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E-learning Managers Training to Design High-tech Electronic Learning Environment

Abstract

Education today must adequately reflect the needs of the society and be available throughout life, with an equal access for all people at all levels. The real step in solving these problems consists of creating an information and educational e-environment, using open learning, and providing an open access to educational resources. Organisation and management of the educational process, proper development of IT infrastructure, learning management system, and preparing and creating educational content are still necessary to ensure the quality of the educational information environment. Therefore, there is a need for training that could resolve expressed tasks to organise the educational process to a modern level using an information and educational e-environment available 24*7*365. For this purpose, in the system of e-learning of Borys Grinchenko Kyiv University, an electronic training course "Design and expertise of information and educational e-environment" (available online: http://e-learning.kubg.edu.ua/course/view.php?id=2741) was developed.

K e y w o r d s: e-learning manager, information and educational e-environment, the quality of the learning process, planning of information and educational e-environment, learning management system, blended learning

Introduction

At the beginning of the 21st century, the socio-cultural development of society defined fixing complex and contradictory trends in education: globalisation, demographic changes, and the emergence of new knowledge and competencies. These trends occur under the influence of the rapid development of information and communication technologies (ICT). It changes the business development, the labour market, and, in turn, higher education, which is to prepare graduates for the today conditions – graduates with new competencies, such as inherent teamwork, the ability to solve problems, the ability to innovate, practice-oriented knowledge, knowledge of related sciences and technologies, the ability to work with embedded systems, or high performance (Morze, Buinytska & Varchenko-Trotsenko, 2016).

Higher education institutions should be able to provide educational services to people, allowing continuous study and acquisition of advanced professional knowledge; these institutions should build the educational trajectory which would more fully meet educational and professional abilities and needs of the student, regardless of his or her location (Morze, 2016).

For providing the educational services, institutions must create an open information and educational e-environment, which will be used in open learning: an innovative system of evaluation of scientific research, management, and implemented remote access to educational resources, an integral part of which is an e-learning system.

Ensuring the quality of the open information and educational e-environment, as well as the educational system, requires a special attention in such components and participants of e-learning as strategic management, infrastructure, educational process, teachers and students, and content. Thus, the task for the university is to train professionals able to manage the educational process with the use of an open information and educational e-environment, to understand the processes of the organisation and administration of the components of an information and educational e-environment, and to manage organisation of e-learning.

Training managers of e-learning will help fill high-quality content, and correctly and efficiently organise the management of educational activities of the institution on the basis of an information and educational e-environment.

Training Managers of E-learning

Basic Competencies of a Manager of E-learning

The field of education is updated with new information and communication technologies that are designed to contribute to its efficiency, but none of them are developed specifically for the implementation of educational goals. Therefore, an extremely large and difficult task lies ahead of the university – the adaptation of new technological tools for the needs of education and testing in an information and educational e-environment.

An information and educational e-environment of the institution at the present stage should include:
- personal computer devices – means of implementation of educational, scientific, and administrative activities of the institution;
- environment's support of collective and individual communications and collaboration;
- open educational resources – objects of education and interaction;
- centralised and decentralised training platforms; and
- means of information security and centralised filtering incompatible with the educational process content, etc.

Each of these components is constantly changing and improving. Therefore, the task of universities – to prepare professionals having professional competence – can also embrace:
- analysing market offers concerning available systems and technologies of development of an information and educational e-environment;
- testing, implementing, and evaluating IT technologies for an e-learning system;
- choosing the form and means of presentation of educational e-content;
- advising and verifying compliance solutions according to the requirements of an information and educational e-environment;
- developing instructions for the use of resources and content;
- organising the educational process using an information and educational e-environment, and evaluating its effectiveness;
- monitoring the use and satisfaction of participants in the educational process component of an information and educational e-environment; and
- managing the educational process using information resources of an information and educational e-environment to provide high-quality educational services 24*6*365.

Today's graduates should be inherent in combining educational, technical, and creative skills (Morze, Balyk & Smyrnova-Trybulska, 2014).
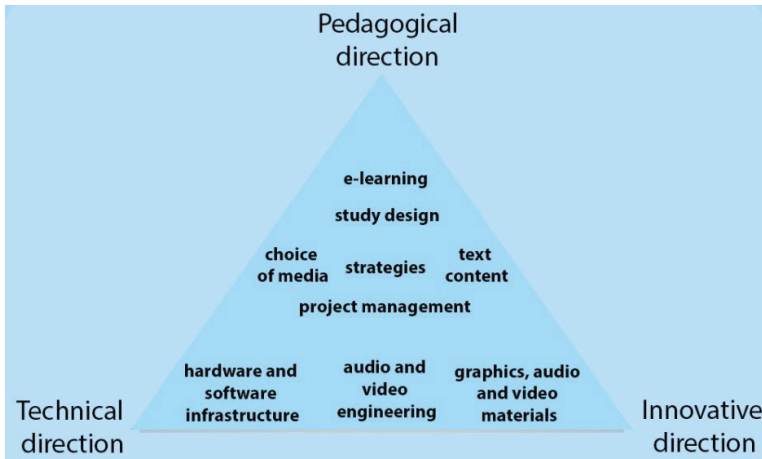
Figure 1. Job profile diagram of a modern graduate.

In order to solve this problem, Borys Grinchenko Kyiv University introduced preparing graduates who besides a professional competence have additional special competencies, particularly in the development of IT infrastructure, design and development of an information and educational e-environment, and electronic and blended learning, which is the key component of information and educational e-environment of the university. This training is carried out when selecting students' further specialisation – "Management of e-learning," which makes it possible for students to acquire the necessary competencies of a manager of e-learning.

The main roles of a manager of e-learning are: organiser of e-learning, develo-per, and e-tutor (Morze, Balyk, & Smyrnova-Trybulska, 2015) (see: Figure 2).
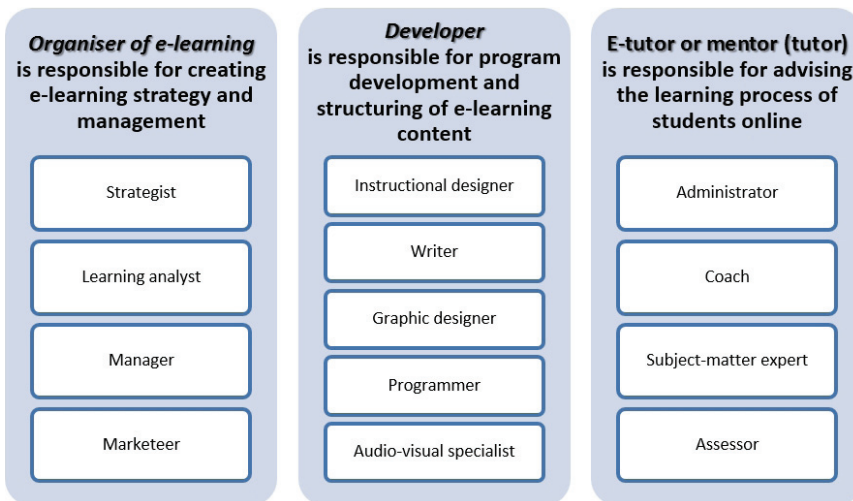

Figure 2. Roles of a manager of e-learning.

Training Managers of E-learning

Training managers of e-learning is performed basing on a specially designed curriculum for two years at the master's studies. The training is designed to develop the professional competence of students in the design and management of e-learning for different age groups, preparing graduates for the implementation of the educational process in the information and educational e-environment using e-learning technologies.

Features of the training of managers of e-learning are as follows (Morze, Balyk & Smyrnova-Trybulska, 2014):

- It is based on global approaches to training in the field of e-learning, and it allows giving graduates relevant documents (taking into account the experience of training these professionals in different countries, including Poland, Slovakia, Portugal, the Czech Republic, Russia, Spain).
- It involves the study of Internet services, gadgets, ways of learning management based on them, the organisation of formal, non-formal, and informal studies based on modern ICT, the introduction of steam, collective project activities, and protection of master's work as a start up.
- It ensures the implementation based on adaptive learning, forming soft skills, and training closer to the real "production" process.

During the training, students are invited to learn four key disciplines, each of which is a logical continuation of the previous one (See: Table 1).

Let us consider the content of new disciplines.

Table 1.

The recommended list of subjects in a curriculum for students of "Management of e-learning" specialisation

No.	Code	Name of Subject	Estimated number of credits / hours	Name of the semantic module	The form of the final control
				Disciplines	
1.	VDS. 1.01	Internet and applied information technology in education	8/240 (year 5, term 1)	New Information Technologies in Education; E-learning as an example of innovation in education; Electronic educational resources to support e-learning; Applied Information Technologies for the educational process; E-learning in the corporate sector.	exam

2.	VDS. 1.04	Managing the IT infrastructure of educational institutions	4/120 (year 5, terms 1–2)	Designing IT infrastructure; Programming software for educational institutions; ICT policy and IT infrastructure of educational institutions; The use of cloud technologies for building IT infrastructure of educational institutions.	test, exam
3.	VDS. 1.02	Innovative methods, technologies, and monitoring the quality of e-learning	6/180 (year 5, term 2, year 6, term 1)	Education policy in the field of ICT of educational institution; Educational technology and science communication; Fundamentals of educational design; Monitoring and evaluating the quality of e-learning; Non-formal education and training; Joint project.	test, exam
4.	VDS. 1.03	Design and examination of high-tech information and learning environment	6/180 (year 5, term 2, year 6, term 1)	The concept of electronic information and educational environment; Design of information and educational environment of the university; Design of IT infrastructure and components of information and educational environment; Design of management procedures and processes using of information and educational environment; Examination of information and educational environment of the university; Design of Quality Assessment System of information and educational environment of the university.	test, exam

Practice

| 5. | VP. 1.01 | Production (specialisation) | 4.5/135 | | test |

Certification

| 6. | VA. 1.01 | Qualifying examination with specialisation | 1.5/45 | | exam |

Design and Expertise of Information and Educational E-environment of the University

Features of the "Design and Expertise of Information and Educational E-environment" Course

The purpose of this discipline is to provide the basic profile training in the specialty, the formation of theoretical knowledge and practical skills in designing an information and educational e-environment, and the implementation of expertise of its quality. The main objectives are:

- to reveal the purpose, objectives, and functions of an information and educational e-environment in higher education;
- to create competencies which are necessary for use in the classroom information and educational e-environment of the university in the future manager of e-learning;
- to acquaint students with the standards and requirements for the structure of an information and educational e-environment;
- to form knowledge and skills at the stages of design of an information and educational e-environment of the university and its quality evaluation;
- to teach a creative approach to solving problems of designing teaching components, to form the skills to analyse IT infrastructure design, research problems, and psychological and educational situations in the design of use, process, and procedures of information and educational e-environment management;
- to develop and deepen the understanding of the ways and prospects of an information and educational e-environment in the university;
- to develop the ability of and the need for constant self-education and self-improvement, seeking scientific research ways to improve the educational and information e-environment;
- to create favourable conditions for the pursuit of scientific research ways to improve their work.
  Following the completion of the discipline, the student should know:
- the purpose, objectives, and functions of, and requirements for an information and educational e-environment, as well as its classification;
- stages and phases of design of an information and educational e-environment;
- standards for the design and execution of project documentation;
- a systematic approach to designing an information and educational e-environment;
- level of IT infrastructure design of an information and educational e-environment;
- procedures of management of an information and educational e-environment;

- the model of the use of an information and educational e-environment; and
- methods of evaluating the quality of an information and educational e-environment.

  The student should be able to demonstrate the ability to:

- study domestic and international experience in design of an information and educational e-environment;
- analyse and document requirements of an information and educational e-environment;
- design data models and process models;
- use modern CASE-technology, maintain and evaluate the quality of an information and educational e-environment;
- master the latest methods, tools, design tools of an information and educational e-environment on their own;
- improve personal and professional levels.

  The teaching card of discipline is presented in Table 2 (Glazunova & Buinytska, 2016).

Table 2.

Teaching discipline card. "Design and expertise of information and educational e-environment"

Topic (name, points)	1. The concept of electronic learning environment (64 points)		2. Designing IT infrastructure and components of learning environment (64 points)		3. Design management procedures and processes used in learning environment (64 points)		4. Expertise of learning environment of the university. Quality Assessment of learning environment (64 points)	
Topics	1	2	3	4	5	6	7	8
Lectures (topics, points)	1.Appointments, tasks, functions, classification of information and educational e-environment (IEE). The structure of the IEE of the university. (1 point)	Cloud-oriented IEE of the university	2. Stages of designing IEE of the university. Design development processes of IEE, IT infrastructure, components of e-collaboration and e-interaction of IEE of the university (1 point)		3. Design management procedures of IEE. Designing processes using IEE (1 point)		4. Performance measures of IEE. Criteria of expert evaluation of IEE. Factorial-criteria Quality Assessment Model of IEE. Tools of Evaluation of IEE. (1 point)	

	PW1. Appointments, tasks, functions, classification of IEE (11 points)	LW1. Structure of IEE of the university. Cloud-oriented IEE of the university (11 points)	PW2. Design development processes of IEE. Designing of IT infrastructure of IEE of the university (11 points)	LW2. Design components of e-collaboration and e-interaction of IEE of the university (11 points)	PW3. Design management procedures of IEE (11 points)	LW3. Designing processes using IEE (11 points)	PW4. Performance criteria of IEE. Classification criteria and requirements for them. Criteria of expert assessment of IEE (11 points)	LW4. Factorial-criteria evaluation model quality of IEE. Quality Assessment Tools of IEE (11 points)
Practical laboratory sessions (topics, points)								
Individual work	Individual work (5 points)		Individual work (5 points)		Individual work (5 points)		Individual work (5 points)	Individual work (5 points)
Final control (type, points)	Exam (40 points)							

Features of the "Design and Expertise of Information and Educational E-environment" Training Course

Teaching discipline for students of master's degree was carried out on the basis of 50/50 using blended learning technology, since the appropriate electronic learning course was developed in the information and educational e-environment of the university (developer: O. Buinytska; available at: http://e-learning.kubg.edu.ua/course/view.php?id=2741) (See: Figure 3).

Blended learning in a flipped model can "flip" the organisation of the learning process, rearranging its key components. Using an inverted model of blended learning, we can get (Morze, Buinytska, & Varchenko-Trotsenko, 2016):

- an introduction to learning outcomes, levels of assimilation of content, alignment of individual educational programmes and learning paths;
- self-study materials available for learning (online), which make it possible to study more complex material, and practical skills and competencies including group and project activities during classroom; and
- self-control of our own course advancement and adjustment of our own programme.

The feature of flipped study is familiar with the results of study course achievement goals that are specified in the criteria and levels of evaluation results. Then, the content of the main part (in modules, themes) is described, with presentation of electronic and classroom parts of the course, in each of which the criteria and levels of evaluation are also specified, displaying results for each completed task and capturing the module generally.

The essence of flipped study is that prior to the classes students independently study the material (lecture), located in an information and educational e-environment. Students come to the classroom lesson with some knowledge, which makes it possible for them to be prepared to accept more complex tasks. The teacher in the classroom lesson offers a higher level of task complexity, with the performance of which students have difficulty.

Consolidation of acquired knowledge is also organised in an information and educational e-environment in the form of homework. This may be of practical tasks using Internet resources, inter-assessment and self-assessment, or reflection during the course.

Figure 3. Electronic course "Design and assessment of information and educational e-environment."

In the study of topic 1, students explored the purpose, objectives, function, and classification of an information and educational e-environment. They were acquainted with the model of an information and educational e-environment, designed on the example of the Borys Grinchenko Kyiv University, its structure and components. We determined the requirements for an information and educational e-environment, and the reasons for the complexity of its development.

Topic 2 was dedicated to the design phase of an information and educational e-environment of the university: defining goals and objectives, requirements analysis to ensure the quality of training IT professionals at universities, analysis of functional information and educational e-environment, building its structural-functional model, the choice of technology infrastructure, choices of software platforms, designing data structures, designing information management, designing management procedures, planning application information and educational e-environment. During the design of the manufacturing process of the information and educational e-environment, characteristics of processes that provide the functionality of the system were studied: preparation of an information and educational e-environment, selection and creation of electronic educational resources; methods and organisation of e-learning; training students and teachers to use an information and educational e-environment; quality assessment of an information and educational e-environment. The process of designing IT infrastructure included a study of physical and virtual management of virtual resources, platforms, and software. The study of the components of e-collaboration and e-interaction made it possible to design the components of educational-methodical guidance (system of e-learning, electronic repository of educational materials, base of masterworks, etc.), components of the scientific direction (institutional repository, electronic publications, electronic conferences), its requirements, and components for e-collaboration. Results of mastering the topic were presented in the form of mind maps with the results of a survey research design stage, certain manufacturing process of the information and educational e-environment, designed IT infrastructure, and the indication of the main ways designing of simulated information and educational e-environment.

The study of topic 3 includes: 1) procedures of management of elements of the information and educational e-environment based on ISO 9001 (content procedures, form of the description, method of introduction at universities); 2) processes and stages of application of the information and educational e-environment (the use of e-resources and services that are hosted in the academic cloud of university, adapting resources to student's needs); and 3) methods of application of the information and educational e-environment for all participants in the educational process (students, teachers, administration, etc.).

Topic 4 was devoted to expert evaluation of an information and educational e-environment and efficiency criteria. Examination components of information and educational e-environment were carried out in sequence "meta – object – means – process – product." Instruments of quality evaluation of an information and educational e-environment, quality evaluation methods, and basic tools for assessment, projected by supporting and developing an information and educational e-environment, were studied.

The result of mastering the discipline by students was the design of models of information and educational e-environment in schools where they were studying or working.

Design of Information and Educational E-environment of Educational Institutions

The design of the information and educational e-environment of the institution was the main task of the students during the manufacturing practice of specialisation. Bases of practice, which lasted for 3 weeks, were selected schools (grades 1–3) and preschool educational institutions of different levels of IT infrastructure.

Task 1

Monitoring the implementation of ICT in educational institutions:

- the analysis of educational policy on ICT; the interview with the head of the institution and his or her deputies;
- ICT-competence of teachers, educators of the institution; creation of a questionnaire; conducting surveys; the analysis of the survey;
- The analysis of the IT infrastructure of the institution (hardware, software, information, educational, scientific support).

Task 2

Choosing the task:

- developing a consultation blog;
- school site;
- Google Calendar for managers;
- Google group to display the main activities of the institution.

Task 3

Workshop (training):

- holding a workshop (training) for teachers (educators) of ICT use in education or performance at the teachers' meeting on the possibilities of online learning.

Task 4

Preparing guidelines for:

- design of information and educational e-environment of educational institutions,
- modernisation of IT infrastructure,
- formation of ICT-competence of teachers from educational institutions.

Task 5

Presentation of execution:

- presentation of practice on the Wiki Portal.

An example of performed tasks posted on the University Wiki portal is presented in Figure 4.

In addition to the publication of the created project, students presented their achievements in the practice protection, which are publicly placed on the Wiki portal of BGKU.

PRACTICE TASK

Monitoring of the implementation of ICT in educational institutions
*   Analysis of educational policy on ICT. Interview with the head of the institution and his deputies.
Interview with the Head of the institution Kinkov Y.G.
Interview with Deputy Director of educational work Kravchuk O.O.
Interview with Deputy Director of educational work Redko I.I.
*   ICT-competence of teachers, educators of institution. Creating a questionnaire. Conducting surveys. Analysis of the survey.
Questionnaire "ICT competence of teachers"
Among teachers of educational-production complex №141 were conducted a survey on "ICT competence of teachers."
The survey results and analysis can be traced in the following charts. You can view profile submitted by link: Questionnaire.
Results of survey: The survey results.
*   Analysis of the IT infrastructure of the institution (hardware, software, information, educational, scientific support)

Figure 4. An example of practice assignment.

During the analysis of the feasibility of introducing such a specialisation, students were surveyed. 43 respondents took part in it (students of groups Dom-1-15-2.2z, POm-1-15-2.2z). 82% of master's students indicated that knowledge acquired during the study subjects is very useful and necessary nowadays, 18% – do not believe in expediency because they do not know how it may affect the administration of the institution to build a high-quality information and educational e-environment. Students within the survey were asked to assess their own level of competence acquisition as a result of studies of the specialisation on a 4-point scale, as presented in Figure 5.

53% of the students rated a maximum score acquired professional competence necessary to carry out educational activities; for administrative activity: 4 points – 31%, 3 points – 47%, 2 points – 22%; for the implementation of the project: 4 points – 40.6%, 3 points – 46.9%, 2 points – 12.5%; specific competences: 4 points – 34.4%, 3 points – 43.8%, 2 points – 21.9%.

Estimate please your entry level competencies (https://goo.gl/WHJIsw)
the results of studies with specialization "Management of e-learning" *

	0	1	2	3	4
Professional (educational activities)	○	○	○	◉	○
Professional (research and development)	○	○	○	◉	○
Professional (methodical activity)	○	○	○	◉	○
Professional (management activity)	○	○	○	◉	○
Professional (project activity)	○	○	○	◉	○
Specific	○	○	○	◉	○

Figure 5. The view of the questionnaire.

The level of exposure (on a 4-point scale) of study subjects of specialisation in the formation of professional competencies for the survey is as follows:
- Innovative methods, technology, and quality monitoring of e-learning: 4 – 78.1%;
- Design and examination of information tech learning environment: 4 – 64.2%;
- Internet and application of IT in education: 4 – 78.1%;
- Management of infrastructure of educational institutions: 4 – 65.6%.
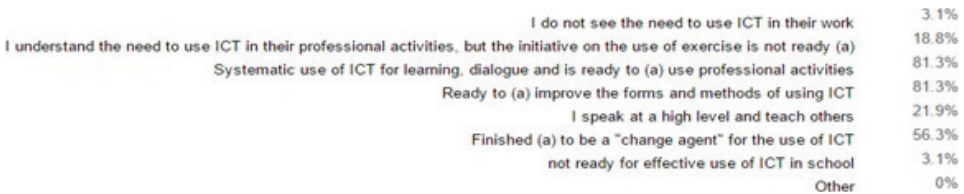 Readiness to use ICT in professional activities is presented in Figure 6.

I do not see the need to use ICT in their work	3.1%
I understand the need to use ICT in their professional activities, but the initiative on the use of exercise is not ready (a)	18.8%
Systematic use of ICT for learning, dialogue and is ready to (a) use professional activities	81.3%
Ready to (a) improve the forms and methods of using ICT	81.3%
I speak at a high level and teach others	21.9%
Finished (a) to be a "change agent" for the use of ICT	56.3%
not ready for effective use of ICT in school	3.1%
Other	0%

Figure 6. Readiness to use ICT in professional activities.

54% of the students see the necessity to introduce the basis of "Innovative methods, technology, and quality monitoring of e-learning," "Design and examination of information tech learning environment," "Internet and application of IT in education," "Management of infrastructure of educational institutions" during the first courses of all specialties, as specialists today cannot have acquired ICT competencies.

Conclusion

To solve complex problems, current graduate students should master basic and specialised knowledge, the methodology of scientific research, information and communication technology, in order to be able to use all the new and emerging science and practice, to adapt to market changes, to improve their skills, and to be ICT competent. UNESCO Guidelines emphasise that for the modern professional it is not enough to be technologically literate and be able to shape one's skills, including technological ones. Modern teachers should be able to help students use ICT to successfully cooperate, to solve arising problems, to develop 21st century skills, and to create and develop high-quality information and educational e-environment.

The introduction of "Management of e-learning" specialisation makes it possible to prepare such qualified professionals who possess pedagogical, technological, and creative skills, as well as expertise, which will build right educational activities of the institution designed using the information and educational e-environment.

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Szkolenie menedżerów e-learningu w zakresie projektowania najnowocześniejszego środowiska nauczania elektronicznego

Streszczenie

Kształcenie w dzisiejszych czasach musi adekwatnie odzwierciedlać potrzeby społeczeństwa i musi być dostępne przez całe życie, dla wszystkich i na wszystkich poziomach. Realnym krokiem w zakresie rozwiązywania tych problemów jest stworzenie e-środowiska informacyjnego i edukacyjnego, korzystanie z otwartego nauczania i zapewnianie otwartego dostępu do źródeł edukacyjnych. Aby zapewnić jakość edukacyjnego środowiska informacyjnego, wciąż potrzebna jest organizacja i zarządzanie procesem kształcenia, prawidłowe opracowywanie infrastruktury informatycznej, system zarządzania nauczaniem, przygotowywanie i tworzenie treści edukacyjnych. Dlatego też istnieje potrzeba szkolenia, które mogłoby rozwiązać wyżej określone zadania, mające na celu zorganizowanie procesu kształcenia na nowoczesnym poziomie, wykorzystującego dostępne e-środowisko informacyjne i edukacyjne 24*7*365.

Słowa kluczowe: menedżer e-learningu, e-środowisko informacyjne i edukacyjne, jakość procesu nauczania, planowanie e-środowiska informacyjnego i edukacyjnego, system zarządzania nauczaniem, nauczanie hybrydowe (blended learning).

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Подготовка менеджеров электронного обучения к проектированию высокотехнологической электронной образовательной среды

Аннотация

Образование сегодня должно адекватно отражать потребности общества и быть доступным на протяжении всей жизни, обеспечивать равный доступ для всех людей на всех уровнях. Реальным шагом в решении этих проблем является создание информационно-образовательной электронной среды, использование открытого обучения и предоставление открытого доступа к образовательным ресурсам. Для обеспечения качества образовательной информационной среды по-прежнему необходима организация и управление учебно-воспитательным процессом, правильное развитие ИТ-инфраструктуры, системы управления обучением, подготовка и создание образовательного контента. Поэтому существует необходимость в подготовке кадров, которые могли бы решать перечисленные задачи по организации учебного процесса на современном уровне с использованием информационно-образовательной электронной среды доступной 24 * 7 * 365.

Ключевые слова: менеджер электронного обучения, информационная и образовательная электронная среда, качество процесса обучения, планирование информационно-образовательной электронной среды, системы управления обучением, смешанное обучение

Nataliia Morze, Oksana Buinytska

Preparación de los gestores de e-learning para diseñar un entorno de aprendizaje de alta tecnología

R e s u m e n

Hoy en día la educación debe reflejar adecuadamente las necesidades de la sociedad y estar disponible a lo largo de toda la vida, proporcionando acceso igualitario a todas las personas de cualquier nivel social. Un paso decisivo en la solución de estos problemas es crear el e-ambiente educacional e informacional, el uso de aprendizaje abierto proporciona acceso abierto a los recursos educativos. Para garantizar la calidad del entorno de información educativa sigue siendo necesaria la organización y gestión del proceso educativo, el desarrollo adecuado de la infraestructura de TI, un sistema de gestión del aprendizaje, la preparación y creación de contenidos educativos. Por tanto, existe una necesidad de capacitación para poder resolver las tareas citadas con el objetivo de organizar el proceso educativo con el nivel adecuado utilizando un e-ambiente educacional e informacional disponible 24 * 7 * 365.

P a l a b r a s   c l a v e: Gestor de e-learning, información y e-entorno educacional, la calidad del proceso de aprendizaje, planificación de la información y e-entorno educacional, sistema de gestión de aprendizaje, aprendizaje semipresencial.