

UNIVERSITY AND REVOLUTION IN COMMUNICATIONS AND COMPUTING: EXPERIENCE OF DONETSK NATIONAL TECHNICAL UNIVERSITY

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About Donetsk National Technical University (DonNTU)

In the May of 2006 DonNTU will see his 85th anniversary. Our school is the first higher education establishment in the Donbass region and one of the first schools of this rank in the Ukraine.

The history of DonSTU could be divided into several stages:

1921-1926 Donetsk Mining College
1926-1935 Donetsk Mining Institute
1935-1960 Donetsk Industrial Institute
1960-1993 Donetsk Polytechnic Institute
since 1993 Donetsk State Technical University

The first in the Donbass Region higher education establishment's coming into being took place under the extremely unfavorable conditions. The mines, metallurgical, machine-building and coke plants were inactive; railways were destroyed. The new government considered the Donbass Region restoration to be a very important task. For this the engineers were of great demand. There were only 189 mining engineers in the Donbass that time

By the beginning of the 90-s DPI had turned up to be the largest higher education school in the Ukraine. More than 1400 academics worked here. Among them there were 122 professors, Doctors of Science, about 700 associate professors, Candidates of Science. 10 Honoured High School Teachers of the Ukraine (M. P. Zborshchick, G. V. Maleyev, V. N. Matsenko) and leading researchers who were Honoured Scientists of the Ukraine (V. G. Geyer, V. M. Klimenko, K. F. Sapitsky, N. G. Logvinov, A. A. Minayev and others) trained students. In 1993 DPI was certified and due to the decision of the Ministry of Education of the Ukraine obtained the status of state technical university.

Donetsk national technical university is a qualitatively new step in the school's development history

Every year new specialities and specializations are opened at the University. There are more than 60 of them now. More than 20 thousand students study here. 1300 highly qualified teachers train students at 88 departments. Many of them are honoured and active members of research associations and academies. They were rewarded with the diplomas of honoured researchers, teachers, and engineers.

For the years of its existence the University trained more than 110 thousand experts. Political leaders, companies managers, great scientists are among our graduates. These are some of the names: A. F. Zasyadko, N. M. Khudosovtsev, A. A. Pshenichny (they were the Coal Industry Ministers in different periods), A. P. Lyashko -the leader of the government of the Ukraine, E. F. Zvyagilsky -Vice-Prime Minister of the Ukraine, L. F. Bezlepkina-Russia Social Aid Minister. The Donetsk Opera and Ballet House was named after the Honoured Singer A. B. Solovyanyenko who was our graduate and teacher. He sang at many world opera stages.

Donetsk national technical university looks into the future. It will occupy a proper place of the Region megauniversity training specialists in the most modern technologies of the information society of the XXI century.

Development of Internet infrastructure for higher education in Donetsk Region of the Ukraine

The creation of modern high-speed informational and educational infrastructure of Internet in the Donetsk Region is one of the most topical tasks which the regional higher education establishments face. It is connected to the fact that in the nearest future the international community will not recognize the people who did not have the access to the Internet resources during their training as specialists with proper education.

The Donbass Region academic infrastructure started its development in 1995 when the first marked channel joined the Institute of Cybernetics of the National Science Academy of the Ukraine and Donetsk Physical and Technical Institute. Donetsk State Technical University and the Regional Library were the first to be on line within the regional Internet network which was being formed then. This, in fact, initiated the formation of the Donbass Academic and Research Network (DARN) which is the component of the Ukrainian Academic and Research Network UARNet and comprised a number of Donetsk institutes of the National Science Academy of the Ukraine and some of higher education establishments of Donetsk. However, the low-grade connection provided rather adequate access only to the E-mail service at that stage.

The formation of the Ukrainian Research and Academic Network URAN being the joint initiative of the Ministry of Education and the National Science Academy was the next stage in the development of the educational Internet in the Ukraine in 1998. The initiative was supported by a number of foreign funds and organizations – the NATO Research Program and the German Research Network in particular. In fact, the project Ukrainian Academic and Research Data Network, Part 1 (UARDN-1) implemented by the NTUU Kiev Polytechnic Institute in partnership with a number of leading universities (including DonSTU) and research institutes of the Ukraine in 1998-1999 was the network's beginning. The NATO Research Program (grant NIG-97-1779) supported it.

In 2000 the URAN infrastructure was represented by 6 regional centers, DonSTU being one of them (Figure 1). The intensive coordinated development of the regional research and academic infrastructure of the Internet is to be the next stage.

The modern stage of informatization of the educational space of the Donetsk Region requires creation of high-speed universities network aimed to solve the problems they face in a corporate way. There should be three stages in formation of this type of the regional informational and educational network including joint with Ukrtelecom development of the Eastern node URAN. They are as follows:

Stage 1. Creation of the base digital infrastructure based on backbone with the capacity of 2-100 Mb/s. and peripheral lines (64-128 Kb/s.) covering the leading educational establishments of the region (2001-2002). This stage's activities should be implemented in the following way:

The first stage of the University Informational Ring (“University Ring”, Figure 2) which provides for the backbone logging out (100 Mb/s.) to the node of the Donetsk directorate of Ukrtelecom. Besides, it provides for the digital lines to the central node of the network URAN in Kiev for Donetsk National Technical University (DonSTU).

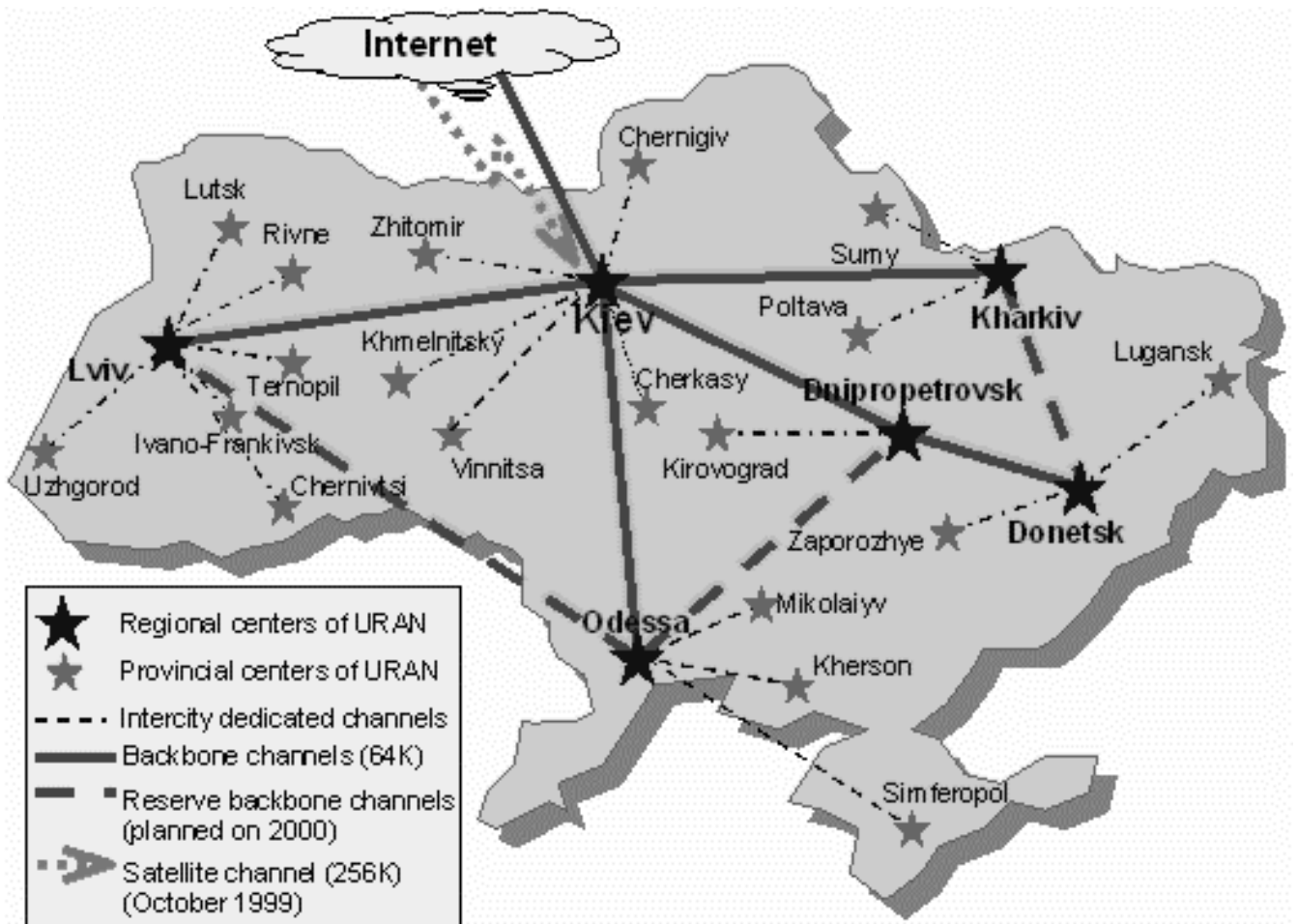


FIGURE 1
 UKRAINIAN RESEARCH AND ACADEMIC NETWORK (URAN): INITIAL 6 REGIONAL CENTERS
 (2000)

Master's portal of DonNTU as the practical result of studying web-technologies

Training students for effective activity in conditions of the Europe of Knowledge future [1] is a complicated task, which requires changes in many approaches to academic process organisation. One of the main goals in this case is to make students form ability to create original, qualitative and attention worthy intellectual product that demonstrates the real level of their knowledge and creativity at their maximum. Master's portal [2] (fig.2), viewed in this report, is one of the results of successful realisation of such approach to training DonNTU students.

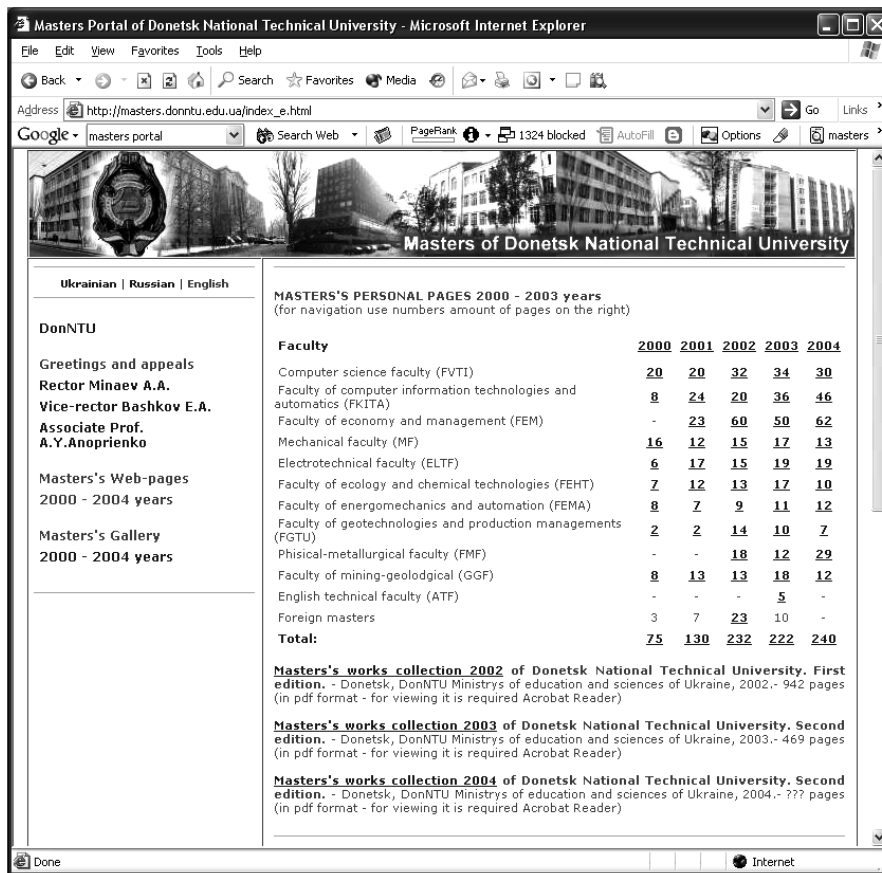


FIGURE 2 MAIN ENGLISH INDEX OF A DONNTU MASTER'S PORTAL

Systematic work in developing Internet infrastructure possibilities for creation and use of educational-scientific information resources on Donetsk National Technical University (DonNTU) has been conducted since 1996. Characteristic feature of DonNTU approach to presence in virtual reality was initial focus on factuality and multilingual approach (Ukrainian, Russian and English languages with German and French to follow). At present, it is certain that according to information filling and practical use of Internet resources DonNTU continues to be in sure leadership in the region. Since 2000 DonNTU has been taking goal-oriented steps in expanding and raising quality of its "virtual representation" in the international information space. A considerable intensification of Internet development works in DonNTU was connected with participation in Ukrainian Research & Academic Network (URAN) project [3-5]. The main result of this project (or rather of its beginning phase) in DonNTU became regional server organization of URAN network (<http://uran.donetsk.ua>), which became the basis for creating a number of educational and scientific resources. DonNTU Masters portal [2] is of the biggest interest, however, as one of the most successful particularized university Internet-projects not only in Ukraine but also in all post-soviet territory.

During the process of search and selection of different projects for information filling of the regional URAN server the crucial part was played by introducing "Network Information Technologies" course into DonNTU Master Program for all specialities in 2000. Quite a number of laboratory works in the given course allowed to set the goal of not only passive study of modern Internet infrastructure information possibilities, but also its active exploration as the extremely effective means of modern scientific communication and electronic publication of educational-scientific oriented materials. The main idea here is that each of Master Program students, while doing this course, will be using knowledge they get not only for fulfilling some abstract tasks, but also for step-by-step creation of their personal site main content of which will be determined by a student's graduation work.

The resource thus formed is raised to such a qualitative level which presupposes possibility of its uploading into Internet and its further practical use. The advantages of such an approach are as follows:

- work in mastering network information technologies becomes more purposeful and comprehensive as it presupposes achievement of socially useful information product;
- responsibility for results of studying and tasks fulfillment rises as it is supposed that these developed resources will be actively used in Masters portal which is principally different from the usual "archive-trash" use of paper reports;
- students become more interested in the results of their work because for the majority of Master students the site, which was developed in the course frames, becomes their first personal Internet page and for quite a while it functions as the so-called "representation in virtual reality";
- due to the placement of the web-sites on the Internet as our official resources our students have a chance to master in practice the range of issues connected with correct dealing with copyrights and neighbouring rights, the relevance and observation of which has gained importance in the Internet;
- a very important experience in modern terms of cooperative work is acquired in frames of quite scaled and successful Internet-project.

Typical structure of a Master student's site is shown on figure 3. Its basic elements are as follows:

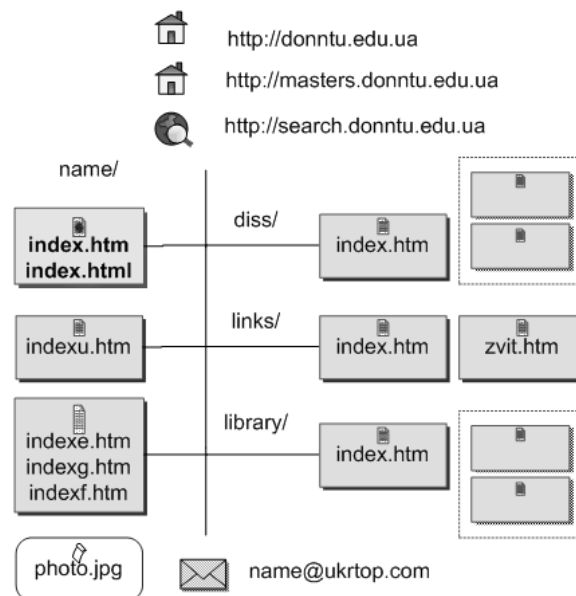


FIGURE 3 TYPICAL STRUCTURE OF A MASTER'S SITE

Biographical part includes Master student's Curriculum Vitae (CV) in amount equivalent to 1-3 pages of typescript. Russian (index.htm), Ukrainian (indexu.htm) and English (indexe.htm) versions of CV are obligatory. Alongside with English version, which sometimes is much shorter because of the lack of knowledge of English, German (indexg.htm) or French (indexf.htm) versions are appreciated if a student has studied correspondingly one of these languages. Personal photograph is also obligatory. All the versions of CV should be connected with the mutual hyperlinks and provided with some additional attributes including e-mail of the Master student.

Thematic part consists of three sections connected by the topic of graduation work. The key-section is dissertation abstract (diss/) which is a preliminary description of the main results of the work accompanied by an expanded review on the topic based primarily on materials found in the Internet in the process of the course study. What is more, the last part seems to be more important in the context of the course and that is why it is supposed to be more voluminous than the first one. Hyperlinks section on the topic (links/) is considered to be a necessary addition to dissertation abstract and contains selected annotated links on different Internet resources connected with the topic of a graduation work. The important element of this section is a report on result of thematic search in the Internet (zvit.htm). The third obligatory section is the electronic library on the topic (library/) which contains the most important

additional information materials connected with the topic of graduation work or some other creative activity of a Master student including texts of publication with student's participation and some selected materials out of those he/she found in the Internet during thematic search process. Example of index page of a typical Master student site is shown on the figure 4.

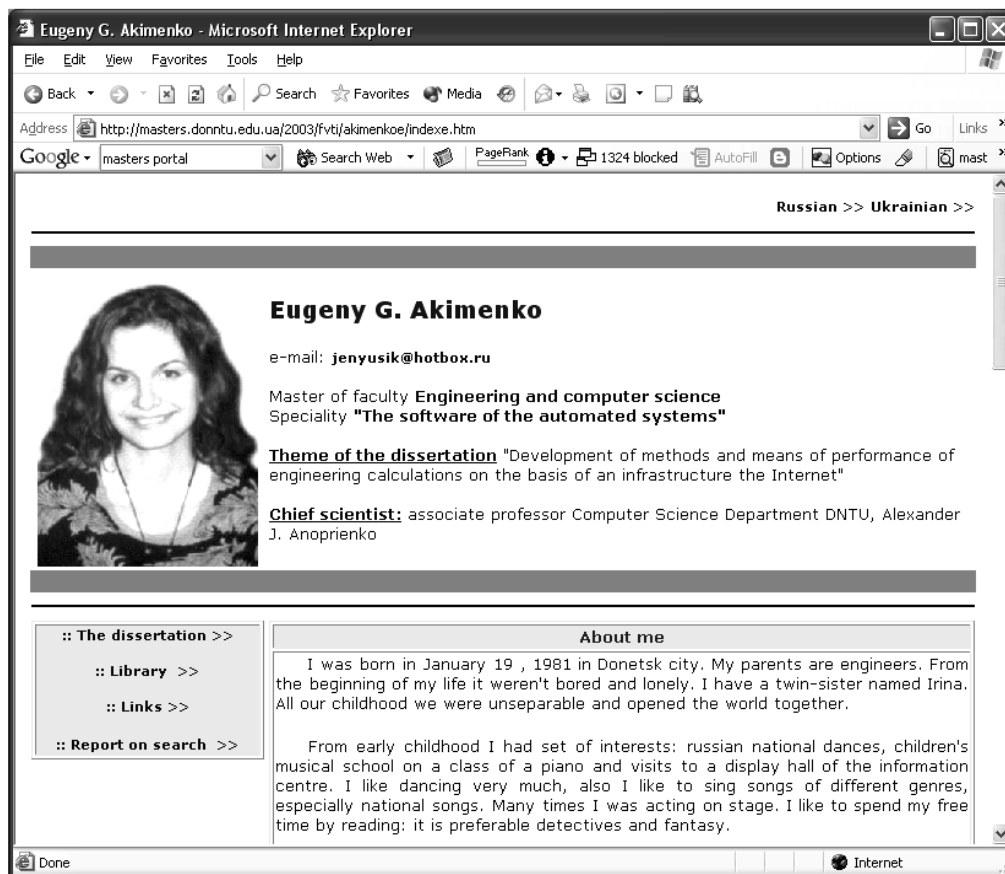


FIGURE 4 EXAMPLE OF INDEX PAGE OF A TYPICAL MASTER'S SITE

PROMOTION OF MASTERS PORTAL IN THE INTERNET

According to some assessments in the now-forming society not only capital will not be the main resource, but the information itself in its simplest form will not be such either! The factor of "human attention" will be perhaps the determining one, that will be a reflection of the general tendency of shifting such traditional economic and social factors as land, labour and capital to secondary part to the advantage of such specific resource as knowledge. In other words, to effectively train students (and especial Master students) for future it is necessary nowadays, first of all, to train them to use the Internet as an environment of knowledge spreading.

The most objective indicator of value and demand of scientific and educational materials and publications is considered to be the citation index and real intensity of its use. In case of Internet resources it is possible to calculate the activity data with high accuracy and completeness due to special statistic and rating services which was impossible earlier.

Masters portal formation in its present form with the registration in the leading statistic systems has become a reality since the middle of 2002 when there were the results of three Master Program Graduation groups which in overall made up to more than 400 personal thematic sites (Table 1) reflecting practically all the directions DonNTU of research and academic activity.

TABLE 1 QUANTITATIVE CHARACTERISTICS OF INFORMATION FILLING OF DONNTU MASTERS PORTAL			
Year	Number of Master students	Total, Mb	Average site size, Mb
2000	75	22	0,29
2001	130	74	0,57
2002	232	144	0,62
2003	233	148	0,64
2004	240	155	0,65
2005	240	160	0,67
Total	1150	703	

In English-speaking space the most relevant indicator of a corresponding resource significance is its position in the results of the leading search system Google. Active DonNTU masters portal promotion in English-speaking space has begun only since 2003, however, due to initially presupposed multi-lingual approach in the resource, it became possible to occupy quite quickly the leading positions. The proofs for that can be found in the request results in Google and Yahoo for such key words as «masters portal», «masters portal national» (fig. 5) or «masters portal of technical university».

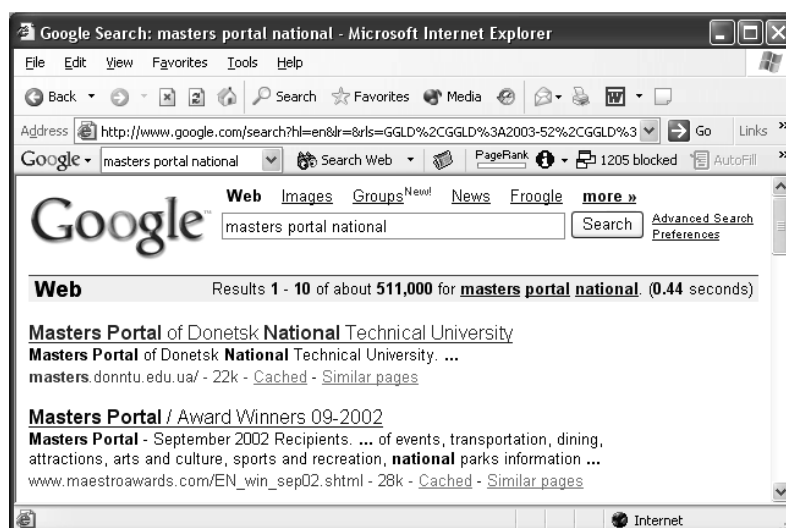


FIGURE 5 TYPICAL SEARCH RESULTS IN GOOGLE FOR KEY WORDS «MASTERS PORTAL NATIONAL».

According to the abovesaid, special attention was paid to its demand and utility by scientific-educational community. On this way the considerable results have been achieved which can be proved, in particular, by rating positions of the given resource: by 2005 the resource took the leading position among all regional sites, occupied one of the first places in Ukraine in “science” section and entered the first hundred of the most successful ones among all Ukrainian sites.

Figure 6 is also quite a demonstration. It shows attendance changes dynamics of DonNTU Masters portal. The given diagrams are quite typical for research and academic resources: this means that on the background of constant growth of attendance there are pronounced weekly and seasonal rhythms of attendance recession. The weekly maximums are observed in the beginning and/or the middle of academic week, and the seasonal ones – at the end of academic semesters. The attendance minimums happen in weekends and during vacations, in this case indexes decrease almost twice their amount. The absolute minimum takes place approximately in the first half of August. Relatively fast growth in the beginning of the academic year can be explained not only by seasonal demand of the corresponding resources, but also by additional appearance of new personal sites of the current graduation of Master students. This greatly influences the growth of portal summary attendance as its indexation by search engines intensifies.

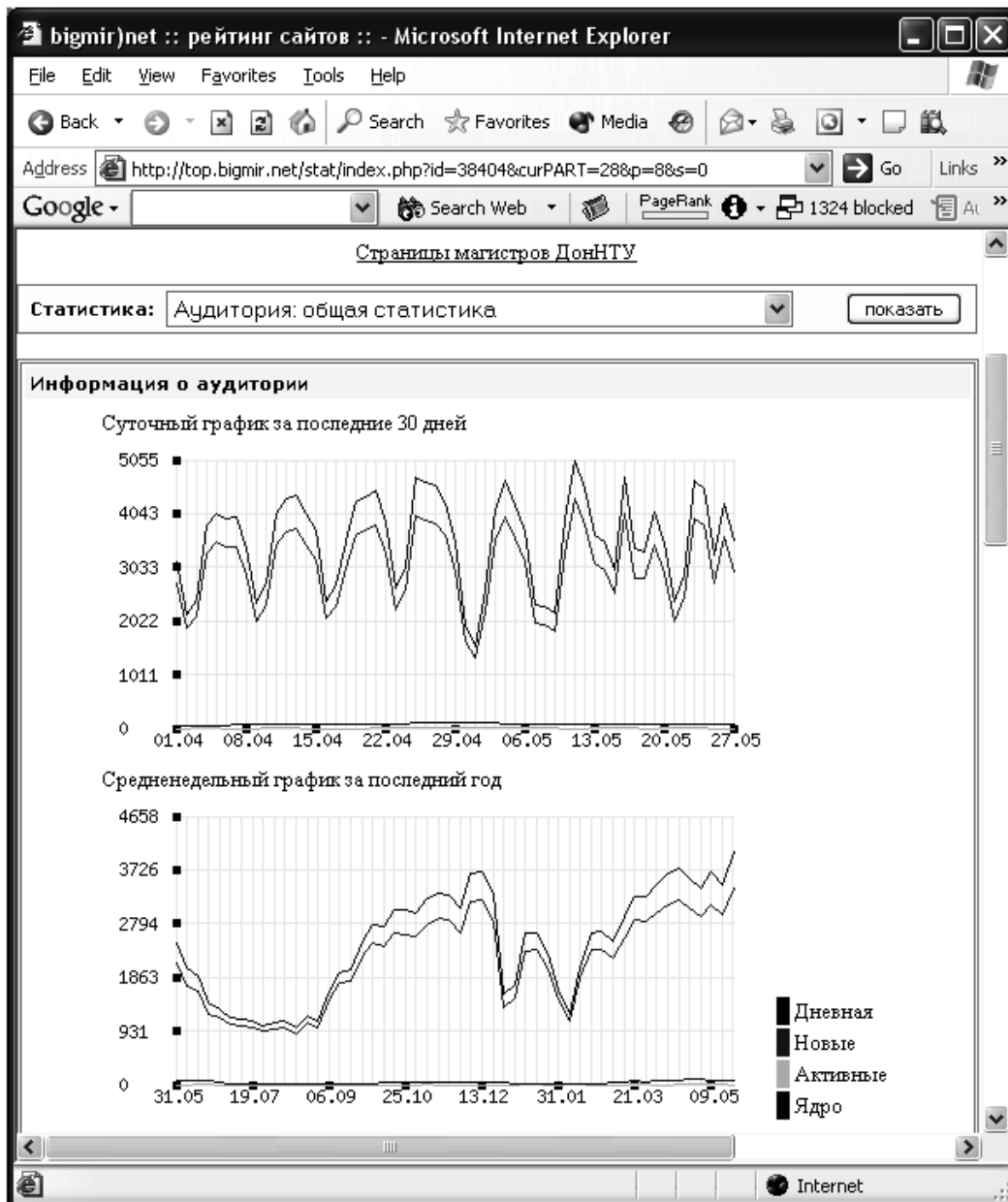


FIGURE 6 TYPICAL S GRAPHICS OF VISITS

PERSPECTIVES OF FURTHER DEVELOPMENT

Taking into account the five years exploitation experience, the main directions of the portal's further development can be as follows:

Expanding number of participating higher educational establishments and Master students. DonNTU appeared to be actually the first university having created such a resource in all the post-soviet territory. Experience of its successful creation and exploitation lets us hope for appearance of similar resources in other higher educational establishments. One of its main conditions is the respective modern network technologies course included in Master Program's curriculum. In this case optimum alternative would be to borrow DonNTU's experience including compulsory personal standardised web-pages placing of all the Master students of the institution or of its definite specialities. It is also possible that some Master students from other different institutions voluntarily place their web-pages in the Internet. Later it is planned to supply DonNTU Masters portal services with such a possibility as well.

Expanding the number of information services. Except the above mentioned possibility of independent personal web-pages uploading in the special portal section, it is also appropriate to additionally supply the portal with the Internet resources catalogue on issues connected with Master studies, forum systems, on-line polls and so on.

Portal's methodical element development, in the first place, at the expense of considerable expansion of the number of educational and academic-methodical materials presented there.

Multilingual information filling development of the portal. In particular, German and French versions of portal's generic pages are likely to appear in further years. First of all, however, it is necessary to considerably expand the number of materials in English language which is very important for further resource promotion in the international information space.

Development of portal's internal links system, which becomes more and more relevant as information saturation of the resource grows. At present moment in "links" section (links/) of Master students personal sites absolute majority of links leads outside the portal which negatively influences citation index parameters and portal's PR.

Conclusions

On the whole it can be pointed out that DonNTU's experience in creation of the unique academic-science oriented resource and its successful promotion in Slavonic-speaking as well as English-speaking information space is a revealing precedent of a new generation of research-academic resources formation. This portal is also an example of new approaches to academic process organisation using at maximum the information possibilities of modern Internet infrastructure. The main goal for the nearest future is a maximum possible further development of the given resource, and also further search of the ways enabling the most effective mastering of a research-academic potential of modern network information technologies.

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Citation:

Anopriyenko A., Bashkov E., Minaev A. University and Revolution in Communications and Computing: Experience of Donetsk National Technical University // *Proceedings of the International Conference & Workshop on 3G GSM & Mobile Computing: An Emerging Growth Engine for National Development*, 29-31 January, 2007. – College of Science and Technology, Covenant University, Canaan Land, Ota, Nigeria. 2007. P. 34-46.