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HIGHER EDUCATION DIRECTORATE
„DEVELOPING A RANKING SYSTEM OF UNIVERSITIES IN THE REPUBLIC OF BULGARIA“

Consortium «OSI-MBMD-S»
1000 Sofia, 56 Solunska Str.

BULGARIAN UNIVERSITIES RANKING SYSTEM

METHODOLOGY

Consortium OSI-MBMD-S

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Main features of the Bulgarian universities ranking system

Rankings and ranking systems

First, it is important to clarify what we mean by "ranking" and what we reckon to be the difference between "ranking" and "ranking system". Ranking is a type of classification that rates the subjects of classification based on some relatively stable features of theirs. This is namely what distinguishes the ranking type of classification from the classification that is the result of a specific, singular competition. The same differentiation is used in sports as well (e.g. in chess or tennis) where competitors acquire results from a certain tournament while also having a long-term ranking (standing in the ranking list) which ranking depends on their overall performance at competitions throughout their sports career. Even in sports that do not have official rankings, fans can easily distinguish between the results of a specific game and the long-term performance of the teams. Let us sum it up: the results of a certain competition are strongly dependant on singular arbitrary factors such as the weather conditions, the location of the tournament, the physical condition of each athlete in that particular moment, judges' concentration, etc. Rankings on the other hand rate participants on the basis of stable, long-term results.

A ranking system comprises a cumulative method of generating sustainable classifications called rankings. The ranking system that we have developed is in its essence a platform that can generate a very large number of rankings¹. If we also acknowledge the fact that the system is flexible enough to accommodate the inclusion of new indicators, the number of rankings that may be achieved is practically infinite. Certainly, a great part of the new rankings do not rate universities in a new way, simply because there needs to be certain sustainability in good achievement (which indeed there is, as our ranking system shows). So if a school is good at something, then there is great probability that it is good at other things too.

Ranking by professional field

All possible rankings in our ranking system are made by professional field. The team's idea has been to only compare things that are comparable. From a purely calculation point of view, there is of course no problem to provide a rating scale to rank universities in general. Numbers and standings cannot add value to a ranking. Only people can. We could not figure out a way to interpret a ranking where medical universities are brought together with art schools, sports academies, technical, economic, and natural science universities. It could be argued that in this case what could be compared is these universities' management, their prestige in society, the quality of their administrative services, and other concomitant activities. It is not possible however to draw a comparison among them based on the core essence of their activity and the reason why they have been established and why there are certain groups of young people with specific interests that are being drawn to them.

Here is why we decided to develop a system that provides rankings based solely on professional fields. In this case interpretation would be quite simple. The applicant student who is wondering where to study machine engineering, medicine, economics, architecture or law, can draw advice from our ranking system and weigh the pros and cons of the various possibilities.

Effectively searching our system requires more effort than just "browsing through" a universities ranking, but we are convinced it is all worth it. A basic requirement is that users get familiar with the structure of higher education in order to be able to check the professional field in which one or another major falls.

¹ More specifically, $117,094 * 10^{12}$ rankings, if by separate ranking we mean all possible combinations of indicators for all professional fields. If we take into consideration the unavailable data, the number of possible rankings becomes slightly smaller, but in all cases we mean thousands of trillions of rankings. If we also add to the calculations the change of weights, we shall need to add 28 more zeros to the number. So users can always try one more ranking.



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Standardized and custom rankings

There are two types of rankings in our ranking system: standardized and custom rankings. Standardized rankings are ready-made rankings in each professional field, which include prior selected indicators. The weights have been selected by experts upon assessing international experience, the context of the Bulgarian higher education, and the limitations stemming from data availability and quality. Users can see and study standardized rankings, but cannot change them. Most famous rankings are limited to providing users namely with what we call standardized rankings.

Custom rankings are those that can be made by each user, by choosing the professional field and generating a combination of the 51 available indicators using user-selected weights. Users can rank universities either by one indicator only, or by all 51 indicators, or based upon their own combination of indicators depending on users' specific priorities and interests. For example, a user can choose "law" as a professional field, and request a ranking based on the *insured income* indicator selected from the group of indicators for professional and career realization that has 50% weight, an on the *assessment by the National Evaluation and Accreditation Agency* indicator that also has 50% weight. That would result in the user's customized specific ranking.

Information system

The system provides users with access to a large volume of data about Bulgarian higher education. More than a few of the other rankings made either in Bulgaria or abroad provide users with access only to the final ranking (sometimes even just to the final standings without showing any points or other quantitative results). Our ranking system is also an information system securing full accessibility of the initial data and transparency with regard to the weights used and the calculation procedures applied. Any tempted and motivated user may check any specific ranking by repeating the calculations using the initial data available in the system. The data may also of course be used for any other informational and analytical purposes.

The system uses data that are updated periodically whereas parts of the data are automatically uploaded through an electronic connection of the system with other registers. That guarantees that the system remains dynamic and up to date, and diminishes the risk of human error. The risk of automatic multiplication of mistakes already made during the initial uploading of the information increases. There are two prescriptions against this risk: the gradual implementation into the system of more and more automatic logic controls to signal to the operators about anomalies; the system's publicity itself that would generate error signals to users, including signals coming from the institutions that have provided the initial data. The latter shall be stimulated by the system's publicity to fill in their electronic forms with greater care.

Sources of information

The first important differentiation we should make about the data used in the system is the one between the data collected through polls and the data received from the existing registers. Objective data are those that do not depend on anyone's subjective judgment. This kind of data are usually imported periodically by authorized persons into the administrative registers, forms or official databases, after which they are aggregated and processed on different levels, and are then made available to certain users under the form of references, statistical publications, databases, etc. The Bulgarian universities ranking system uses several such sources of information: data from the administrative database of the Ministry of Education, Youth and Science, AdminPro, data from the National Insurance Institute, data from the webpage of the National Evaluation and Accreditation Agency available online, data from the Scopus international database, and data provided by the schools themselves.



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Subjective data are those that depend upon someone's subjective judgment. This kind of data are usually collected through polling or other sociological approaches for gathering information, after which the data are summarized and analyzed.

Often, subjective information regards the respondent themselves, their personal experiences, feelings, and assessments of how they like something, or find it enjoyable, interesting, useful or valuable *to them*. As far as this information is concerned, the respondent is the authority of last instance, meaning that there cannot be a superior judgment than theirs. For example, professors or some external evaluators may be unanimous that the teaching method is very understandable. If however the students are convinced that the method of teaching has been difficult to comprehend and they have not learnt anything, we are obligated to evaluate the quality of the teaching process as inaccessible to *this group of students*.

When it comes to facts, polling is usually an alternative used when the data cannot be otherwise collected. If for example there is no register to show which students have participated in the university's projects, one of the possible ways to acquire this otherwise objective information is to request of every student to tell us if they have participated in such projects. There is a possibility of some mistake here that would be hard to assess regarding ability to reminisce about the facts, readiness to share the facts, etc. In all cases however, a certain student's participation or non-participation in some projects remains a fact that is potentially ascertainable in another way too.

System of indicators

Our system works with a total of 61 indicators, 51 out of which may be used in producing rankings (we call these "rating indicators"), all divided into six groups. The list of indicators divided into groups is enclosed in Application I herein. The system of indicators has been produced after reviewing the international experience and other countries' experience when developing national rankings of universities. Similar groups of indicators may be found in most rankings, with different weights and in different combinations. A description of the system of indicators is provided in Application II herein.

Selection of weights

Selecting the weights is the most sophisticated task when it comes to complex rankings (rankings that include more than one indicator). Most of the possible rankings in our ranking system, including standardized rankings, are of this kind namely. Here is why selecting the appropriate weights has been one of our most responsible tasks.

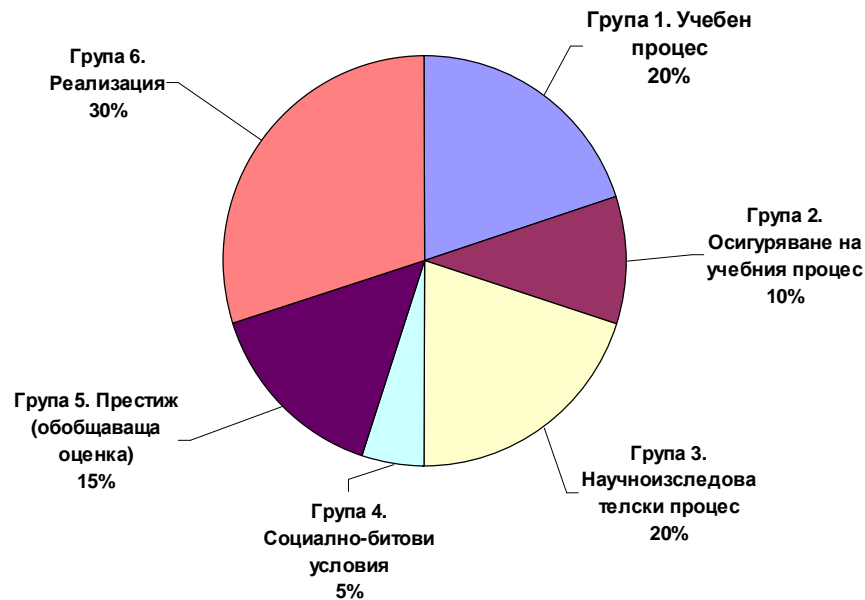
The main logic when selecting weights is that the important indicators (the relevant indicators) for which there is reliable information at hand, should receive relatively large weight. By reducing the significance of the indicator and the reliability of the data, the weight is reduced too. The less important indicators receive little weight even in cases when their measurement is very reliable, simply because their significance to the quality evaluation of education as a process and a product is not great. Even the most important indicators may receive smaller weight when their measurement is not reliable enough, simply because the information that has been acquired in such a way hides great uncertainty and should not be granted decisive importance.

The following chart demonstrates the distribution of weights among the separate groups of indicators in standardized rankings.



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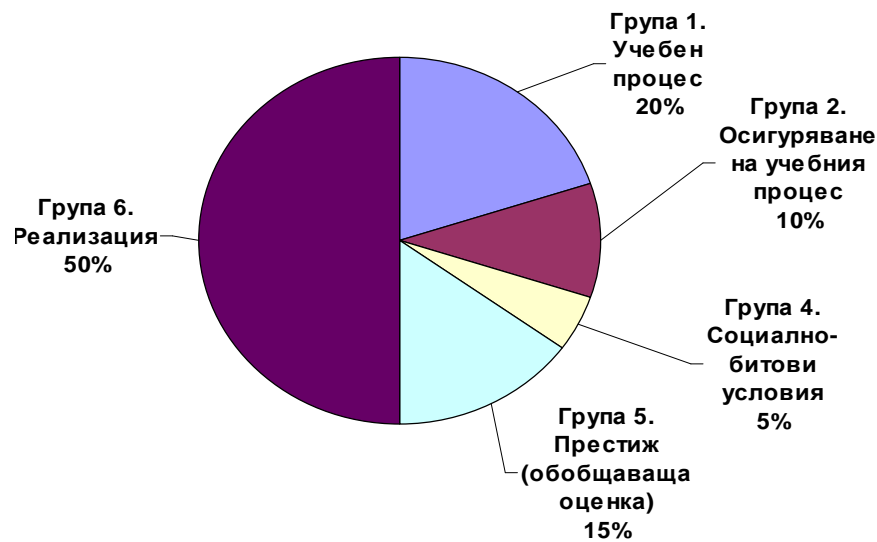
- Group 1. Teaching and learning. 20%
- Group 2. Resources for teaching and learning. 10%
- Group 3. Science and research. 20%
- Group 4. Social and living conditions. 5%
- Group 5. Prestige (cumulative rating). 15%
- Group 6. Professional and career realization. 30%

The same system of weights is applied to all professional fields. An additional standardized ranking has been produced only for the professional fields of the various arts, where the research and development group of indicators has been omitted, and the weight of this group has been transferred to the "Professional and career realization" group as demonstrated in the following chart.



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- Group 1. Teaching and learning. 20%
- Group 2. Resources for teaching and learning. 10%
- Group 4. Social and living conditions. 5%
- Group 5. Prestige (cumulative rating). 15%
- Group 6. Professional and career realization. 50%

That was required by the fact that science and research activity is not as relevant to arts as it is to the other professional fields. Its analogue here is 'artistic and creative activity', it takes a different kind of indicators to measure it that are currently not included here. This gap may be filled during the forthcoming improvements of the ranking system.

Calculating the results

When producing university rankings, indicators have been used in different measurement units (number, scale measurement, percentage, leva, etc.). That requires standardizing indicators' values using a statistical procedure called 'Z Points' that rescales values into a unified scale while simultaneously preserving their order and the proportions among them. Rescaling is conducted using a classical approach that utilizes an average scaled value and standard deviation. The final rating of each university in the rankings is presented as a result in a scale of 0 and 100.

Limitations and exceptions

Each ranking system has its limitations. This one is no exception. It provides information of all higher education schools in Bulgaria apart from the newly opened European Polytechnical University in Pernik. The reason why it is not included is because it was established at a time when the development of this ranking system was already quite advanced, so it was impossible to collect the necessary information about it.

Yet another circumstance that we would like to highlight is the fact that whenever the information collected about a certain school from a given professional field had been insufficient to allow us to draw reliable conclusions out of it, we took the respective schools out and into footnotes. That means that the data about the separate indicators for those schools are available to users, but the schools are not included in the ranking for the respective professional field.



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How to use the rankings

University rankings should be used with caution. The order in the rankings and the scores achieved should not be generalised. The fact that a certain school has been granted more scores in the final ranking than another does not yet mean that this is the best school for you. The final ranking (rating) may sometimes be the result of minimal differences or of indicators that are not of such great importance to you. We would like to specifically emphasize that whenever there is a difference within five points between universities in a ranking, in most cases this means that these schools are actually in the same league and offer comparable conditions.

Here is why we would recommend that you used the current ranking system only as the start of a longer and more thorough research of the education possibilities provided by Bulgarian universities.

No expert system that ranks possibilities, extends recommendations, or provides directions, etc., can replace the autonomous choice. It can only aide it so that this choice may be better informed. Our ranking system aims within the same limits: at the end of the day, it is school-goers and students who make the choice.



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Application I

List of indicators in the Bulgarian universities ranking system, divided into groups

Group 1. Teaching and Learning
Evaluation by the National Evaluation and Accreditation Agency (NEAA)
Theoretical knowledge
Level of practical skills acquired
Participation in internships
Relevance of the educational content taught
Foreign language teaching
Teaching
Student assessment
Student load
Academic staff
Academic staff with academic rank
Assistant professors with PhD
Foreign students

Group 2. Resources for teaching and learning
Assessment of material resources and infrastructure
Assessment of administrative service provision
Organisation of the teaching and learning process
Library stock
Library stock per student
Assessment of library stock
Availability of information resources
Availability of a viable career development centre
Teaching premises

Group 3. Research and Development
Articles in scientific journals
Number of published books per academic staff member
Citation index
Academic staff involved in projects of the National Scientific Research Fund
Academic staff involved in international scientific research projects
International scientific exchange
Participation of students in scientific research activities
Quality of scientific research
Financial resources per academic staff member attracted for scientific research
Financial resources for scientific research
Financial resources for scientific research per student
Training of doctoral candidates within the professional field
Training of doctoral candidates at the university
Academic staff-to-doctoral students ratio



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Group 4. Social and Living Conditions
Scholarships
Students housing
Satisfaction with the social and living conditions
Group 5. Prestige (cumulative rating)
Secondary education diploma GPA
Prestige among students
Prestige among graduates
Prestige among academic staff
Prestige among employers
Prestige among the general public
Group 6. Professional and Career
Graduates' insurance income
Unemployment among university graduates
Professional development and career in the chosen field of study
I gained confidence that I will succeed in life
I created important contacts and friendships
Employers' preferences



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Application II

Description of the indicators in the Bulgarian universities ranking system

Group 1. Teaching and Learning

Indicator 1.1 Evaluation by the National Evaluation and Accreditation Agency

Assessment grade of the professional field awarded by the NEAA

Evaluation and accreditation of the separate majors at Bulgarian universities is performed by the National Evaluation and Accreditation Agency (NEAA). This indicator shows the average assessment grade awarded by the NEAA (the result of the rescaling procedure) of the respective professional field. When there is no information about the rescaling procedure result, the assessment grade of the professional field is used scaled on a 0 to 5 scale, where 0 means "dissatisfactory" grade or absence of grade; 3 is "satisfactory", 4 is "good", and 5 is "very good". All grades below 2.50 are scaled down to 0. The grade refers to the respective professional field at the respective university. The NEAA grade is the only legally established assessment grade of universities in the country, and this grade provides them with accreditation to teach certain majors in certain professional fields, and to issue valid diplomas. Still, we decided to place it in the 'Learning and Teaching' group because the exercising of a teaching and learning process is ultimately the main activity of universities, which they could not perform without the existence of a NEAA assessment grade.

Information source: National Evaluation and Accreditation Agency

Indicator 1.2. Theoretical knowledge

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator is based on students' subjective assessment of the quality of the theoretical knowledge available in their major at their university. Students evaluate the overall theoretical knowledge at their university on a 5-point scale. After that the data is transformed into grades of 2 to 6 – the most popular grading scale in Bulgaria – in order to facilitate users' intuitive understanding of grades. Supposedly, each student evaluates theoretical knowledge on the basis of their own personal experience of their major. That is, a student's evaluation concerns their major, while the average grades of the separate majors within the same professional field provide the grade of the professional field. The limitations of this indicator are related to the fact that especially during the first year of their university education, students may have a wrong idea of what theoretical knowledge at university actually is, and of how they can distinguish when it is good or bad. This indicator however has the advantage of directly reflecting the service user's attitude, which is always very important. Theoretical knowledge can be evaluated in many other, more complicated ways too which are not related to students' degree of satisfaction.

Information source: Sociological research carried out in April-June 2010.

Indicator 1.3. Level of practical skills acquired

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator is identical to the previous one, the only difference being that students also provide their subjective rating of the level of practical skills they acquire at university. It could also be allowed that students' subjective rating of their practical preparation is a more reliable indicator than their evaluation of the available theoretical knowledge. This is so firstly because assessment of practical preparation is often related to



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acknowledging whether there is any practical preparation at all or those are the same lecturing sessions with a different name. Second, the user is the ultimate authority when it comes to something being of practical use to them or not. This evaluation may be complemented (and amended) using practical skills quality evaluation criteria, now in the context of professional realization. Students who have acquired better practical training, together with theoretical knowledge, are better prepared to start work without any additional employer-provided training, and to be very productive from the very start of their professional careers.

Information source: Sociological research carried out in April-June 2010.

Indicator 1.4. Participation in internships

Percentage (from 0 to 100) of students who have rated their participation in internships as useful.

This indicator shows the percentage of students who have rated their participation in internships as fully or partially useful. This is a percentage of all students, including those who have not participated in internships. Internship participation is an important part of students' practical skills acquisition process, which brings them as close as possible to real-life business environment.

Information source: Sociological research carried out in April-June 2010.

Indicator 1.5. Relevance of the educational content taught

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

The rating of educational content's relevance is produced on the basis of a sociological survey among students about their degree of satisfaction with the relevance of the educational content taught. The value of the indicator is the result of respondents' average rating by university and professional field. Students have provided their evaluation on a 5-grade scale. The data have then been transformed into grades of 2 to 6.

The results of this indicator should be interpreted keeping in mind the possible limitations of students' capability of assessing the relevance of the educational material when it comes to the latest knowledge available. The year of publication of textbooks, books and articles used is one of the easily detectable relevance criteria. We could also add here assessment of the relevance, applicability and up to date of seminars, cases, examples, methods, technologies, etc. We should still note that relevance criteria in the various fields could differ greatly in the span of time. In medicine for example, it takes years for published materials to go out of date, while in mathematics there could be publications that are still being cited after decades.

Information source: Sociological research carried out in April-June 2010.

Indicator 1.6. Foreign language teaching

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

The rating of foreign language teaching has been achieved on the grounds of a sociological survey among students. The indicator value is the result of the average rating provided by respondents by university and professional field. Students have provided rating on a 5-grade scale. After that, data have been transformed into a 2 to 6 rating scale. The degree of foreign language proficiency is relatively easy to measure, whereas respondents' subjective evaluation is reliable enough.

Information source: Sociological research carried out in April-June 2010.



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Indicator 1.7. Teaching

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator has been achieved on the grounds of sociological polls. It consists of six components rating respectively: 1) the method of lecturing; 2) the regularity of the lectures in compliance with the curriculum; 3) the method of teaching at seminars in compliance with the curriculum; 5) professors' individual work with students; 6) accessibility of the educational material taught. Two of these components: regularity of lectures and regularity of practical sessions, are rather related to certain facts known to students, so the risk of distorting the data as the result of inaccurate or badly informed subjective evaluation is minimal. As per two other components: professors' individual work with students and accessibility of the educational material taught, students are the authority of last instance, so their judgment is to be considered as absolutely reliable. It is only with the first and the third component that purely subjective evaluation on behalf of the respondents is required about a process that is rather complex: method of lecturing and method of teaching at seminars.

The indicator value is the result of the average evaluation provided by the respondents by university and professional field. Students have provided rating on a 5-grade scale. After that, the data have been transformed into a 2 to 6 rating scale.

Information source: Sociological research carried out in April-June 2010.

Indicator 1.8. Student assessment

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator is based on students' subjective evaluation of the assessment they receive at their university. It consists of three components: 1) method of continuous assessment during the semester; 2) existence of objective assessment criteria; 3) assessment objectivity. The indicator value has been achieved through striking an average of respondents' grades for all three criteria by university and professional field. Students have provided rating on a 5-grade scale. After that, the data have been transformed into a 2 to 6 rating scale.

When interpreting the results of this indicator, students' possible biasness should be taken into account with regard to the assessment system, depending on whether students have received better or worse grades.

Information source: Sociological research carried out in April-June 2010.

Indicator 1.9. Student load

Average number of hours spent by one student at lectures and seminars per week

This indicator is based on students' responses about the actual time spent at lectures and seminars per week. The hours indicated by all students from the respective university and in the respective professional field have been brought to an average. Students' responses vary a lot. The professional fields and universities where time spent studying is longer than in others are clearly outlined.

Information source: Sociological research carried out in April-June 2010.

Indicator 1.10 Academic staff

Number of academic staff on a permanent employment contract per 100 students

The indicator includes all students, whereas its value is calculated by university and professional field. Academic



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staff are considered to be all permanently employed teachers who teach at least one major per professional field.

The number of academic staff on permanent employment contracts provide the best idea of the teaching resources available at the university and to students.

Information source: The higher education information database of the Ministry of Education, Youth and Science. The data are updated twice a year.

Indicator 1.11 Academic staff with academic rank

Number of academic staff with academic rank (associate professors and professors) per 100 students

This indicator is similar to the previous one, but only academic staff with academic rank are considered per 100 students. The indicator includes all students, whereas its value is calculated by university and professional field. Academic staff with academic rank include all associate professors and professors. Academic staff with academic rank are the most highly qualified among the faculty, having the highest achievements in science, and usually the greatest experience teaching. In principle, this indicator is supposed to bring to the spotlight those universities that have the most qualified faculty.

Information source: The higher education information database of the Ministry of Education, Youth and Science. The data are updated twice a year.

Indicator 1.12 Assistant professors with PhD

Number of assistant professors with a PhD, employed on a permanent contract per 100 students

The indicator value has been calculated by university and professional field. This indicator shows the qualification of the faculty of non-academic rank. Having a PhD could be interpreted as an attestation of more thorough knowledge in the respective field and greater growth potential.

Information source: The higher education information database of the Ministry of Education, Youth and Science. The data are updated twice a year.

Indicator 1.13. Foreign students

Percentage (from 0 to 100) of foreign students against the total number of students

This indicator measures some aspects of a university's attractiveness and international competitiveness. Ethnical and cultural diversity among students is also a resource that enriches the educational process and the social life at the university.

Information source: The higher education information database of the Ministry of Education, Youth and Science. The data are updated twice a year.



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Group 2. Resources for Teaching and Learning

Indicator 2.1 Assessment of material resources and infrastructure

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator comprises a cumulative assessment by the students of the quality and condition of the material resources and infrastructure. The students have separately assessed the lecture halls, the computer rooms and the labs. The result is an average of the three components on a scale of 2 to 6. Users' subjective assessment is just one of the aspects of the assessment of the material resources and infrastructure. Unfortunately, collecting other relevant data such as accounting value and age of key elements of the material resources like specialized equipment, labs, etc. is hindered by the level of availability and accessibility of information.

Information source: Sociological research carried out in April-June 2010.

Indicator 2.2. Assessment of administrative service provision

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator comprises a subjective assessment of administrative service provision, resulting from a sociological survey among students. The indicator value is achieved from the average of respondents' ratings by university and professional field. Students have provided rating on a 5-grade scale. After that, the data have been transformed into a 2 to 6 rating scale. When it comes to the quality of administrative service provision, users' assessment can be considered as the most relevant and reliable factor.

Information source: Sociological research carried out in April-June 2010.

Indicator 2.3 Organisation of the teaching and learning process

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator shows students' subjective assessment of the curriculum schedule convenience at their university. The indicator value is achieved from the average of respondents' ratings by university and professional field. Students have provided rating on a 5-grade scale. After that, the data have been transformed into a 2 to 6 rating scale.

To students this is the most easily established and obvious aspect of the organization of the teaching and learning process. Convenience is especially important to senior undergraduates and Masters students, when their education is often combined with internship or a job.

Information source: Sociological research carried out in April-June 2010.

Indicator 2.4 Library stock

otal number of library units (in thousands)

This indicator measures in thousands the number of library items available in the university libraries and repositories. Library items are considered to be books, archive materials, CDs, periodical editions, microfilms,



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etc. The indicator does not include access to electronic libraries and databases. The data refers to 2008/2009 academic year.

Access to up to date and reliable information has been turning more and more into a main competitive advantage in scientific work and teaching. Although the significance of electronic libraries and databases continues to grow, traditional libraries and repositories holding information on hard copies have preserved their importance. Internet offers easy and quick finding of all kinds of information, but selecting the good from the "trash" is not an easy task. The risk of coming across "trash" is almost fully eradicated with the traditional academic approach of referrals and mutual citations. Today, almost all scientific publications: monographs, textbooks, articles in the scientific journals, etc., are accessible online, but the cost of individual subscription is generally unaffordable to the average Bulgarian student. Broader access to such editions is only possible through libraries purchasing copies or the university purchasing organizational subscriptions.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 2.5 Library stock per student

Average number of library units per student.

This indicator measures the number of library units per student. The definition of library unit is the same as with the previous indicator, 'Library Stock'. Access to electronic libraries and databases is not included. The data refers to 2008/2009 academic year.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 2.6 Assessment of library stock

Average rating by students, measured on a scale of 2 (Poor) to 6 (Excellent)

This indicator comprises subjective evaluation of library use conditions and the accompanying services, and of the quality of the library stock available without including electronic libraries and databases. The indicator value is achieved from the average of respondents' ratings by university and professional field. Students have provided rating on a 5-grade scale. After that, the data have been transformed into a 2 to 6 rating scale.

Unlike the previous two indicators which assess libraries according to their size, students' subjective evaluation rates the quality of the service they receive as users of those libraries, and that is an important aspect of libraries' accessibility and convenience of use. The quality of library information units is also being assessed here.

Information source: Sociological survey from April-June 2010.

Indicator 2.7. Availability of information resources

Number of international databases to which the university maintains a subscription

The indicator points out the number of international databases to which the university maintains a subscription. The data have been provided by the universities themselves. Electronic libraries and databases are notable with their ownership of editions that are much more numerous and up to date. There are considerable differences in the scope and cost of subscription plans too. In this sense, the number of databases to which a university maintains a subscription is an indicator that does not provide a full idea of a student's access to electronic editions, but could still serve as a lead. It was not possible to make a more thorough analysis for this edition of the ranking system of the accessibility and volume parameters of the databases for which subscriptions have been purchased.



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Information sources: Data provided by the universities in the period April – September 2010.

Indicator 2.8. Availability of a viable career development centre

Rating by university students, measured on a scale of 0 to 100

This indicator shows what part of students compared to the total number of students have declared to use the services of the university's career development centre, or have at least heard of it. The value of the indicator is the result of the number of those students divided by the total number of students interviewed by university and professional field. At universities where the career development centre is not active, this share is very small, whereas at universities with no career development centre, it is 0%. There are some among the students who have used the career centre but who declare they are not happy with its services.

Information source: Sociological survey from April-June 2010.

Indicator 2.9 Teaching premises

Sq.m. of teaching premises per student at the higher education institution

This indicator comprises the square metres of teaching premises in a higher education institution per student. The data refers to buildings' spread up area that includes the teaching premises too: lecturing halls and laboratories. The indicator does not register universities' areas available for testing fields.

Information sources: Data provided by the universities in the period April – September 2010.

Group 3. Science and Research

Indicator 3.1 Articles in scientific journals

Number of articles in scientific journals according to the SCOPUS international database for the period 2005 - 2009

This indicator shows the number of publications in referred-to scientific journals by university and professional field, according to the SCOPUS international database. The SCOPUS data concerns the period 2005-2009. Several professional fields correspond to each scientific field. The number of articles per given professional field equals the number of articles in the scientific field where the professional field belongs.

The number of publications is one of the possible indirect indicators of the volume of scientific production. In fact, publishing is a main product in non-applied disciplines: *"Publish or perish"*, goes a famous saying from the English-language academic folklore. The requirement that publications be published in referred-to journals is a guarantee that some minimal academic standards of production quality would be observed.

Information source: SCOPUS international bibliographic database.

Indicator 3.2 Number of published books per academic staff member

Number of books published in Bulgaria and abroad per permanent academic staff member

This indicator shows the number of books published in either Bulgaria or abroad in the professional field by a permanent member of faculty as compared to the number of all permanent faculty at the university. The data



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refers to 2009 academic year. This indicator does not feature any additional specification to determine some admissible minimal quality of the publication. Besides, the data does not come from independent sources (such as the SCOPUS database, for example). We recommend that this indicator be used only in combination with other indicators of the Science and Research group.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 3.3 Citation index

Citation index of the SCOPUS international database.

This indicator shows the frequency of citing according to the SCOPUS international database for the period 2005-2009. The SCOPUS citation index applies specific measurement to the impact of publications, known as the 'h index' or the 'Hirsch index' after George Hirsch from the University of California, San Diego, who developed it. A scientist, a research group or a university has an "h index" if "h" of the total number of articles published by their academic staff have been cited at least "h" times each, while other articles have been cited less than "h" times.

Information source: SCOPUS international bibliographic database.

Indicator 3.4 Academic staff involved in projects of the National Scientific Research Fund

Percentage (from 0 to 100) of permanent academic staff involved in projects of the National Scientific Research Fund against the total number of permanent academic staff

This indicator shows the percentage of permanent faculty involved in projects of the National Scientific Research Fund with the Ministry of Education, Youth and Science, the European Social Fund and the Ministry of Health. The purpose of the indicator is to measure the extent of faculty's participation in scientific projects. Higher education institutions may have scientific projects financed by other sources in Bulgaria too, or their faculty may participate in scientific projects managed by other Bulgarian organisations as well. Definition-wise, it is difficult to differentiate between science-and-research projects and some other initiatives. Involvement in projects of the National Scientific Research Fund allows for clearly defining and easily double-checking the information, which was exactly the reason why we decided to choose it as the basis of the indicator.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 3.5 Academic staff involved in international scientific research projects

Percentage (from 0 to 100) of permanent academic staff involved in international projects against the total number of permanent academic staff

This indicator shows the percentage of permanent faculty participating in international scientific research projects. The data relates to 2009 academic year by university and professional field. This indicator is similar to the previous one, except that it measures involvement in international scientific research projects.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 3.6 International scientific exchange

Number of specialisations abroad per permanent academic staff member with duration over a month



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The present indicator measures the number of specialisations abroad per each permanent faculty member, with duration of more than one month. The data relates to 2009 academic year by university and professional field. Faculty's mobility is one of the indirect indicators of the relevance, competitiveness and breadth of faculty's academic and professional experience.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 3.7 Participation of students in scientific research activities

Percentage (from 0 to 100) of polled students who have declared that they have been involved in scientific research activities

This indicator shows the percentage of students polled by professional field and university who have declared they have participated in scientific research activities while at university. Involvement in scientific research activities is a main tool for enhanced mastering and development of skills for practical application of the acquired theoretical knowledge. It is assumed that students who have participated in scientific research activities would be much better prepared to work in their professional fields after graduation, needing much less additional training and a much shorter adaptation period. Besides, participation in projects is also instrumental in developing key team work skills that are very important both in present day scientific and research work and in most professions.

Information source: Sociological survey from April-June 2010.

Indicator 3.8 Quality of scientific research

Assessment by academic staff on the quality of scientific research, measured on a scale of 0 to 100.

This indicator comprises faculty-provided rating of the scientific and research activity at their higher education institutions, against the scientific and research activity at other universities. Faculty provide their evaluation of whether the scientific and research activity at their university in their professional fields is of a higher level, the same level or lower level than at other universities. The aggregated responses are transformed into a balance value, which is then transformed into points from 0 to 100. Zero (0) is the lowest grade that would be achieved if all faculty were unanimous that the quality of scientific and research work in their professional fields at their university is of a lower level than at most other universities. One hundred (100) is the highest grade that would be achieved if all faculty were unanimous that the quality of scientific and research work in their professional fields is of a higher level than at most other universities.

Information source: Sociological survey from April-June 2010.

Indicator 3.9 Financial resources per academic staff member attracted for scientific research

Average amount (in leva) of financial resources per permanent academic member raised annually for scientific research

This indicator shows the amount of the funding in leva that is raised annually in addition to the governmental subsidy for scientific and research activity that is released under Regulation No. 9, for scientific and research activity, per permanent faculty member. This is the funding raised for scientific and research work from sources



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such as the Scientific Research Fund of the Ministry of Education, Youth and Science; project participation; international projects under EU scientific research framework programmes; donations, etc. The data refers to 2009 academic year, and have been provided by the higher education institutions themselves. The indicator measures a university's pro-activity (respectively that of its faculty, PhD holders and students) in raising additional funding for scientific and research activities, just as it measures the size of that funding. This indicator could be interpreted as one of scientific capacity and competitiveness in the scientific and research field.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 3.10 Financial resources for scientific research

Total amount of resources for science and research, including governmental subsidy and funding raised by the university from other sources (in thousands of leva)

This indicator shows the total amount of the financial resources available for scientific and research activity in thousands of leva for the 2009 calendar year, including the governmental subsidy and the additional funding raised by the university. The indicator measures the overall potential of the university to fund scientific and research activity. The indicator is strongly dependant upon the size of the higher education institution, and it demonstrates the fact that by default the most expensive scientific and research projects require a certain size of the higher education institution.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 3.11 Financial resources for scientific research per student

Average amount of resources for science and research per student, including governmental subsidy and funds raised from other sources (in leva)

This indicator shows the funds available for scientific research activity including governmental subsidy and the additional funds raised by the higher education institution, weighed against the number of students, i.e. the numerator of this indicator is the result of the previous indicator (26), and the denominator is the number of all students in all forms of study. The data refer to 2009 calendar year, and have been provided by the universities. The purpose of this weighted indicator is to partially balance the university size effect from the previous indicator, and outline those among the smaller universities that have managed to develop scientific activity that is extensive enough for their size.

Information sources: Data provided by the universities in the period April – September 2010.

Indicator 3.12. Training of doctoral candidates within the professional field

Number of accredited majors for doctoral studies within the professional field

This indicator shows the number of accredited doctoral studies per professional field at the university. Doctoral studies are classified by scientific fields, while professional fields are united into higher education studies. The two classifications do not completely cover each other; here is why it was necessary that for the needs of the university ranking system we develop a special scheme to match accredited scientific (doctoral) studies to the professional fields at the university.

Information source: National Evaluation and Accreditation Agency.



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Indicator 3.13 Training of doctoral candidates at the university

Number of accredited majors for doctoral studies at the university

This indicator rates universities' potential to grow beyond Masters degrees, and train PhDs. PhD, which lies on the border between educational and research degrees, is getting more and more popular in higher education in developed countries. In this sense, universities' capacity to maintain PhD programmes is a good indirect indication of faculty's potential, the thoroughness of science and research activity, and of future competitiveness.

Information source: National Evaluation and Accreditation Agency.

Indicator 3.14 Academic staff to doctoral students ratio

Number of PhD students per 100 permanent academic staff holding an academic ranks within the university.

This indicator shows the number of PhD students per 100 permanent academic staff of academic ranks at the higher education institution. The indicator shows faculty's capacity to maintain PhD programmes. This is one of the direct methods of rating faculty's and university's scientific potential.

Information source: Higher education information database of Ministry of Education, Youth and Science. Data are updated twice a year.

Group 4. Social and living conditions

At a first glimpse, social and living conditions are not related to the mission and main activity of higher education institutions. In fact, however, they make an important component of universities' competitiveness and of their ability to attract students. Even universities in large cities and densely populated agglomerations cannot rely on local students only. In this sense, social and living conditions for students make a very important part of the overall educational service. The availability of eating places close to university campuses is an element of the overall convenience of the educational process. In Bulgaria, those services are offered in student canteens and dormitories, whereas their organisation is constantly changing and modernizing. In some cases, those services die out in their organizational form, and are only offered on the free market.

The social and living conditions group also includes a scholarships indicator. Scholarships are part of universities' policy of enhancing higher education accessibility along various criteria: social criteria or high academic achievements.

Indicator 4.1 Scholarships

Percentage (from 0 to 100) of students receiving scholarships

This indicator shows the percentage of regular students who receive scholarship against the number of all regular students. The data refers to 2008/2009 academic year. The possibility of obtaining scholarship is without doubt an important criterion when it comes to choosing a university. In some cases, when resources are in deficit, that could even turn into a main criterion that might receive higher priority than academic and professional arguments.

Information sources: Data provided by the universities in the period April – September 2010.



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Indicator 4.2 Students housing

Number of bed days per student for one academic year

This indicator shows the average number of bad days per student for one academic year. The indicator denominator includes all students in all degrees and forms of education (BAs, BSc, MAs and PhDs): both students that have used the dormitories, and students who have not. The indicator refers to the 2008/2009 academic year. The indicator demonstrates dormitories availability at the respective university. Generally, the higher the indicator value, the greater the probability that an applicant student settles in a dormitory.

Information sources: Data provided by the universities in the period April – September 2010, and reference from Student Canteens and Dormitories EAD for the 2008/2009 academic year.

Indicator 4.2. Satisfaction with the social and living conditions

Average satisfaction with the social and living conditions at the university, as assessed by students on a scale of 2 (Poor) to 6 (Excellent).

This indicator is an average assessment by students of their satisfaction with the social and living conditions at the university on a scale of 2 (Poor) to 6 (Excellent). The assessment of social and living conditions includes rating of: sports premises and equipment; student canteen and dormitories; health care and services; entertainment and communion clubs. Students' satisfaction with the social and living conditions is the best indication of the quality of the provided services.

Information Source: Sociological survey from April-June 2010.

Group 5. Prestige

A higher education institution's prestige entails how good its reputation is in society as a whole, as well as among specific groups interested in the quality of higher education such as students, professors, some categories of employers (especially those in need of highly qualified employees). When a university is in demand, that allows it to select the best among applicants, thus turning admission level into yet another indicator of prestige.

Indicator 5.1 Secondary education diploma GPA

Secondary education diploma GPA

This indicator shows the average secondary education GPA of each student enrolled at a given university in a given professional field. The average GPA of the enrolled students shows the level of competitiveness that an applicant student would face at a certain university and, respectively, their chances of being admitted. The large number of candidates with high achievements at school demonstrates how attractive the university is, and that is a function of its prestige: applicant students who have not yet had the opportunity to gather personal experience and impressions of the pros and cons of a certain university may rely on various other sources which would to a degree reflect the university's image in society. The present ranking system is also one such source.

Information source: Higher education information database of Ministry of Education, Youth and Science. Data are updated twice a year.

Indicator 5.2 Prestige among students

Prestige as perceived by students measured on a scale of 0 to 100



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The indicator reflects students' subjective evaluation of which three Bulgarian universities other than the one they attend provide the best education in their major or professional field. Students' rating is indicative of the prestige the respective professional field enjoys at the respective university. For example, in order to achieve Sofia University's grading in the professional field of Economics, the rating that has been weighed is that of all economics students from all other universities who have pointed out Sofia University as one of the three best universities in their professional field. The university's size has also been registered by the weighting, so small university students' response weighs as much as that of students from large universities. This is necessary so as not to deprive large universities, because students are not allowed to point out their own university.

Information Source: Sociological survey from April-June 2010.

Indicator 5.3 Prestige among graduates

Prestige as perceived by graduates, measured on a scale of 0 to 100

This indicator differs from the previous one in the aggregate from which respondents have been selected. In this case respondents are people who have acquired their university degrees at various universities and in various professional fields. For further details on the method of calculating this indicator, please see the definition of the "Prestige among students" indicator. The second difference is that the data are representative of the higher education institution as a whole, regardless of the specific professional field.

Information source: Sociological survey from April-June 2010.

Indicator 5.4 Prestige among faculty

Prestige as perceived by the faculty measured on a scale of 0 to 100.

This indicator is only different from the previous one in the aggregate from which the respondents have been selected. In this case respondents are professors from the various professional fields at all universities. What in English is known as 'peer review' is an established assessment method for universities and other organisations, and is also used in the practice of many accreditation bodies, including the National Evaluation and Accreditation Agency in Bulgaria. In its essence, this indicator comprises a short form of 'peer review' based on polled faculty's previous experience and information, and is not the result of a special research. The data are provided by university.

Information source: Sociological survey from April-June 2010.

Indicator 5.5 Prestige among employers

Prestige among employers, measured on a scale of 0 to 100.

This indicator measures the prestige that various universities have with employers. Respondents comprise a nationwide representation of employers from different sectors of industry, from various regions of the country. Employers have pointed out the three Bulgarian universities that prepare the best specialists for the needs of their economic activity. Employers' evaluation is one of the very important components that shape up a university's prestige, and is directly related to chances of finding employment and achieving high remuneration in the respective professional field.

Information source: Sociological survey from April-June 2010.



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Indicator 5.6 Prestige among the general public

Prestige as perceived by the general public, measured on a scale of 0 to 100.

This indicator measures universities' prestige among the general public as a whole. Respondents comprise a nationwide representation of the country's population of age. Respondents have pointed out the three best Bulgarian universities, whereas the indicator presents the percentage of respondents who have pointed out to the respective university as one of the three best.

The public's evaluation is what comes as close as possible to the definition of prestige, if we are to understand prestige as "good name". It is in this broadest sense of "prestige" that it naturally also includes the entire objective information and experience that the various public groups have. When making evaluations people usually are unable to set aside their own knowledge and personal experiences. But prestige as a good name has one residual component which is not directly related to any objective criteria or facts. It may reflect a past story (we sometimes call this "old glory"), some sentiments or prejudice, rumours and other layers that are difficult to determine but that shape people's attitude towards a given institution. Nevertheless, even if it does not have a clear definition, prestige has some absolutely tangible effects that should not be ignored.

Information source: Sociological survey from April-June 2010.

Group 6. Professional and career realization

University graduates' enhanced possibility to have productive lives and a higher social status is among the very important criteria for evaluating results in higher education. More than a few economists would say that this is actually the only reasonable criterion. Without going into extremes, this ranking system acknowledges those economic sentiments which are also shared by a great part of society, so professional and career indicators carry sufficiently great weight.

Professional and career realization is hard to define, but its key aspects are relatively easy to measure. It is hardly possible to seriously dispute that a person's income is a major indication of both market's and public's assessment (in case they work in the public sector) of their work, and of their potential to be socially active and participate in public life.

Indicator 6.1 Graduates' insurance income

Average monthly insurance income of graduates from Bulgarian universities in the last three academic years

This indicator shows the average insurance income of university graduates for the last three academic years. The data are up to date towards March 2010 by university and professional field. There is a ceiling to the insurance income equal to tenfold the minimal monthly salary. That allows for certain information about the highest paid people to be lost, but first, those people are not that numerous, and second, we can easily assume that everyone who has reached the insurance income ceiling in the country has found good professional and social realization.

The average insurance income of graduates by professional field and university has been achieved based on data provided by the Ministry of Education, Youth and Science about graduates for the previous three academic years, set against the National Insurance Institute data about insured persons and the size of their insured income.

Information source: National Insurance Institute

Indicator 6.2 Unemployment among university graduates

Percentage of officially registered unemployed persons among graduates of Bulgarian universities in the last three academic years (expressed in a negative number)



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The level of unemployment among graduates by professional field and university has been established based on data of the Ministry of Education about graduates from the last three years, set against the National Insurance Institute data about the number of university graduates who are officially registered as unemployed according to the Employment Agency data as towards March 2010. This indicator has a negative sign to it in order to emphasize the fact that its increase reflects a negative effect, unlike the other indicators where increase indicates a positive effect.

Unemployment is one of the undesired social occurrences both in personal and professional aspect. Each further year of education is expected to increase a person's competitiveness on the labour market. From a macro-economic perspective, education is expected to increase labour efficiency for industry, and thus result in increased GDP or in the possibility of having more free time while maintaining the same GDP.

With this indicator we have full match between personal and public expectations. For this reason and because information has been acquired from an official register, unemployment among university graduates has been attributed relatively large weight compared to the other indicators. The data are relevant towards March 2010.

Information source: National Insurance Institute

Indicator 6.3 Professional development and career in the chosen field of study

Percentage of permanently employed graduates from Bulgarian universities for the last three academic years working in the professional field they have graduated from

This indicator shows the percentage of Bulgarian university graduates from the last three years working on permanent labour agreements in professional fields that match those of their university education. The indicator has been formed on the basis of information provided by the Ministry of Education about university graduates from the respective professional field at the respective university for the last three years, and on data from the Employment Contracts Register with the National Insurance Institute towards March 2010. The indicator provides information about the percentage of persons working on permanent labour agreements, whose professional field studied at university matches their profession.

This indicator measures the degree to which university graduates use what they have learnt at university in their jobs. The greater the match, the more efficient both the private and the public investments made in education. Of course, there are increasingly numerous kinds of knowledge, skills and qualities that are universally needed and easily transferrable from one job to another. Those include language skills, being good with figures, computer skills, communication skills, analytical skills. The list is infinite. On the other hand, there is specific knowledge applicable to the separate professions, the mastering of which often requires a lot of resources. Let's provide an example with someone with a medical degree working as an administrator. Obviously, part of the investment they and society have made in an (very expensive) education are not put to a great effect. The same is true about all university graduates who settle into jobs that require lesser qualification.

Information source: National Insurance Institute

Indicator 6.4 I gained confidence that I will succeed in life

Average assessment by students measured on a scale of 0 to 100

This indicator shows the degree to which students have gained confidence that they will be successful in life as the result of their university education. The indicator has been calculated as a balance value of all responses, where positive responses (by respondents who have fully or partially gained confidence) add weight in the positive direction, while negative responses (coming from those who have not gained any confidence at all, but have even become less confident) add weight to the negative. Finally, the result has been transformed into items from 0 to 100, where 0 points would go to a university that has made all of its students absolutely insecure (fortunately, such a school does not exist), and 100 points would be granted to a university whose



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students have become absolutely confident in their future (it is not realistic of us to expect that such a school exists). The data are by university and professional field.

Information source: Sociological survey from April-June 2010.

Indicator 6.5 I created important contacts and friendships

Average assessment by students measured on a scale of 0 to 100

This indicator shows the degree to which students have managed to create important contacts and friendships as the result of their university education. The indicator has been calculated in the same way as the previous one. Finally, the result has been transformed into points of 0 to 100, where 0 points would go to a university where not even one student has managed to create any important contacts or friendships, and 100 points would be granted to a university where every single student has created important contacts and friendships. The data are by university and professional field.

Information source: Sociological survey from April-June 2010.

Indicator 6.6 Employers' preferences

Assessment of employers' preferences measured on a scale of 0 to 100

This indicator comprises an assessment of employers' preferences, measured on a scale of 0 to 100. Employers have had the possibility to select the five universities they best prefer, together with the respective majors. These are the universities teaching majors which the respective employers prefer to employ at their companies or organizations. For example, an employer may point out that they prefer to appoint lawyers from the Higher School of Legal Sciences and economists from the Regional Economic Institute. Employers' choices are reflected both by the demand for specialists with a certain kind of education as determined by the company's or organisation's profile, and by employers' opinion of the respective university. In both cases, employers' express preferences are of interest to both students and applicant students who seek to increase their chances of good professional realization. The data are by university and professional field.

Information source: Sociological survey from April-June 2010.