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TYPES OF ACADEMIC INTERNET-RESOURCES FOR IT STUDENTS' INDIVIDUAL WORK MANAGEMENT

Individual work is one of the main forms of organization of academic process for students of IT specialties. Main practical professionally oriented skills and abilities are retained only due to students' hard individual work while doing tasks in programming, algorithmization, designing etc. development of effective academic resources will help students to work individually as well as comfortable ways of delivering such materials with the help of Internet guarantees enhancing the quality of studies. Information and educational resources for independent work of students today are one of the most effective means. The technique of creating and using these tools requires constant research through the rapid development of new information technologies. The present article describes the most effective tools and technologies for creating online resources for self-study of IT students, grounded methods of their use in the educational process. The most commonly used tools for formal and informal components of independent work are identified: professionally-oriented sites, massive open online courses, blogs programmers professionally groups on social networks, news sites, and so on. Studies show a significant improvement of independent work of students on the study material by using video tutorials.

Keywords*: self-study, independent work, formal learning, informal learning, Internet resources, video tutorial, video lecture, social networking, webinar*

Introduction

For IT students individual work management in professionally oriented subjects foresees the existence of specific types of resources reflecting their studying aspects. Another peculiarity of IT students' preparation is that their profession foresees constant self-development and that is why it is necessary to form the readiness to gain knowledge in new technologies and it individually since the first year of study. So the question to ground the methodology of forming academic resources for IT students that will be effective for individual work management as well as technologies of delivering these materials to a student is actual and up-to-day. It is necessary to draw our attention to a great significance of formal and informal element in IT students' individual work management, as a great amount of knowledge in new technologies is not received from academic courses.

Main part

To achieve maturity in individual work students depend much on the level of their informative culture, that is on their ability to gain individually, work out and use the information in the process of academic and scientific activities. That is why informative culture forming is a very urgent question not only for higher educational establishments but for secondary schools as well.

Kozakov V.A. defines individual work as a specific type of academic activity, the main task of which is the formation of individual work skills and this formation is done through syllabus and methods of all types of academic lessons [1].

Yevdokymov V.I. defines individual work as a specially organized students' activity taking into account their personal peculiarities, aimed at individually doing academic tasks of different levels of difficulty as at academic classes and after classes as well. The task of students' individual work management is its focusing at fulfilling a social order that is forming students ability to reinforce their knowledge, to orientate themselves in the flow of scientific information [2]

Individual work in the system of education can be realized in the form of formal, non-formal and informal elements [3].

In the terminology dictionary in andragogy it is said that formal education anticipates the existence of structural programs that are recognized by a formal system of education, the probability to receive generally defined certificates and documents [4]. That is this education is based on the structural academic materials, tasks that are made by a teacher according to curricula and branch academic standards.

A big amount of useful information that helps a student's professional development he receives from other sources outside an educational establishment. This form of getting the knowledge is known as an non-formal education. D. Livington defines a non-formal education as an academic activity determined by educational demands, by youth's ambition to gain the necessary knowledge and abilities and this education is done beyond educational establishments curricula [5]. This education is associated with one's desire to gain the knowledge and get abilities necessary for one's personal life and for professional work.

Another type of realization of students' individual studies is informal education. V. Lugovyi defines an informal education as education which is not still organized [6, 7, 8]. That is such education is based on one's own experience and on the experience of other people. Studies in informal education can be purposeful (for example, watching TV programs, reading books and magazines, meetings) and unplanned as well (accidental as everyday activity).

Types of Internet resources that can be used in formal, non-formal and informal components independent work presented in fig. 1.
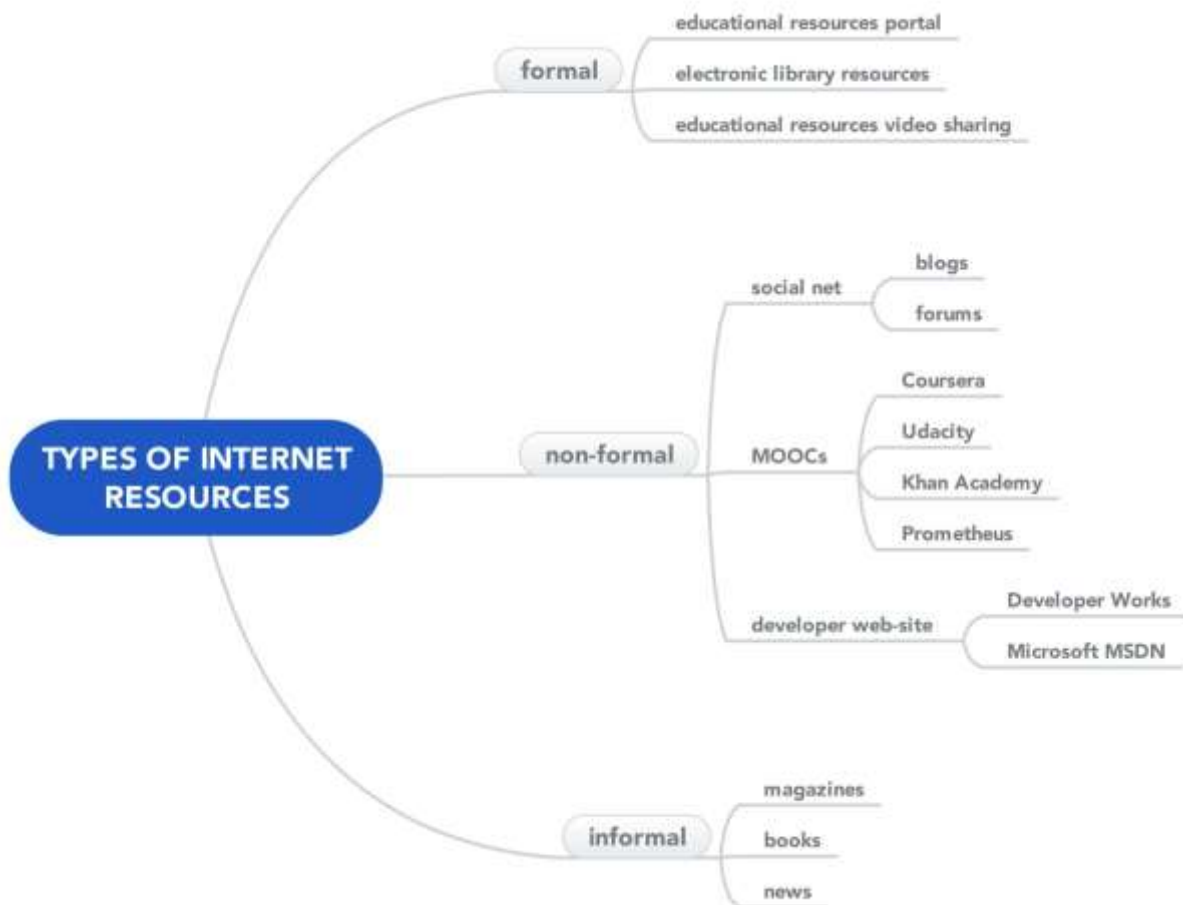

Fig. 1. Type of internet-resources for it students' individual work management

One of the types of formal element of individual work management can be making academic resources in some electronic academic course, for example on the basis of CLMS-system platform Moodle [9]. Platform Moodle is oriented on the organization of cooperation between a teacher and students with the help of an electronic academic course where different types of academic resources can be placed for students' individual work. At the beginning of an academic semester students receive an access to electronic academic course and have an opportunity to work with academic resources at any place and at any suitable for students' time. As a result of using electronic academic courses for organization students' individual work students get rid of time-consuming process of thoughtless noting and concentrate their attention on content-related component of academic material which is given by a teacher at a lass in the classroom. Let's study some of such resources which during a pedagogical experiment was conducted with students of Computer sciences; these resources showed the best results, study quality and students' satisfaction.

To create resources for independent work of students of IT professions and place them in the online courses go from the source data, such as curriculum, student learning styles and teaching methods (fig.2). Based on these data is determined by the purpose and objectives of resources. Then compile the script, preparing the necessary materials, and then choose the type of resource that should be used for a particular topic, according to the kind of resources choose tools to create a screencast, video lecture, video lesson and lesson learned. Creating appropriate resources embed them in e-learning courses according formulating tasks for independent work of students, followed by learning activities using resources. According to the quality and satisfaction of students you can edit the script create resources.
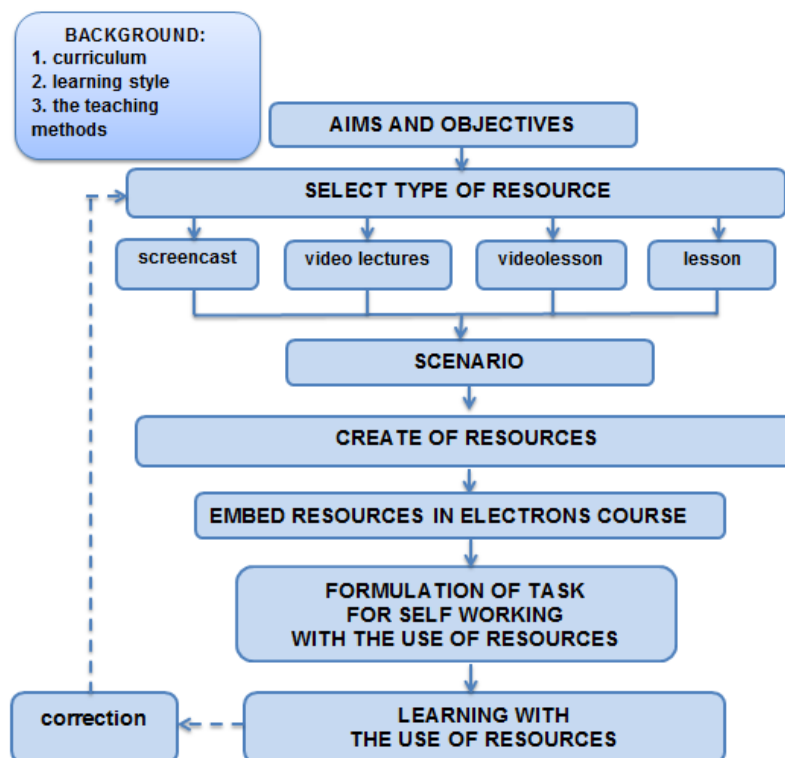

*Fig. 2. Stages of creating of resources for self working
and placing them in online courses for formal education*

To apply theoretical and practical training material effectively used video lesson. Recent studies relating to the consideration of the creation and use of video lessons in the classroom, such as the work of scholars such as I. Abramov [10] A. Meshcheryakov [11] I. Norenkov, Alexander

Zimin [12] B. Nozdrachev [13] S. Seytveliyeva [14] et al., prove the effectiveness of their application for independent work.

Video lesson is one of the resources that we recommend in our research. It is a systematic, successive telling of an academic material that does not demand a teacher's personal presence before students, using a wide range of possibilities for working, keeping and transferring audio and video information.

The resource of the type "Video lesson" is widely used for studying professionally oriented courses focused at Computer sciences in the form of a screencast of work of some program or practical realization of program coding of scripts with obligatory textual and voice supporting (fig. 3). Video lesson use in individual work enables students to attain the information in individual regime and if needed simultaneously revising what is being demonstrated in the video lesson and the highest effect will be reached using all sources of perception and attaining the information such as visual, audial and kinesthetic. To create these video lessons using such software such as: Camtasia Studio, using this program you can make video capture from the monitor screen, Adobe Captivate used to demonstrate the software to record video lessons, create simulations and other applications.Another type of resources that will enable individually at one's own speed to gain academic information with the help of visual and audio types of perception. It is a video lecture.

Now the educational platform of domestic production becomes widespread in Ukraine. One of these projects is a massive public project online course (MOOC) «Prometheus», which offers several courses from faculty of Kyiv National Shevchenko University, Kiev Polytechnic Institute and Kyiv-Mohyla Academy (http://prometheus.org.ua/about-us/). Every course project «Prometheus» consists of video lectures of leading teachers of the best Ukrainian universities, interactive tasks that will reinforce your knowledge and forum where students can ask questions to the teacher and talk to each other [15].

We define lecture as a video record of a classroom lecture or a part of it which can last full 90 minutes, or can be divided in parts depending on the theme that is being revealed. Of course during this lecture a teacher can widely use audio and visual means demonstration etc. (fig. 4). To create these video lectures start transmitting video lectures, then captured video and audio materials assembled. To do this, use a program such as Pinnacle Studio, as the program is easy to use and affordable , VirtualDub, Nero Vision and others .
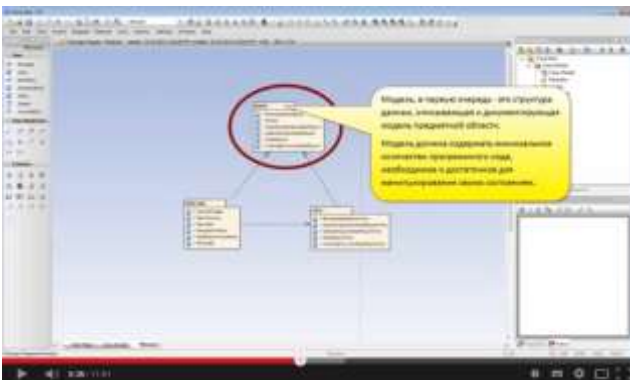

Fig.3. An example of using a resource of the type "Video lesson"

Fig. 4. An example of using a video lecture

Mentioned types of resources such as a video lesson and a video lecture can be included into passive ones as for controlling individually learned material one need additional test of reflective papers.

Platform Moodle allows to make active resources that anticipate a student's activeness while doing some activity.

One of such resources is "Lesson" that is a structural continuity of pages where a text, graphics, video, text tasks can be placed. In the resource "Lesson" we can organize individual step-to-step learning academic material, and the opportunity to revise it impacts on the level of mastering

this material. An example of such a resource on the subject "Information Technology" for the students' field of study "Computer Science" is shown in fig. 5. Resource type "Lesson" on "Operating Systems" offered students the theoretical material in the form of text with additions in the form of videos and graphics.

Fig. 5. Example of pages of resource "Lesson"

Between informative parts of a lesson we can place testing tasks for periodic testing of individually learnt material. Having the wrong answer a student can be backed to the lesson page where the information giving the opportunity to answer the question corrected is situated or to come back to the beginning of the lesson (вычитать нужно). Thus we receive an effective instrument for students' individual mastering the learnt material (fig. 6), that helps do a current testing and provide students' work assessment automatically that frees a teacher from checking students' done task.

This resource will let a student individually check received knowledge and get an according result (fig. 7). порядок слов
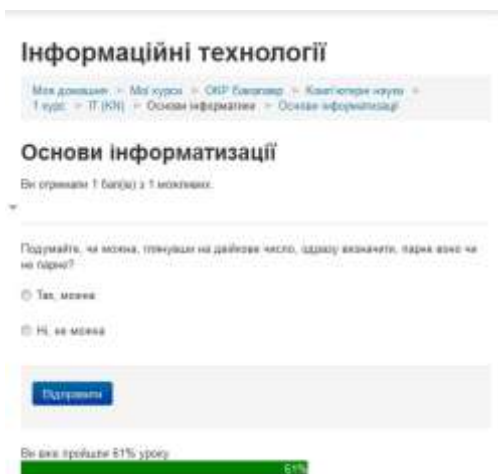

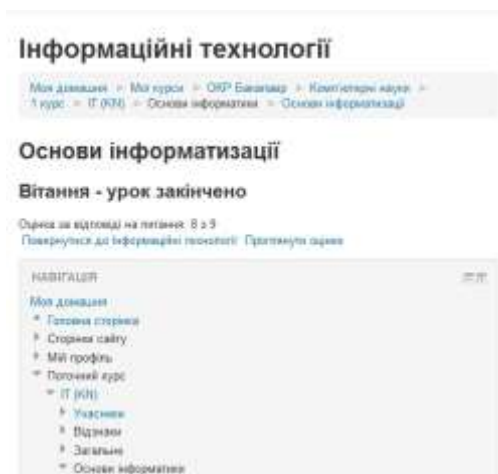*Fig. 6. An example of using testing tasks in resource "Lesson"*

Fig. 7. An example of getting results for mastering a lesson

To determine the degree of satisfaction in each of the study groups with students field of study "Computer Science" were surveyed. Grading scale distributed on the following points: 5 points – fully satisfied, 4 points – satisfied overall, 3 points – satisfied , 2 points – partly satisfied , 1 point – generally dissatisfied. The survey results are presented in the table 1.

Table 1

The level of student satisfaction

Type of educational resources	The level of student satisfaction (based on 5-point scale)
1	2
The resource type "Video lesson"	4,35
1	2
The resource type "Video lecture"	3,5
The resource type "Lesson" (text, graphics, screencast)	4,7
Training book (text and graphics)	2,5

As can be seen from the table 1, the greatest satisfaction resources show students who used the resource type "Lesson". This once again confirms that the most convenient and effective resource for independent work is exactly the resource.

Besides the revealed methods of organization of formal element of individual work, in a modern informative society there are widely used instruments for providing non-formal education, one of which is a social net. A social net is the structure that is based on people's relations or mutual interests. As an Internet service a social net can be considered as a platform helping people make connection and group themselves according to their interests. Tasks of this site are to provide consumers with all possible ways for interaction such as video, chats, pictures, music, blogs etc.

Using social nets, IT specialists can get new knowledge individually as they have a free access to professionally-oriented information, that is revealed in magazines, books, video, blogs etc. to make a quick exchange of information between the participants of groups who are users of social nets and have mutual professional interests, discuss questions that touch the sphere informative technologies. One of the examples of groups that are united to discuss professionally interesting questions in the sphere of IT technologies is a programmer blog (a social net "Facebook" [16]) and it is given in fig. 8.

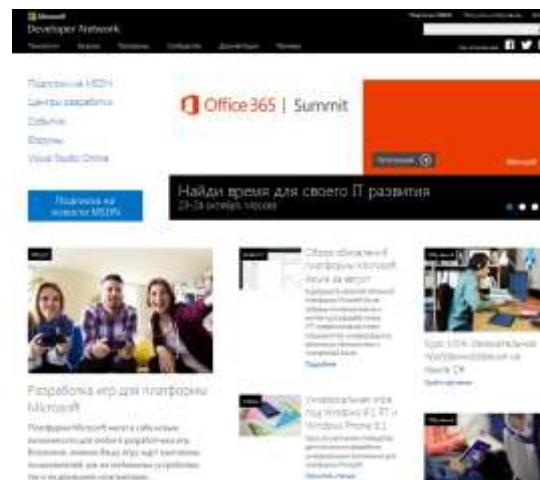*Fig.8. Blog picture of a programmer in a social page "Facebook"*

Fig.9. Professionally oriented web-site

Blog is the most effective instrument of non-formal education that enables to conduct Internet register of events, online diary in the form of notes that are constantly added, containing a text, pictures or multimedia. Future specialists can not only familiarize themselves with professional programmers' experience but can ask questions, share their achievements, take part in discussions and projects etc. besides social nets there are special professionally focused sites in the sphere of IT, containing a big amount of users' instructions, code examples, links for downloading programs, debatable forums, blogs etc. For example, resource DeveloperWorks reveals themes from open

industrial technologies (Java, Linux, SOA, PHP etc.) to products IBM (fig. 9), resource Microsoft MSDN thematically focused at Microsoft goods, though it is characterized with less filling [17].

To familiarize users with new informative technologies leading educational centers in the sphere of IT conduct webinars, for example in the educational system Microsoft in the academic center CyberBionic Systematics etc. [18, 19].

Webinar is an interactive seminar or a training using a computer, Internet and means of communication, broadcasting video, audio, documents sharing voice and text chat – all this helps a teacher to conduct a course on the high level of interacting with the audience. Students joining the webinars are another effective methods of individual work management.

To identify the most used tools of informal education in independent work of students of IT specialties questionnaire was developed and under were surveyed students in the area of training courses 1-4 "Computer Science" for educational and informational portal NUBiP Ukraine.

Table 2 shows that social services are used for professional development of students. The students get the skills most in their independent work using video and forums on professional topics.

Table 2

Social services used by students for professional growth

Services	The service students, %	Rating (on a 5-point scale)
Educational portals Prometheus type or Coursera	15	2,9
Professional blogs (Microsoft, etc.)	11	3,0
Professional websites (such DeveloperWorks)	7	2,7
Webinars (eg Microsoft)	5	2,6
The video (such as YouTube)	25	4,3
Forums on professional topics	22	4,1
Social networks (such as Facebook)	15	2,5

Assessing the quality listed in the table 2 types of resources, students also prefer video portals, forums (4,3 and 4,1 points on a 5-point scale, respectively).

Summarizing. The existence of great number of modern informative technologies and resources that can be used for IT students' individual work management encourages teachers to change the methodology of teaching using more effective methods of students' individual work. Results of the conducted research show a direct dependence of a quality of studying from the effectiveness of students' individual work. And effectiveness of individual work depends on methods and instruments that are used for its organization. Using specially made academic resources such as a video lecture, a lesson in electronic academic courses enables increasing effectiveness and students' satisfaction of academic process. Such non-formal instruments for gaining new knowledge and abilities as professionally oriented sites, thematic webinars widen students' opportunities in self and professional development.

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ТИПЫ УЧЕБНЫХ ИНТЕРНЕТ-РЕСУРСОВ ДЛЯ ОРГАНИЗАЦИИ САМОСТОЯТЕЛЬНОЙ РАБОТЫ СТУДЕНТОВ ИТ-СПЕЦИАЛЬНОСТЕЙ

Самостоятельная работа является одной из основных форм обучения будущих специалистов по информационным технологиям. Главные практические профессионально-ориентированные навыки студенты получают путем тяжелой самостоятельной работы во время выполенения заданий по программированию, алгоритмизации, проектированию и т.д. Разработка эффективных учебных ресурсов, которые помогут студентам в индивидуальной

работе, распространение таких материалов с помощью Интернет, повышает качество обучения. Информационно-образовательные ресурсы для самостоятельной работы студентов на сегодняшний день являются одним из самых эффективных средств. Методика создания и использования этих средств требует постоянных исследований в силу интенсивного развития новых информационных технологий. В предложенной статье рассмотрены наиболее эффективные инструменты и технологии создания Интернет-ресурсов для самостоятельной работы студентов ИТ-специальностей, обоснованы методы их использования в учебном процессе. Также, определены наиболее эффективные средства для организации формального, неформального и информального образования: профессионально-ориентированные сайты, массовые открытые он-лайн курсы, блоги программистов, профессиональные группы в социальных сетях, новостные сайты и т.п.

Ключевые слова: самостоятельная работа, формальное обучение, неформальное обучение, Интернет-ресурсы, видеоурок, видеолекция, социальные сети, вебинар

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ТИПИ НАВЧАЛЬНИХ ІНТЕРНЕТ-РЕСУРСІВ ДЛЯ ОРГАНІЗАЦІЇ САМОСТІЙНОЇ РОБОТИ СТУДЕНТІВ ІТ-СПЕЦІАЛЬНОСТЕЙ

Самостійна робота є однією з основних форм навчання майбутніх фахівців з інформаційних технологій. Основні практичні професійно-орієнтовані навички набуваються лише шляхом тяжкої самостійної роботи під час виконання завдань з програмування, алгоритмізації, проектування, і т.д. Розробка ефективних навчальних ресурсів, які допоможуть студентам в індивідуальній роботі, розповсюдження таких матеріалів з допомогою Інтернет, підвищує якість навчального процесу. Інформаційно-освітні ресурси для самостійної роботи студентів на сьогоднішній день є одним з найефективніших засобів. Методика створення і використання цих ресурсів вимагає постійних досліджень в силу інтенсивного розвитку нових інформаційних технологій. У запропонованій статті розглянуто найбільш ефективні інструменти і технології створення Інтернет-ресурсів для самостійної роботи студентів ІТ-спеціальностей, обґрунтовані методи їх використання в навчальному процесі. Також, визначені найбільш ефективні засоби для організації формальної, неформальної та інформальної освіти: професійно-орієнтовані сайти, масові відкриті он-лайн курси, блоги програмістів, професійні групи в соціальних мережах, сайти новин і т.п.

Ключові слова: самостійна робота, формальне навчання, неформальне навчання, Інтернет-ресурси, видеоурок, відеолекція, соціальні мережі, вебінар