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ANALYSIS OF USING INFORMATION TECHNOLOGIES IN SYSTEMS WITH DUAL PROCESSES

Abstract. The article deals with the analysis of using information technologies in systems with dual processes. It was shown how concepts information systems and technologies relate. The information system is the main medium for information technology. Information technology is a combination of techniques and processes, with clear rules and actions. Without knowledge of the oriented information technology, it is impossible to realize information system. The information system uses information technology to support decision making. At present, using of information technologies in the educational systems of 1-2 levels of accreditation is increasing. There are some opportunities for application of network technologies for the purpose of training, which allow the transfer of information of any kind and volume on-line to any distances, as well as interactivity and visibility of providing training materials. Among the information systems and technologies used in the higher education institutions, the most popular are web-technologies; intellectual computer programs, training; information technologies of decision making support and expert systems. Besides, creation of personal websites for teachers is particularly popular, thanks to these websites the teacher demonstrates his educational research activity, communicates with representatives of scientific schools and student communities, and thereby shares his experience and scientific achievements. After analysing the information systems and modelling tools in the production systems, it shows using some of the considered systems and tools in combination for divisions of the industrial enterprise. The structure of the industrial enterprise is divided into main blocks and each of them uses its own software product.

Keywords: information systems; information technologies; education; production; systems with dual processes.

Introduction

Before carrying out the analysis of information systems and technologies it is necessary to specify how these two concepts relate.

The information system is a complex that includes computer and communication equipment, software, linguistic tools and information resources, as well as system personnel and provides support for dynamic information model of some part of the real world to meet the information needs of users [1].

The personal computer is used as the main technical equipment of information processing in the modern sense of the information system. Indeed, it is impossible to imagine everyday life without using a personal computer, tablet computer or smartphone. However, it is not enough to create and implement information system technology, it is also necessary to take the role of the person into account for whom this information system and the information produced by it is intended.

In addition, it is impossible to obtain and provide information without human participation. The information systems that are being built are dynamic in most cases and their construction uses a systematic approach. The result of the information system operation is the information on the basis of which decisions are made, for example, regarding subsequent training in self-training of University students.

Information technology (IT-technology) refers to the system of methods and forms of collection, accumulation, storage, search, processing, analysis, data output, information and knowledge based on the application of hardware and software tools in accordance with the users' requirements [2]. By applying different technologies in relation to any process, in particular educational, it is possible to obtain some kind of information. Today, when creating any

software that is tooling of information technology, it is necessary to take into account that the user owns a variety of types of data entry and processing devices, examples of which are given above.

Thus, the information system is the main medium for information technology. Information technology is a combination of techniques and processes, with clear rules and actions. Without knowledge of the oriented information technology, it is impossible to realize information system. The information system uses information technology to support decision making.

Today, the administration process of educational systems is one of the main tasks of education and training management in systems with dual processes. This process consists in the management of all the parts of systems with dual processes, also including development and implementation of standards, planning and definition of training procedures, etc.

In the age of global information system development of society, any process is not complete without using information systems and IT-technologies. Their application is also relevant in the administration of systems with dual processes.

Among these technologies we can select as follows: ontological approach, artificial intelligence systems and integrated intelligence, etc. All these technologies shall be implemented in conjunction with the system approach, as it is necessary to understand the role and place of their use in the overall process of administration of systems with dual processes.

The building of the intelligence system of administration of systems involves the creation of knowledge database for educational purposes. In terms of such database it is proposed to create a web-portal that would unite educational systems within the framework of not separate department, higher education institutions (HEI) and enterprises, but different hierarchy levels as a whole. Application of the modern

IT-technologies in system administration is the most effective way of management in systems with dual processes.

1. Analysis of using information technologies in the educational systems of 1-2 levels of accreditation

At present, using of IT-technologies in the educational systems of 1-2 levels of accreditation is increasing. There are some opportunities for application of network technologies for the purpose of training, which allow the transfer of information of any kind and volume on-line to any distances, as well as interactivity and visibility of providing training materials. Besides, it is possible to get access to various sources of information and communication in real time.

Information and communication technologies are used actively in classrooms during author's presentations using multimedia, creation of CD-encyclopaedias and reference books, development of computer training systems, simulators and testing.

The functions of the personal computer take special preference as a tool for educational activities, primarily due to the ability to store, edit, transfer of a significant volume of information. This allows applying it for optimization of training management, as well as the increase of educational process efficiency [3].

The didactic benefits of computer-based training resources are primarily in the fact that the use of multimedia technology makes it possible to create a learning environment with a clear and vivid presentation of information.

In addition, integration of significant amount of information in the single complex is carried out, as well as due to the creation of hyperlinks, navigation through the training material is simplified and the opportunity to choose the individual trajectory of studying the material is provided.

Thus, the analysis showed that IT-technologies find poor application in the educational systems of 1-2 levels of accreditation.

2. Analysis of using information technologies in the educational systems of 3-4 levels of accreditation

Among the information systems and technologies used in the higher education institutions (HEI), the most popular are web-technologies; intellectual computer programs, training; information technologies of decision making support and expert systems. Let us dwell on each of them in detail (Fig. 1).

Web-technologies – are technologies of creation and support of various information resources in the computer Internet network [2].

Hierarchies of information resources in the form of web-pages are built in HEI. Almost every HEI has its official

website, which contains web-pages of faculties, and within each faculty, there are web-pages of departments.

Besides, creation of personal websites for teachers is particularly popular, thanks to these websites the teacher demonstrates his educational research activity, communicates with representatives of scientific schools and student communities, and thereby shares his experience and scientific achievements.

Computer training programs are gaining popularity [4]. Most of them are electronic environments with interactive functions and multimedia elements, which are designed for independent student's work with training material in various forms of education – not only part-time and remote but full-time as well. Computer training programs are created not just to replace traditional training materials designed for the student's training but in order to add them, using with that the capabilities of modern information technologies. Most often, they include theoretical material, illustrated the analysis of solutions to common tasks and explanatory examples, graphics and animation materials, self-control tests, as well as for knowledge control. In most cases, educational computer programs are interactive. They implemented the experience of teachers, communication of students with which is limited, for example, at remote or individual study.

Information technologies of decision-making support are aimed at improving training efficiency and development of individual training paths for students, taking into account their individual characteristics of material perception.

In the educational process, more and more attention is paid to knowledge control systems. In general, preference is given to use of testing, as it is one of the fastest and most convenient ways to monitor and evaluate knowledge. Testing shows the degree of student's learning of training materials and indicates gaps in his knowledge.

Based on the test results, you can tell the student what he needs to learn to improve his level of knowledge according to the requirements of educational standards.

In addition, remote learning is becoming increasingly popular, as it allows gaining knowledge regardless of the country in which you live. The student develops educational materials independently in the interactive mode, passes testing, carries out control tests and sends them to teachers for review. The most

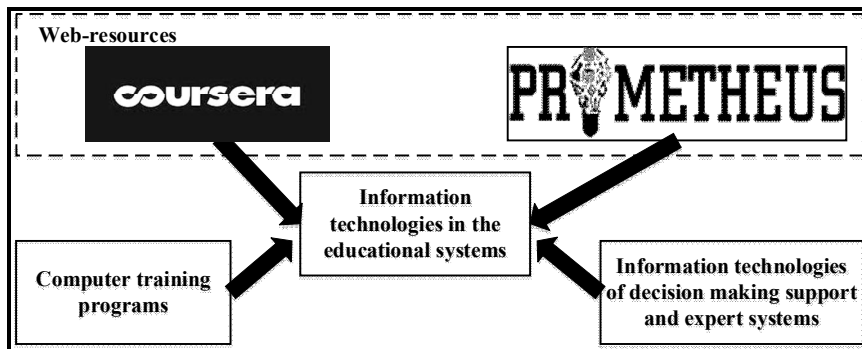


Fig. 1. Illustration of using information technologies in the educational systems of 1-2 and 3-4 levels of accreditation

important thing in remote learning is to have access to the Internet, which is no longer a problem up to date. The Moodle system is the most popular remote learning system. The Moodle system is a course management system, also known as a learning management system or virtual learning environment. [5] This system is a free web application that provides the ability to create websites for online training.

At the present time, the problem of creation of such approach to training occurs, which would consider individual student's personalities and could encourage for independent studying of educational material. To solve this problem, the use of information and communication technologies is proposed at work [6]. One of the ways to solve the problem assigned is the arrangement of classes using multimedia aids.

The basis of the arrangement of classes using multimedia aids covers the following principle: the studied material of the discipline is arranged so as to take into account the peculiarities of the perception of information by the student, that is, speed and order of material study should take into account the individual characteristics of the student.

The ability of visual presentation of a variety of tasks with a visual demonstration of their solutions, which is accompanied by theoretical material, is the advantage of such classes.

Classes with the use of multimedia aids involve the creation of slide lectures (presentations) using PowerPoint editor. The slide lectures are based on the approach in which the study of educational material is carried out using algorithms of step-by-step solutions. In this approach, the information on each slide appears gradually, allowing the student to dwell in detail on each element of the topic. In this case, they apply pop-up objects, phased construction of pictures, simulation of movement of elements using animation, etc. Detailing the process of problem solving and learning academic material is the main feature of this approach. The student has the opportunity to view the slide lecture repeatedly, while he can return to the incomprehensible moments of learning and problem-solving for several times, or vice versa if all the calculations are clear, then go to the next slides of the lecture.

Besides, in the work [7], scientists from the University of Washington revealed the regularity between student's progress and teaching methods of academic disciplines. Taking into account the results of research, scientists advise shifting to active teaching methods, in which students study the academic

discipline in training and freely discuss the studied material among themselves in practical classes [8].

Thus, the analysis showed that IT-technologies take a significant place in the educational systems of 3-4 levels of accreditation.

3. Analysis of using information technologies in the production systems

At this stage of industry development, we can observe the trend of increasing demand for application of information systems and technologies when producing highly technical products in the production systems. With increasing of production volumes and expansion of enterprise the question of activity coordination of each of divisions of the enterprise arises [9]. If we consider the production system as a set of individual lines of activities, then among them we can select the main ones: business planning, production process, warehousing and transportation. After analysing the information systems and modelling tools in the production systems the Fig. 2 shows using some of the considered systems and tools in combination for divisions of the industrial enterprise. The structure of the industrial enterprise is divided into main blocks and each of them uses its own software product (Fig. 2):

- 1) Project Expert;
- 2) BAAN;
- 3) Oracle JD Edwards;
- 4) Microsoft Dynamics AX (Axapta);
- 5) DELMIA;
- 6) SAP Business Suite;
- 7) CALS technologies.

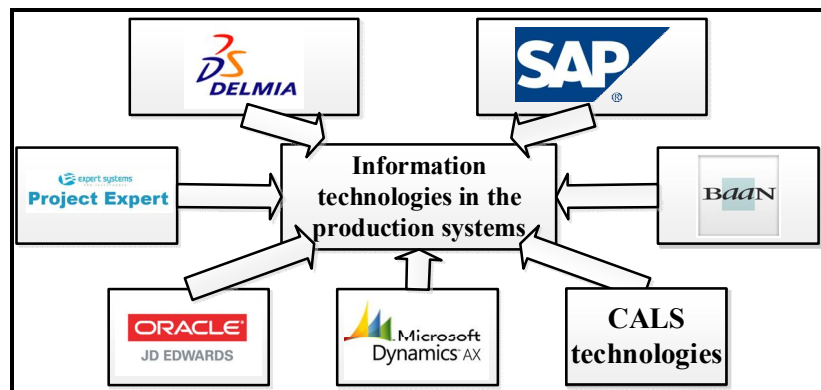


Fig. 2. Illustration of using information technologies in the production systems

Conclusions

Thus, based on the analysis of the modern information systems and modelling tools, it can be concluded that the systems and tools can be used in the various combinations to unite and optimize the operation of the production system as a whole. This raises the problem of integration of systems and tools applied in the systems with dual processes.

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Аналіз використання інформаційних технологій в системах з дуальними процесами

О. І. Морозова

Анотація. В роботі проведено аналіз використання інформаційних технологій в системах з дуальними процесами. Було показано, як співвідносяться поняття інформаційних систем і технологій. Інформаційна система є основним середовищем для інформаційної технології. Інформаційна технологія є об'єднанням методик і процесів, з чіткими правилами і діями. Без знання орієнтованої інформаційної технології неможливо реалізувати інформаційну систему. Інформаційна система використовує інформаційну технологію для підтримки прийняття рішень. В даний час йде підвищення використання інформаційних технологій в освітніх системах 1-2 рівня акредитації. Існують можливості застосування мережових технологій з метою навчання, які дозволяють передачу інформації будь-якого виду та обсягу в оперативному режимі на будь-які відстані, а також інтерактивність та наочність надання навчальних матеріалів. Серед інформаційних систем і технологій, що використовуються в закладах вищої освіти, найбільшою популярністю користуються web-технології; інтелектуальні комп'ютерні програми, які навчають; інформаційні технології підтримки прийняття рішень та експертні системи. Крім цього, особливою популярністю користується створення персональних web-сайтів викладачів, завдяки яким викладач демонструє свою науково-педагогічну діяльність, спілкується з представниками наукових шкіл і студентства, і тим самим передає свій досвід і наукові досягнення. Провівши аналіз інформаційних систем і засобів моделювання в виробничих системах, показано використання в комбінації деяких розглянутих систем і засобів для підрозділів промислового підприємства. Структура промислового підприємства розбита на основні блоки і в кожному використовується свій програмний продукт.

Ключові слова: інформаційні системи; інформаційні технології; освіта; виробництво; системи з дуальними процесами.

Анализ использования информационных технологий в системах с дуальными процессами

О. И. Морозова

Аннотация. В работе проведен анализ использования информационных технологий в системах с дуальными процессами. Было показано, как соотносятся понятия информационных систем и технологий. Информационная система является основной средой для информационной технологии. Информационная технология является объединением методик и процессов, с четкими правилами и действиями. Без знания ориентированной информационной технологии невозможно реализовать информационную систему. Информационная система использует информационную технологию для поддержки принятия решений. В настоящее время идет повышение использования информационных технологий в образовательных системах 1-2 уровня аккредитации. Существуют возможности применения сетевых технологий с целью обучения, которые позволяют передачу информации любого вида и объема в оперативном режиме на любые расстояния, а также интерактивность и наглядность предоставления учебных материалов. Среди информационных систем и технологий, используемых в учреждениях высшего образования, наибольшей популярностью пользуются web-технологии; интеллектуальные компьютерные программы, которые учат; информационные технологии поддержки принятия решений и экспертные системы. Кроме этого, особой популярностью пользуется создание персональных web-сайтов преподавателей, благодаря которым преподаватель демонстрирует свою научно-педагогическую деятельность, общается с представителями научных школ и студенчества, и тем самым передает свой опыт и научные достижения. Проведя анализ информационных систем и средств моделирования в производственных системах, показано использование в комбинации некоторых рассмотренных систем и средств для подразделений промышленного предприятия. Структура промышленного предприятия разбита на основные блоки и в каждом используется свой программный продукт.

Ключевые слова: информационные системы; информационные технологии; образование; производство; системы с дуальными процессами.