacations.

3) on methodological work

Organization, adjustment of theoretical and methodological plans. Calculation and control of the workload of scientific consultants and managers. Preparation of an individualised curriculum, development of examination schedules. Statistical indicators of scientific activity of applicants. Issuance of certificates in electronic form.

4) on work with scientific councils

Maintenance of documentation of Scientific Councils, the formation of the work plan, preparation of current and final analytical materials on the results of discussions of dissertation works. Systematisation and accounting of protocols and decisions of scientific councils.

5) on work with departments and departments

Exchange of information and documents for the prompt receipt of information and other materials about the structure of the teaching staff, the scientific work of faculty and employees, information on talented young people, the results of scientific and creative competitions, etc., the execution of instructions of the management, etc.

The Monitoring subsystem

Prompt receipt of integrated information about the structure of the teaching staff, the movement of students and staff, information on applicants, study groups, the results of the sessions, etc., on the implementation of instructions from management, etc.

“Personnel” subsystem

Maintaining an archive of personal cards, recording the movement of university employees, vacations, sick leave, the formation of orders. Preparation of reports on personnel information.

“Masters” subsystem

Maintaining a master's card. Formation of a theme for dissertation works and distribution. Monitoring of Master's degree activity.

“Department” subsystem

Personal data of the faculty at the department. Formation of curricula and modules, distribution among teachers. The private office of the teacher.

Information-resource centre

Formation of a personal history of library subscribers. Online order for resources available in the library. Binding to the personal identification card of employees and students of the university with the possibility of further binding to other related services of the university.

Subsystem “Planning and financial management.”

Calculation of the staff schedule of teaching and training staff, accounting for the movement of staff and students. Planning of salaries, scholarships and other payments. Calculation of university expenses.

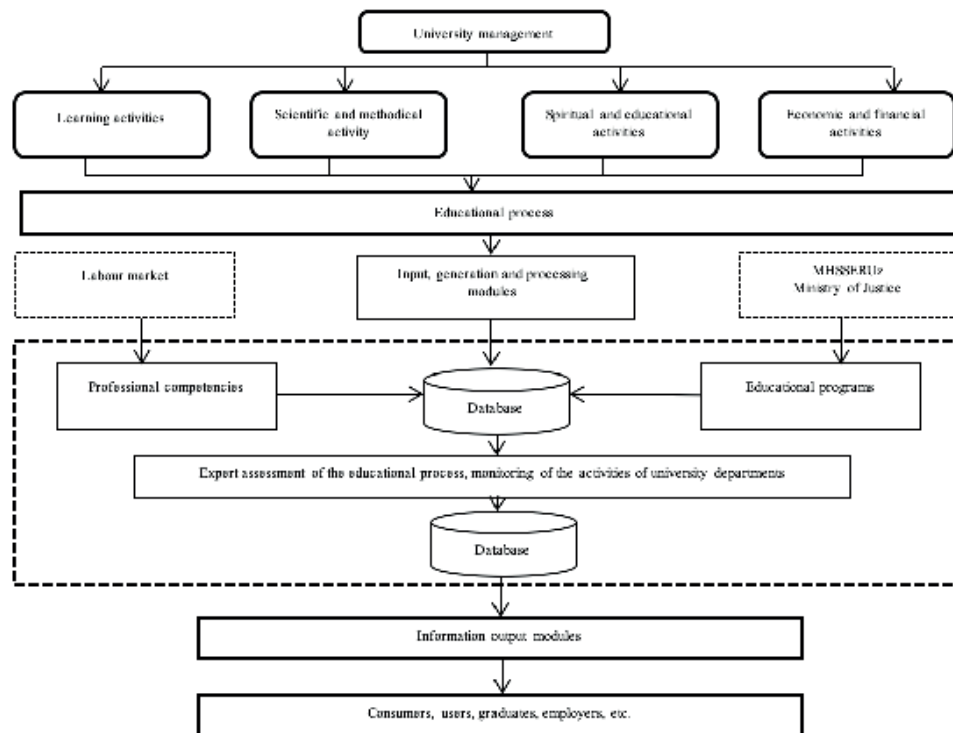
Accounting” subsystem

Accounting for the movement of materials of fixed assets. Registration of documents, maintenance of order logs and sheets. Settlements with debtors and creditors, with accountable persons, salaries.

The intellectual information management system is schematically presented in Picture 6.

Conclusion

In this article, we have tried to reveal the basic approaches in development of intellectual information system of management of educational process. By working out took into account experience of some foreign and national high schools, taking into account the general principles of educational process. The comparative analysis of the existing systems has shown that during the development of the information system there is a need for a specific approach to the development of the system based on the specifics of education. Since the systems of educational process management, where training specialises in the exact sciences differs from training in the humanitarian sphere. The analysis of different systems and literature has shown that there are many forms and different concepts for the development of education management information system. While in most cases the management of the educational process involves the management of educational activities of higher education institutions, the system under development has set us the task of developing an integrated system that includes other types of activities in higher education institutions, emanating from the specifics of public education management in our country. Despite the presence of specific problems which constrained introduction and development of information system of education management in university the system of education management which considers specific features of preparation of straight shots is created.



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