Technology of programme and institutional ranking of higher education institutions of the Republic of Kazakhstan on areas and levels of studies

R.G. Seidakhmetova, K. Sh. Shunkeyev

This technology is universal in a sense that it allows ranking of higher education institutions of the Republic of Kazakhstan both in general and also differentiated for education programs of the specialists' training in the three-dimensional structure of academic titles: bachelor - master – doctor of philosophy (PhD).

It also provides rating of the teaching staff of the Republic of Kazakhstan as a whole and each of higher education institution based on their contribution to the education and science.

The following publicly available sources of the Ministry of Education and Science of the Republic of Kazakhstan and international e-resources were used under the framework of rating survey of higher education institutions: information on institutional and specialized accreditation of higher education institutions, education grants, about "Gold medal" badge holders, state grant "Best teacher of the higher education institution", state awards and scholarship holders for the development of science of the Republic of Kazakhstan, holders of academic grants, patents and inventions, as well as publications on Hirsch index (ISI Web of Knowledge), Thomson Reuters and Scopus.

The structure of the criterion and indexes for all three levels is identical and consists of 5 indicators.

The input indicators include institutional accreditation of the higher education institution and specialized accreditation of educational programs in three levels of specialists' training (bachelor, master and doctoral studies).

Indicator **"the highest concentration of talented students, teachers and researchers"** consists of two parts: students and lecturers. All of the students are enrolled in a special education program, including those studying on a scholarship grant (including a rural quota), a Gold Medal award holders, and graduates of the last three years holding a diploma with distinction. All personnel faculty members

and their achievements are recorded based on the breakdown of the higher education institutions of the Republic of Kazakhstan: academic titles, state and nominal awards, scientific scholarships "Best Teacher of the higher education institution" and management of the scientific grant of the Ministry of Education and Science of the Republic of Kazakhstan, holders of the International Scholarship of the President of the Republic of Kazakhstan "Bolashak".

The indicator **"academic mobility"**, mainly takes into account professors and students coming from a far abroad to the higher education institution, as well as professors and higher education institution's students visiting distant foreign universities, as well as the availability of joint educational programs with distant foreign partners on dual degree education.

In the indicator "**graduates competitiveness**" the main indice is the employment of 2016 graduates, trained on the rural quota, educational grant and on the basis of the contract.

The indicator **"competitiveness of scientific publications of the course teachers"** takes into account Hirsch indices (h-index) for ISI Web of Knowledge, Thomson Reuters and Scopus, as well as patents and inventions. These indicators are absolutely independently determined from these international electronic resources.

In the ranking of the bachelor's educational programs all indicators refer to students and teachers, and in ranking of the educational programs of the master and doctoral studies, all indices refer to the master degree holders and doctoral candidates, respectively.

According to the methodology of the ranking of educational programs, a special computer program has been developed for processing the database and verifying the reliability of indicators, provided by higher education institutions.

The sum of the indicators for the bachelor programs - I (B) is calculated by the formula: I (B) = I_0 + $\sum_{i=1}^{n} N_n * k_n$ or I (B) = I_0 + $N_1 * k_1 + N_2 * k_2 + N_3 * k_3 + N_4 *$.

where N_1, N_2, N_3, N_4 - the sum of scores, gained according to the indicators I_1, I_2, I_3, I_4 respectively. I_0 - input data on the higher education institution; I_1 - high concentration of talented students, teachers and researchers; I_2 - academic mobility; I_3 - the competitiveness of graduates; I_4 - competitiveness of scientific publications of the course teachers; k — weight coefficient of the indicator (Table No.1).

If we take into account that all indicators, except for I_0 are equal, i.e. their input to the total score is the same, then the coefficients will be equal: $k_1 = k_2 = k_3 = k_4$ and has a value of $k_n = 0.25$. If necessary, their priorities are managed through the same coefficients.

The sum of the scores for the master's degree -I (M) as well as for the doctoral studies - I (D) is determined in a similar way. However, the content of the indicators will mainly be aiming at the achievement of master degree holders (Table No. 2) and doctoral students (Table No. 3).

In general, the overall score of the specialty/course (educational program) of the higher education institution is determined by summing up the scores gained through the bachelor, master and doctoral studies:

$$I = I(B) + I(M) + I(D)$$

The computer program allows summarizing the scores of the specialty on a three-level structure (bachelor studies - master program – doctoral studies) and on the basis of these data to determine the rating of the educational program in the areas of training of all institutions of higher education of the Republic of Kazakhstan.

Thus, based on the received database the program allows ranking specialties (educational programs) by:

• Institutions of higher education entered in the Rating-2017.

• The rating of the higher education institutions of the Republic of Kazakhstan on educational programs in accordance with the levels and areas of specialists' training.

• General rating of higher education institutions in the Republic of Kazakhstan in the areas of training specialists in the levels: BA - MA - PhD.

• General rating of teaching staff of higher education institutions of the Republic of Kazakhstan (TOP-50).

Objectivity of data is provided by a computer program from the database of the national and international information resources, and, therefore, their paper format is not required.

Table 1 - Criteria and indicators of the ranking of the educational program of the HEI's undergraduate program

No.	Criteria and indicators	Weight, %
	I_0 (HEI's original data)	**I_0**

	1. HEI: _____
	2. Data on institutional accreditation: accreditation agency's data
	  • National
	  • International, including national
	3. Status of the educational programme: **Bachelor**
	4. Training area: education
	5. Course (educational programme): 5B011000 - physics
	6. Data on specialized accreditation: agency data:
	  • National	

		• International, including national	
1		**High concentration of talented students, teachers and researches (I_1)**	**0,25, 25%**

	1.1	**Students**
		                     Total: _____
		Full-time: _____
		Including:
		Education grant: A. Ivanov
		Based on the agreement: _____
		Part-time: _____
		Including:
		Education grant: A. Ivanov
		Based on the agreement: _____
		"Gold medal holders": A. Zhanbolov
		Graduates with distinction:
		In 2016: A. Zhanbolov
		                     In 2015: A. Yerbolov
		                     In 2014: B. Esbolov	

	1.2	**In-service teachers**
		Total:
		Including:
		With academic titles: _____
		Including:
		Doctors of sciences: A.A. Ivanov
		Candidates of sciences: B. Markov
		PhD: A. Nurbolov
		Laureates of the state awards of the Republic of Kazakhstan:_____
		Laureates of the nominal awards by the Ministry of Education and Science of the Republic of Kazakhstan (K. Satpayeva, Ch.Ch. Valikhanova, Y. Altynsarina, Kul Tegina, D.A. Kunayeva, M.O. Auezova)**:**
		    A. Zhubayev
		Holders of the state scientific scholarship:
		Zh. Ibrayev
		«The best HEI's award holder» Ministry of Education and Science of the Republic of Kazakhstan:
		    A. Abuov
		Supervisors of the state grant by the Ministry of Education and Science of the Republic of Kazakhstan: B. Mamyrov
		Holder of the International Scholarship of the President of the Republic of Kazakhstan "Bolashak" 2011-2016: A.A. Abakanov	

2		**Academic mobility (I_2)**	**0,25, 25%**
	2.1	Visiting professor (professor of PhD holder) from **far abroad**, conducting classes and taking an exam on the taught discipline of the basic (BD) or majoring (MD) cycle of the course in 2015-2016 and 2016-2017 academic years: **N. Itoh**	
	2.2	Teacher (Doctor Ph.D.) of the majoring department, who conducts studies in universities or studies in scientific centers of foreign countries	

		in 2015-2016 and 2016-2017 academic years: **A.Maksimov**	
	2.3	Students from far abroad who studied for one semester in the HEI of far abroad in 2015-2016 and 2016-2017: **Millen V.**	
	3.4	Students from far abroad who studied for one semester in the HEI of far abroad in 2015-2016 and 2016-2017: **A. Ospanov**	
	3.5	Joint educational programmes with the foreign partners on dual degree education:	
3	**Graduates' competitiveness**(I_3)		**0,25, 25%**
	3.1	**Number of graduates in 2016:** Including: On a rural quota: Total **Including employed in the year of graduation (in 2016): ____** On educational grant: Total **Including employed in the year of graduation (in 2016): ____** Based on agreement Total **Including employed in the year of graduation (in 2016): ___**	
4	**Competitiveness of scientific publications of the course's teaching staff** (I_4)		**0,25, 25%**
	4.1	Publications based on Hirsch index(h-index) по ISI Web of Knowledge, Thomson Reuters: **A. Ivanov**	
	4.2	Publications based on Hirsch index(h-index) of Scopus: **A. Ivanov**	
	4.3	Patents (inventions, useful models, industrial samples, throughout 2012-2017): Republican (**A. Ivanov**) International (**A. Ivanov**)	

Table 2 – Criteria and indicators of ranking the HEI's master level education programmes

No.	Criteria and indicators	Weight, %
	I₀ (HEI's original data)	

	1. Status of the educational programme: **Master studies**
	 2. Area of study: education
	 3. Course (education programme): 5B011000 - physics
	 4. Data on specialized accreditation: agency data:
	   ● Republican
	   ● International, including national	

1	**High concentration of the talented master students**(I_1)	**0,25,**

1				25%
	1.1	Total: Full-time: Including: Education scholarship: _____ Based on agreement: Graduates with distinction: in 2016: in 2015: in 2014:		
2		**Academic mobility(I_2)**		**0,25, 25%**
	2.1	Master students from the far abroad who studied for one semester in 2015-2016 and 2016-2017: **1. M. Tomson**		
	2.2	Master students who studied for one semester at the HEI of the far abroad in 2015-2016 and 2016-2017: • **A. Ospanov**		
	2.3	Joint educational programmes with the foreign partners on dual degree education: • ARGU-Gdansk University		
3		**Competitiveness of master students - graduates of the course**		**0,25, 25%**
	3.1	Number of graduates in 2016:_____ Including employed in the year of graduation(в in 2016) _____		
4		**Competitiveness of scientific publications of the course's master students**		**0,25, 25%**
	4.1	Publications based on Hirsch index(h-index) по ISI Web of Knowledge, Thomson Reuters: **A. Ivanov**		
	4.2	Publications based on Hirsch index(h-index) of Scopus: **A. Ivanov**		
	4.3	Patents (inventions, useful models, industrial samples, throughout 2012-2017): Republican(**A. Ivanov**) International (**A. Ivanov**)		

Table 3. – Criteria and indicators of ranking the HEI's doctoral education programmes

No.	Criteria and indicators	Weight, %
	I₀ (HEI's original data)	

	1. Status of the educational programme: **Doctoral studies**
	2. Area of training: education
	3. Course (education programme): 5B011000 - physics
	4. Data on specialized accreditation: agency data:
	    ● Republican
	    ● International, including national	

1	**High concentration of the talented doctoral students (I_1)**	**0,25, 25%**

	1.1	Doctors Total: Scientific supervisor in Kazakhstan: Foreign scientific supervisor: Graduates who completed studies with the dissertation paper defense in 2016: in 2015: in 2014:	
2	\multicolumn{2}{l|}{**Academic mobility**(I_2)}	**0,25, 25%**
	2.1	**Doctoral students** from far abroad who studied one semester in 2015-2016 and 2016-2017: 1. **M. Tomson**	
	2.2	**Doctoral students** who studied one semester at the HEI of far abroad in 2015-2016 and 2016-2017: • **A. Ospanov**	
	2.3	Joint educational programmes with the foreign partners on dual degree education: • ___	
3	\multicolumn{2}{l|}{**Competitiveness of scientific publications of the course's doctoral students**}	**0,25, 25%**
	3.1	Number of graduates in 2016: _____ Including employed in the year of graduation(в in 2016) _____	
4	\multicolumn{2}{l|}{**Competitiveness of scientific publications of the course's doctoral students**}	**0,25, 25%**
	4.1	Publications based on Hirsch index(h-index) по ISI Web of Knowledge, Thomson Reuters: **A. Ivanov**	
	4.2	Publications based on Hirsch index(h-index) of Scopus: **A. Ivanov**	
	4.3	Patents (inventions, useful models, industrial samples, throughout 2012-2017): Republican(**A. Ivanov**) International (**A. Ivanov**)	