DEVELOPMENT OF THE NATIONAL SYSTEM OF INTERNATIONALLY COMPARABLE INDICATORS OF FORMAL EDUCATION-

CASE STUDY FOR A NON-OECD COUNTRY

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Abstract

Measurement of development of particular processes of knowledge has been recently the research topic of many institutions and experts. The awareness of its importance for the efficient policy has been increasing. The paper consists of two parts. The first is largely methodological; it contains presentation of theoretical framework for the system of formal education indicators, model for organizing indicators within the system and model for description of indicators. The second part focuses on a particular case study on the development of a national system of formal education indicators in Slovenia. It contains the overview of international and some national lists of indicators, presentation of version of production model used, of proposed structure of indicators, overview of selected list of indicators, example of description of one indicator and results of use of indicators for the international comparison. At the end some main conclusions are presented.

Keywords: Formal education; Indicators; National system of indicators; International comparability; Slovenia

JEL classification: I21, I28, I29

1. Introduction

Measurement of development of formal education and other types of transfer of knowledge has recently been the research topic of many European institutions and experts. It is of high value for conducting efficient and successful education policy. There is an overabundance of indicators on education from different sources, lack of analyses of methodological and practical questions on indicators, and no general agreement on the best theoretical framework for system/list of indicators on education, neither on approaches for their organization within the system nor on best models for description of indicators.

The main goal and purpose of this paper is the presentation of development of the national system/list of indicators (and their description) covering all important dimensions of formal education. By formal education we consider education, which (in most cases) is carried out within the traditional education system/institutions and grants to participant a publicly recognized certificate. Quantitative ordinary (not composite) indicators are our interest here. Our assumption is that the development of such a system is not an easy task.

Our starting point is the definition of the knowledge based society as a cycle of three processes of knowledge – creation, transfer and use of knowledge; and further, to treat formal education as one part of the transfer of knowledge (Svetlik & Pavlin, 2004; Pavlin, Svetlik & Bevc, 2005). The following represent research questions in developing such a system of indicators: (a) what (general) approach to employ in the development of a national system of indicators for formal education (and other forms of transfer of knowledge – TK), (b) what are the methodological and practical questions on indicators important for the development of such a system, (c) what theoretical framework is the most useful for the formation of such a system, (d) what approach is most useful for organizing indicators in the system, (e) which indicators are, among those available in international literature and statistical sources, the best and (f) what is the best description of indicators (model of description) that allows their most valuable use.

A case study on the development of such a national system of indicators, which includes seeking the answers to the above-mentioned questions, was Slovenia, a new EU member state with gross domestic product (GDP) per capita of 17,076 EUR (year 2007; 69% of the average GDP per capita in purchasing power parities for EU-27; Statistical Office of the Republic of Slovenia – SORS, 2008). Slovenia is not a member of the OECD, which is an important fact, since it is for OECD countries that the largest range of indicators on education has been developed and used. For non-OECD countries the development of a national system of indicators on education is a far more challenging task.

The paper is based on the results of a comprehensive research project on factors and indicators of the development of knowledge based (Slovene) society (Bevc et al. 2004, 2005, 2006) financed by the Slovene Ministry of Education and Sport, and Slovenian Research Agency. The structure of the paper is as follows: It consists of two parts. The first part is mainly methodological and the second one is more practical. The latter presents the development of a concrete national system of indicators of formal education in a single country (Slovenia). It contains the overview of international and some national lists of indicators, the description of version of production model used, proposed structure of indicators, selected list of indicators, example of description of one indicator and results of the use of indicators in analysis. The main conclusions are presented at the end.

2. Broader Context and Methodology

Broader context. Formal education has been observed within the broader context of "transfer of knowledge" and consequently the same remained valid for the indicators for this education. Transfer of knowledge presents one of three processes of the "knowledge cycle", characteristic of the knowledge based society; the other two processes in this cycle are the creation of knowledge and the use of knowledge. The main types of transfer of knowledge are the following: formal education, non-formal education and informal learning. The main goal of the above-mentioned project, on which the paper is based, was the formation of a national system/list of indicators for the continual tracking of development of particular processes and dimensions of the knowledge based society. For this reason the course of work in the project can actually suggest a possible path in the formation of such a system/list of indicators (of formal education, other types of transfer of knowledge, creation of knowledge) for a single country. The main phases of this path will be presented in the paper.

Questions on indicators. In the process of development of the national system of indicators of formal education and other processes in the knowledge based society many methodological and other questions on indicators have to be answered. They can be divided into two groups (Bole-Kosmač, 2005): (a) questions from the overall methodology of indicators for social development and (b) questions connected with the practical use of indicators. The first group consists of the following questions: relationship between data and indicators, theoretical framework for indicators, selection and systemisation of indicators, functions of indicators (descriptive, analytical, operative), mobilisation strength of indicators (mobilisation for action), disaggregating of indicators, level of indicators (institution/school, town, region, state) and composite indicators. And the second group consist of the following: clear and precise definition of indicators, principle of selectivity, principle of stability, international standardisation of data/indicators and their international comparability,

indicators and goals, considering the broader context in the "reading"/interpretation of indicators, indicators for national particularities, overburdening of respondents, structuring of indicators within the system/list and mode of presentation of indicators in the system/list.

Organization of indicators within the list/system. Among the above-mentioned questions the structuring of indicators within the system is especially important. There is no general agreement on the best approach for the organization of indicators of particular types of knowledge transfer (and knowledge creation). On the basis of studying the available systems/lists of indicators and approaches used we consider the production approach/model (input-process-output model), where creation and transfer of knowledge are considered as production processes with inputs, process and results (direct and indirect), as the best reference theoretical model for grouping the above-mentioned indicators. In literature we have observed different versions of the production model. Our version of this approach is more precisely explained later on.

Model of indicators' description. For valuable application of indicators in analysis or (more precisely) for a comparison of different countries, precise information about them is required. The model of description of (elsewhere) available indicators developed by Bevc and Bole-Kosmač (2006) on the basis of (rare) literature (Unesco, 2005a; Institute of Macroeconomic Analysis and Development, 2002), our experiences on international comparisons and the methodology on indicators investigated in the already mentioned project includes the following elements: title of indicator and its disaggregating, broader field of indicator by the extended production model (including synthesis field and context) and the narrower field, explanation what indicator measures (its contents), method of calculation (descriptive), source of data for indicator, precise methodological explanation (if required), international sources, frequency of publishing, additional information for country observed (availability of calculation, source of data, available time series) and notes for indicator. An example of description of one indicator is presented later on.

3. National System/List of Indicators of Formal Education – Developed in Case Study for Slovenia

3.1. International and Some National Lists/Systems of Indicators

The overall approach has already been described; in this chapter it will be concretized. We have analysed many international systems/lists of indicators (see EC, 2005a), among them especially those developed by experts of following institutions:

- OECD - published in publications: *Education at a Glance – OECD Indicators, Education Policy Analysis* and *Human Capital Investment*;
- Unesco - published in publication *Global Education Digest* (Unesco, 2003, 2004, 2005);
- Eurostat in collaboration with Eurydice or European Commission - published in publications: *Key Data on Education in Europe* and *Education across Europe*;
- United Nations Development Programme (UNDP) - published in publication *Human Development Report* (UNDP, 2004);
- National Center for Education Statistics (NCES) - published in publication: *Comparative Indicators of Education in the United States and other G8 Countries* (NCES, 2004); and
- European commission (EC): list of indicators for the realization of the Lisbon strategy (29 indicators; EC, 2003; CEC, 2005) and many different critical responses of experts on them (Desjardins et al., 2003; Kaiser, 2004).

We also made a precise investigation of the data sources for indicators within the above-mentioned publications. Among national systems/lists of indicators we have analysed some cases for old EU member states - EU-15 (Desjardins et al., 2003). For Slovenia, we analysed key available systems/lists of indicators for transfer of knowledge with an emphasis on formal education and data sources for them.

As two key international systems/lists of indicators for formal education we consider the following two: (a) system/list of OECD published in publication *Education at a Glance – OECD Indicators,* and (b) system/list of Eurostat-Eurydice published in publication *Key Data on Education in Europe*.

The main characteristics of these two systems of indicators are presented in Table 1. Each of them has its own special advantages and disadvantages. For Slovenia till 2007 the main disadvantage of the OECD list is the fact that the country is not a member of the OECD and calculations of indicators were not included in the above-mentioned OECD publication (in publication for 2007 and 2008 Slovenia is included). This limited the use of these indicators for national analysis and for comparison to other countries (till 2007), since for many of them, calculations are not available. On the other hand, Slovenia has been included in the second publication, but for reasons of a local nature till 2007 it did not include any data for indicators on expenditure on education.

Main characteristics of some of the national systems of indicators for formal education analysed are presented in Table 2.

Table 1
Characteristics of Two Key International Systems/Lists of Indicators on Education - Publications of OECD and EU-Eurostat

Characteristics	Education at a Glance – OECD Indicators	Key data on Education in Europe
Institution/organization	OECD	EU (Eurostat-Eurydice)
Number of countries included	About 40	About 30
Period of publishing	Annually, from 1992 (except at the beginning)	As a rule every 2 years from 1995
Targeted population	Educational policy makers, experts on education, also employers	Educational policy makers, civil society
Purpose	To inform on operating of educational systems and as support for implementation of efficient educational policy	For measuring national efforts of EU countries in education
View on education (comprehension of education)	As a factor of economic development; for this reason state and employer have to invest in education	Education is of fundamental importance for employment
Themes analysed/observed	Priorities among them have been changing, but some of them are standard (expenditure on education)	Some of them are included over the entire period of publication's existence, some of them only periodically
Context of education –its consideration	Till the year 2000 it was considered directly (as one of the themes with more indicators) and indirectly. From then on it is included only indirectly (indicators of context are included in other themes – with different labels)	It is considered directly (as the theme with indicators)
Context of education - contents	• till 2000: directly (the size of school population, educational attainment of adults), indirectly (learning environment and organization of schools) • after 2000: previous indicators are included in outputs of educational institutions	Demographic characteristics of population, enrolment in education, labour market (unemployment, employment), occupations
Model used for organising indicators	Production model (inputs-process-outputs)+broader context of education	Description of educational system (process, contents)
Methodology for indicators	It has been changing – developing	Smaller changes, appearance of new indicators
Use of standards, benchmarks	Indirectly (relative standards)	Indirectly (relative standards)
Use of benchmarking	Indirectly	Indirectly
Quantitative and qualitative indicators/data	Only quantitative	Both; the percentage of quantitative indicators has been increasing
Total number of indicators (KDE) or groups of indicators (OECD)	Number has been falling (in 2008 - 28)	It has been changing (1995 – 122; 2002 – 138; 2005 – 110 quantitative indicators)
Main sources of data for indicators	UOE questionnaire	UOE questionnaire, Eurydice
Use in national systems/lists of indicators	Quite a lot	Less
Reference manual	For international comparisons	For EU countries
Trends	Conversion (to make uniform) of indicators and themes captured	

Sources: OECD (Education at a Glance – OECD Indicators), different volumes (the last – 2008); Eurostat-Eurydice (Key data on education in Europe), different volumes (the last – 2005); Desjardins et al., 2003 (Benchmarking education and training systems in Europe: An international comparative study).

Note: KDE – Key Data on Education in Europe; UOE – Unesco-OECD-Eurostat.

Table 2
National Systems of Indicators for Education (first of all Formal) in EU-15 Countries – Main Characteristics

	Characteristic of national publication with system/list of indicators on education
Variety of national initiatives	1. making short documents after publishing volumes of publications of OECD (EAG) or EU (KDE) 2. making national version of international publications on indicators, using the same structure of indicators and themes used in the above-mentioned publications (OECD – EAG, EU-KDE) 3. use of international data for supplementing national indicators
Variety of sources	National (main – statistical office) and international (main – OECD – Education at a Glance, OECD Indicators)
Grouping of indicators (theoretical approach)	- groups of indicators: context, inputs, process, outputs - connection between these groups of indicators is lacking
Way of the use and analysis of indicators	MOST OFTEN: separately, not as a system DESIRED: thematic (by questions, which are main for the national policy); such approach is used in OECD publication "Education Policy Analysis"
Interest in synthesis and combined indicators	It is presented (on the basis of OECD publication "Education Policy Analysis"), but in national publications progress in this direction has not yet been seen

Sources: Scheerens and Hendriks, 2002; Desjardins et al., 2003.
Note: EAG – Education at a Glance, OECD Indicators; KDE – Key Data on Education in Europe.

3.2. Version of Production Model Used in Organizing the Indicators into the System/List

Within theoretical approaches for grouping the indicators of formal education we have found as most useful the above-mentioned production model (inputs-process-outputs). This model is used in the majority of international and national systems/lists of indicators of formal (and other) education, but in different versions; the greatest differences we have found in the case of "results". In some cases a unified category is used and is titled "outputs"; in others two types of results are distinguished with regard to the level observed (an individual, institution, etc.): (a) individual level - outcome: learning results at the level of an individual like knowledge, skills, values, beliefs; (b) aggregate level - output: "output of educational institutions" in the sense of graduation or education attained; among these indicators in some cases also indicators of inputs (access, enrolment) or process (progression through the system, mobility) are included.

Alongside these two possibilities for defining "results" there is also a third, whereby both of the above-mentioned types of "results" are considered as "direct" (immediate) results, in opposition to "indirect" results. The latter are impacts of formal education in a broader environment (changes in other sectors), which appear with a certain time lag. This group of

indicators some experts consider as an independent group and name it "indicators of impact or long-term outcome".

In our version of the model of indicators for formal education we include the following categories: inputs, process, results, context and synthesis field/indicators. With particular elements of the production model we consider the following:

1. *Inputs*: students enrolled, teachers, financial resources devoted to education, time of students devoted to education and infrastructure (network of institutions, programmes, information communication technology equipment – ICT equipment).
2. *Process*: progress of students within educational system (within particular levels of education, between them, etc.); quality of instruction (besides characteristics of teachers, which are included among inputs); indicators, which are result of policy of access (context), enrolment (inputs) and progress in the system (process); in the latter case we have in mind expected duration of schooling (which can be observed separately for levels of education and in different time perspective).
3. *Results*: divided into direct (immediate) results, which can be observed at different levels (individual student, educational institutions, region, state, etc.) and indirect results, by which we consider effects of education in a broader environment.

By *context* we consider the size of school population for formal education and many characteristics of educational system, which influence this education (on inputs, process and results). Context, as it has already been mentioned, can be observed for total formal education or for particular levels of education (by International Standard Classification of Education – ISCED). Besides the above-mentioned indicators, directly connected with formal education, valuable conclusions from international comparisons are possible only if some indicators from the broader context (such as the attained level of economic development, size of the country) are considered as well. And into *synthesis field* we include mainly those indicators which cover all levels of formal education.

Regarding the separate observation of particular levels of education it is important to stress that this is reasonable only in the case whereby the remainder levels of education are also taken into consideration; otherwise the wrong conclusions may be drawn on the basis of international comparisons. This is especially true in the case of the first two levels of education by ISCED (primary and secondary). In the case of these two levels of education there are large differences among countries (in their duration and other characteristics). For

these reasons, in international comparison of indicator "rate of enrolment in education" it is more valuable to observe "rate of enrolment in primary and secondary education together" than separately for each of this two levels.

3.3. The (Proposed) Structure of a National System/List of Indicators

Before selection of indicators from different sources we developed the proposal for the structure of a national system/list of indicators for formal education for the case study – Slovenia. It is presented in the Appendix (Table A). This proposal also includes information on the main international and national sources (the latter in the case when Slovenia is not included in international publication) for a particular indicator or groups of indicators. It is reasonable that the system/list and grouping of indicators are adjusted to their users. In the case of the research project which forms the basis for this paper the potential number of users is quite high. The proposed structure of indicators and broader list of indicators we checked in a workshop with representatives of the financers of the project, users and other experts.

3.4. Overview of Selected List of Indicators, According to which Precise Description and Use for International Comparison was done

On the basis of the above-mentioned proposed structure of indicators we selected 97 indicators from the following publications with the systems/lists of indicators of formal education: Education at a Glance – OECD Indicators 2004 (OECD, 2004), Key Data on Education in Europe 2002 (Eurostat-Eurydice, 2002) and 2005 (Eurostat-Eurydice, 2005), Education across Europe 2003 (Eurostat-EC, 2003), Global Education Digest 2005 (Unesco, 2005), Report on the Performance and Progress of Education and Training Systems in Europe - Indicators and Benchmarks – 2003 (EC, 2003a) and Progress Towards the Lisbon Objectives in Education and Training - Report 2005 (CEC, 2005). This list of indicators is presented in Table A in Appendix.

In addition to the title of indicator and international source in the list of selected indicators the following information for each indicator was also included: (a) inclusion of indicator among Lisbon indicators, (b) the possibility of its use as a substitute indicator for any other indicator selected, (c) our assessment if it can be considered as a key indicator for the description of the situation in formal education (selected smaller number of indicators with broader message strength), (d) availability of figures (calculation of indicator) for Slovenia.

Among the 97 indicators presented and described in study Bevc and others (Bevc et al., 2006) figures for Slovenia are available for approximately half of them but calculation is also possible for the rest of them. Indicators are grouped into the following fields: synthesis field, context for entire formal education, primary and secondary education altogether, and tertiary education. Indicators for primary and secondary education are presented in one joint-group (reasons already mentioned); indicators for tertiary education are presented as a separate group. Within particular fields (except for the context) indicators are grouped according to the production model: inputs, process, indirect results, and direct results. Within primary and secondary education a narrower context of this education was also included. Within each of the above-mentioned and more detailed groups of indicators (in the case of inputs: enrolled, teachers, etc.) a grouping of indicators on the basis of their contents was, for reasons of higher transparency, further employed (for example, in the case of enrolled: enrolment ratios, type of institutions, etc.). In the synthesis field there are indicators which cover different levels of education.

In view of the above-mentioned fields, the structure for the selected (and described) indicators is as follows: approximately one-third of indicators present indicators of the synthesis field (which simultaneously covers more levels of education), one-third of indicators present those for primary and secondary education, and one-third indicators for tertiary education. Taking into consideration another dimension of the selection of indicators (production model) greatest (relative) attention was devoted to indicators on financial resources (and the system of funding), which presents one subgroup of "input" indicators.

3.5. Example of Description of One Indicator from the National System/List of Indicators – for Slovenia

On the basis of the model of description of indicators presented in chapter on Broader Context and Methodology, all 97 indicators from the national system/list of indicators were described in the above-mentioned study. For illustration we present the description on one indicator (Table 3), where Slovenia in time of our analysis was not included in the international source for indicator used – OECD publication Education at a Glance.

Table 3
Description of One Indicator from the National System/List of Indicators of Formal Education

	Element/characteristic	Description
1.	*Title of indicator and its disaggregating*	*Expenditure on educational institutions per student – percentage of GDP per capita (levels of education, programmes of tertiary education, ISCED 1-6 altogether)*
		Disaggregating of indicator: (1). by all levels of education by ISCED, including pre-primary level (ISCED 0-6); (2). for primary, secondary, tertiary education; (3). by types of programmes in tertiary education (A, B) with expenditure on R&D included or excluded
2.	*Broader field of indicator by the production model and the narrower field*	Synthesis field of formal education – inputs – financial resources (per student)
3.	*What indicator measures*	Relative size of annual public expenditure on educational institutions per student in comparison to GDP per capita (%)
4.	*Method of calculation (descriptive)*	*Numerator*: annual expenditure on educational institutions per student (at the level or programme observed – with expenditure on R&D included or excluded) *Denominator*: GDP per capita *Quotient* is multiplied by 100
5.	*Source of data for indicator*	UOE questionnaire, national accounts, demographic statistics
6.	*Precise methodological explanation*	OECD, EAG 2008 on website (http://www.oecd.org/edu/eag2008) Students are expressed in full-time equivalents
7.	*International sources*	OECD, EAG, 2008 (indicator B1.4; data for 2005)
8.	*Frequency of publishing*	Regularly every year (from 1996), but for all levels of education only in volumes 2003-2008 and 2000
9.	*Slovenia*	*Calculation*: yes – in publication cited (in volumes for 2007 and 2008); otherwise from the year 2005 calculation is available from Slovene statistical office (SORS, 2005, 2007, 2007a) *Source of data*: see point 5 *Available time series*: yes
10.	*Notes for indicator*	*Advantages*: Calculation is available for all levels of education by ISCED and altogether for ISCED 1-6, at the same time for tertiary education also very disaggregated (programmes, with R&D expenditure included or excluded) – see "disaggregating" of indicator (point 1) *Disadvantages*: • Time series analysis is limited for some disaggregating (see point 8 – frequency of publishing) • In the available international source till 2007 Slovenia was not included. *Others*: • It is the Lisbon indicator.

Notes: GDP – gross domestic product; originally (in study Bevc et al., 2006) the last volume of international source considered was for 2004 (OECD, 2004).

3.6. Use of Indicators of Formal Education for the Analysis – Comparison of Slovenia with Other Countries

From the 97 indicators presented in Appendix (Table B), from the illustration prospect how to use the selected indicators 21 were used for the analysis – comparison of Slovenia with other countries. We direct our attention on the indicators of the synthesis field on one side, as they include a comparison between different levels of education. On the other hand, we focused on indicators for financial resources and the system of funding for formal education, mainly for the following reasons. Firstly, because use of indicators and explanation of their values in this field is very often wrong. And secondly, in period 1995-2005 no internationally comparable data on expenditure on education were available in the country, which has resulted in a lot of inaccurate statements and general impressions regarding the size and structure of this expenditure. On the basis of the use of indicators in analysis the main results for Slovenia are as follows.

The *stock of knowledge/education* obtained by formal education is lower in comparison to the average for the EU-25. This is valid for both, the current stock (measured according to average years of schooling or by percentage of population with tertiary education), and the expected stock (measured by the expected number of years of schooling for 5-year olds).

The *process* by which formal education is carried out we measured by the quantity (number of hours) of instruction in compulsory education and the average number of foreign languages learned per student in secondary education. By hours of instruction, Slovene pupils are less burdened in comparison to the average situation for EU-25; on the other hand, at least in secondary education they learn more foreign languages than on average in EU-25.

Students and graduates in tertiary education: international mobility of students (percentage of students abroad) is smaller than on average in EU-15; relative number of graduates in science and technology has been increasing faster, but is still slightly lower than the EU-25 average.

Expenditure on education in Slovenia is relatively high in comparison to the average for EU-25 by almost all indicators observed based on national sources (SORS, 2005, 2007, 2007a), on some international sources available till 2007 and also the new one (OECD, 2007, 2008) with data on Slovenia included.

Here it is important to emphasize that for purposes of overall/complex comparison of the situation in formal education it is necessary to consider, in addition to the above-mentioned indicators, other indicators as well.

4. Conclusions

Development of the national system of internationally comparable indicators of formal education is of special importance for designing efficient and successful education policy.

Within this paper formal education has been observed within the broader context of transfer of knowledge and "knowledge cycle". This context presents the theoretical framework for the development of a national system of indicators for formal education. Among different approaches employed in organising the indicators the production model was used, extended by two additional elements – context and synthesis field. Besides this model of description of indicators was developed, which includes the following categories: title of indicator, field of the indicator in production model (inputs, etc.), description of entity measured, formula, source of data, methodology notes, international source of the indicator, frequency of publishing, situation in the country (availability of calculation, source of data, etc.) and notes (advantages of indicator, its shortcomings, others).

The development of a concrete national system/list of indicators was presented for one country – Slovenia, a small new EU-member state. Considering the above-mentioned broader context and methodology, the overview of available (till 2006) international, national and Slovene systems/lists of indicators was presented, followed by a proposal for the structuring of indicators within the system and finally, by an overview of such a system/list of indicators. As key (best) international sources of indicators for development of national system of formal education indicators we consider the OECD publication "Education at a Glance - OECD Indicators" and the EU publication (Eurostat-Eurydice) "Key Data on Education in Europe". The resulting national list of indicators for Slovenia consists of 97 indicators, of which one-third presents indicators of synthesis field (simultaneously covering more levels of education), one-third relating to primary and secondary education, and one-third to tertiary education. The results on the use of one-fifth of these 97 indicators for the analysis – comparison of Slovenia with other countries – are presented as well. In this analysis the greatest (relative) attention was devoted to indicators on financial resources (and system of funding).

Our main conclusion is that the development of the national system of formal education indicators in a country which is not a member of the OECD is not an easy task. On

the other hand our answers to the questions raised at the beginning (for formation of the valid system of indicators) are the following:

1. Theoretical framework: observation of formal education within broader context of entire transfer of knowledge and knowledge cycle is useful.
2. Questions on indicators: there are many, some of them are very important and have to be considered precisely in the development of the above mentioned system.
3. Approach in organizing indicators: our version of production model, extended by context and synthesis indicators, we consider as a good solution.
4. As the best lists of indicators we consider two lists published in the above mentioned series of publication of OCED and Eurostat-Eurydice. The majority of indicators selected are from these two lists.
5. Model for description of indicators: we found our version of the model good for practical use.

Finally, it is also important to stress that for the purposes of analysis of particular questions on formal education, in many cases more indicators (including those outside the "production model") have to be taken into consideration. Some questions which require such an approach are: internal economic efficiency of education, equity in education and effects of the system of funding education on students' study efficiency. In the case of internal economic efficiency of education it is important to combine indicators on financial resources with indicators on progress within the system. In the case of equity in education connection between different indicators from different fields of production model is required, and at the same time, combining of indicators from this model with some indicators outside the model (the contribution of particular socioeconomic groups to the state budget for education; public expenditure on education per household, etc.). These questions/topics exceed the scope of this paper but are extremely important for the proper education policy.

References

Bevc, M., Svetlik, I., Kavaš, D., Kovačič, A., Pavlin, S. & Stanovnik, P. (2004). *Opredelitev, dejavniki in mehanizmi družbe znanja* [Definition, factors and mechanisms of knowledge based society]. Ljubljana: Institute for Economic Research and Institute for Social Sciences.

Bevc, M., Svetlik, I., Bole-Kosmač, D., Kovačič, A. & Pavlin, S. (2005). *Indikatorji na znanju temelječe družbe – metodologija, pregled, nabori* [Indicators of knowledge based society – methodology, overview, systems/lists]. Ljubljana: Institute for Economic Research and Institute for Social Sciences.

Bevc, M. & Bole-Kosmač, D. (2006). Model opisa indikatorjev [Model for description of indicators]. In M. Bevc et al., *Indikatorji za merjenje prenosa znanja – pregled, opisi, uporaba* [Indicators for the measurement of the transfer of knowledge – overview, description, use] (pp. 3–4). Ljubljana: Institute for Economic Research and Institute for Social Sciences.

Bevc, M., Svetlik, I., Bole-Kosmač, D., Čelebič, T. & Pavlin, S. (2006). *Indikatorji za merjenje prenosa znanja – pregled, opis, uporaba* [Indicators for the measurement of the transfer of knowledge – overview, description, use]. Ljubljana: Institute for Economic Research and Institute for Social Sciences.

Bole-Kosmač, D. (2005). Metodološki in izvedbeni okviri indikatorjev za spremljanje razvoja Slovenije v družbo znanja [Methodological and practical frameworks for indicators for the tracking the development of Slovenia into the knowledge based society]. In M. Bevc et al., *Indikatorji na znanju temelječe družbe – metodologija, pregled, nabori* [Indicators of knowledge based society – methodology, overview, systems/lists] (pp. 3–28). Ljubljana: Institute for Economic Research and Institute for Social Sciences.

CEC (2005). *Progress towards the Lisbon objectives in education and training – 2005 report* (Commission staff working paper, 22.3.2005, SEC(2005) 419). Brussels: Commission of the European Communities.

Desjardins, R., Garrouste-Norelius, C. & Mendes, S. (2003). *Benchmarking education and training systems in Europe: An international comparative study – prepared for the European Commission.* Stockholm: Institute of International Education in Stockholm University.

EC (2003). *A review of the 29 indicators for measuring progress towards the Lisbon objectives* (Document n. 10, 9.12.2003 (LBJ/AV D – 2003)). Brussels: European Commission.

EC (2003a). *Report on the Performance on progress of education and training systems in Europe, 2003 – Indicators and benchmarks.* Brussels: European Commission.

EC (2005). *Overview on international statistical surveys relevant for education and training – Version: 12/4/05.* Brussels: European Commission.

EC (2005a). *Overview on key international statistical publications on education - Version: 10/4/05.* Brussels: European Commission.

Eurostat – European Commission (2003). *Education across Europe – 2003.* Luxembourg: Eurostat - European Commission.

Eurostat-Eurydice (2002). *Key Data on Education in Europe 2002.* Brussels: Eurostat-Eurydice-European Commission.

Eurostat-Eurydice (2005). *Key Data on Education in Europe 2005.* Brussels: Eurostat-Eurydice-European Commission.

Institute of Macroeconomic Analysis and Development (2002). *Poročilo o razvoju* [Development report]. Ljubljana: Institute of Macroeconomic Analysis and Development.

Kaiser, F. (2004). *Towards a coherent framework of indicators for measuring progress towards the Lisbon objectives.* Work in progress. Enschede: Centre for Higher Education Policy Studies.

National Center for Education Statistics (2004). *Comparative indicators of education in the United States and other G8 countries.* Washington: National Center for Education Statistics.

OECD (1998). *Human capital investment.* Paris: Organization for Economic Cooperation and Development.

OECD (2003-). *Education policy analysis - 2003* (and all other previous issueses). Paris: Organization for Economic Cooperation and Development.

OECD (2004-). *Education at a glance – OECD indicators 2004* (and all other previous issueses). Paris: Organization for Economic Cooperation and Development.

OECD (2007). *Education at a glance – OECD indicators 2007*. Paris: Organization for Economic Cooperation and Development.

OECD (2008). *Education at a glance – OECD indicators 2008*. Paris: Organization for Economic Cooperation and Development.

Pavlin, S., Svetlik, I. & Bevc, M. (2005). Strukturiranje polja indikatorjev za prenos znanja [Structuring of the field of indicators for transfer of knowledge]. In M. Bevc et al., *Indikatorji na znanju temelječe družbe – metodologija, pregled, nabori* [Indicators of knowledge based society – methodology, overview, lists] (pp. 333–358). Ljubljana: Institute for Economic Research and Institute for Social Sciences.

Scheerens J. & Hendricks M. (Eds.). (2002). *Benchmarking the quality of education*. Enschede: Universiteit Twente.

SORS (2005). Izdatki za formalno-stopenjsko izobraževanje v Sloveniji, 2001-2003 [Expenditure on formal education in Slovenia, 2001-2003]. *Statistične informacije [Rapid reports]*, (149) (27.6.2005). Ljubljana: Statistical Office of the Republic of Slovenia.

SORS (2005a). *Slovenia in figures*. Ljubljana: Statistical office of the republic of Slovenia. Retreived August 20, 2006, from http://www.stat.si/doc/pub/slo_figures_05.pdf

SORS (2007). Izdatki za formalno izobraževanje v Sloveniji, 2004 [Expenditure on formal education in Slovenia, 2004]. *Statistične informacije [Rapid reports]*, (66) (28.7.2007). Ljubljana: Statistical Office of the Republic of Slovenia.

SORS (2007a). Izdatki za formalno izobraževanje, Slovenija, 2005, 2006 [Expenditure on formal education, Slovenia, 2005, 2006]. Provisional data (7.12.2007). Ljubljana: Statistical Office of the Republic of Slovenia.

SORS (2008). Statistical Yearbook, Republic of Slovenia, 2008. Ljubljana: Statistical Office of the Republic of Slovenia.

Svetlik, I. & Pavlin, S. (2004). Znanje v na znanju temelječi družbi/gospodarstvu [Knowledge in knowledge based economy/society]. In M. Bevc et al., *Opredelitev, dejavniki in mehanizmi družbe znanja* [Definition, factors and mechanisms of knowledge based society] (pp. 12-41). Ljubljana: Institute for Economic Research and Institute for Social Sciences.

UNDP (2004). *Human Development Report 2004.* New York: United Nations Development Programme. Retreived May 4, 2005, from http://hdr.undp.org/reports/global/2004/pdf/hdr04_complete.pdf

Unesco (2005-). *Global education digest 2005 – Comparing education across the world* (and all other previous issues). Montreal: Unesco Institute for Statistics.

Unesco (2005a). *Education indicators - Technical guidelines.* Montreal: Unesco Institute for Statistics.

Appendix

Table A
Proposal for the Structure of Indicators for Formal Education in the System for a Single Country – Case Study, Slovenia

Element of production model/field, group of indicators	Narrower group of indicators/indicator	Indicators – title	Sources of indicators (international[a], national - Slovenia)
CONTEXT			
Demographic potential for formal education	Size of "school" population (current situation, forecasts)	Percentage of population of (theoretical) ages for different levels of education of total population	EAG, KDE
		Index of growth of population of ages for particular levels of education	EAE
Organization of instruction and educational institutions[b]	Age for entry to primary education	Years	
	Duration of compulsory education + (theoretical) age at the beginning and end of this education	Number of years, age	KDE, EAG, EAE
	Duration of schooling at particular level of education (especially for primary and secondary education together) and theoretical age at the beginning and end of these levels of education	Number of years, age	EAG, EAE
	Compulsory/intended number of instruction hours – together and for different subjects	Number of intended instruction hours	KDE
Policy of access to education and progress between levels	External verification of knowledge at particular level of education (leaving examination, etc.)	yes/no, etc.	KDE
	Limitations in access (enrolment) in tertiary education	yes/no; in which fields of study	KDE
System of funding	Presence of tuition fee for full-time study and its relative size	yes/no; % of costs of instructions per student	KDE
INPUTS			
Enroled/students	Number	Gross and net enrolment ratio at particular levels of education (for some other indicators absolute figure is also relevant/important)	EAG, EAE
		Number of enroled per 100,000 inhabitants	Calculation is required (once this indicator was published in Unesco Statistical yearbook)
	Characteristics: gender, age, types of programmes, field of study, mode of study (full-time, part-time), citizenship, students at home-abroad, educational attainment - parents' income, type of institutions (public, private), etc.	Structure by gender, age, etc.	EAG, KDE
Students abroad	Quantity	% of total student body, etc.	EAE
	Characteristics: age, gender, study field, etc.	Structure by age, etc.	EAE
Teachers	Number of teachers	% of economic active population	EAE
	Characteristics (gender, age, education, work experience, earnings, mode of employment, etc.)	Structure by gender, age, etc.	EAG, KDE, EAE

Element of production model/field, group of indicators	Narrower group of indicators/indicator	Indicators – title	Sources of indicators (international[a], national - Slovenia)
Infrastructure	Network of institutions and programmes	Number of institutions and programmes in comparison to number of inhabitants	Slovenia-particular calculations
	ICT equipment[b]	Number of students per computer	KDE
Structure of educational institutions[c]	Public, independent private, state-dependent private institutions (considering funding)	Structure of institutions	KDE
Financial resources and system of funding	Annual public expenditure on education	Per student, % of GDP, % of public expenditure, structure by type of expenditure (current, investment, R&D, others)	EAG, KDE (there is no data for Slovenia), particular/separate studies
	Annual public expenditure on educational institutions	Per student, % of GDP, % of public expenditure	EAG, KDE
	Cumulative public expenditure per student (total expenditure in normal period of duration of study)	Per student	EAG
	State financial support to students (size and structure – fellowships, student loans, other forms)	Per student, % of GDP, % of public expenditure on education, structure	KDE, EAG
	Household expenditure on education	Average expenditure per household	EAE
PROCESS			
Progress in the system and expected duration of schooling	Access + enrolment + progress	Expected years of schooling for particular age groups (till special age, in particular level of education)	EAG, KDE
	Drop-outs in single year	% of enrolled in particular school/level/programe of education in particular year, who drop out (drop out rate in one year)	Indicator which has been developing; in Slovenia.- SORS
	Drop-out rate at particular level of education	% of generation of students enrolled who have dropped out in period observed (official period of study or differently defined period) - drop out rate in one generation (longitudinal approach)	EAE; Slovenia: particular research studies
	Characteristics of students who leave school without its finishing - drop-outs (educational attainment of parents, gender, mode of study, region, etc.)	Structure by gender, educational attainment of parents, etc.	Particular research studies
	Repetition at particular level of education	% of enrolled at particular level of education (first, second), who repeat particular class/school year	EAE; Slovenia: SORS – global approach, longitudinal approach- particular studies
	Repetition at particular level of education in one generation of students (enrolled in particular year) in defined period of time – (longitudinal approach)	% of enrolled at particular level of education in particular year, who repeat one or more school years in observed period (official duration or any others)	Indicator which has been developing; in Slovenia.- particular very rare studies
	Characteristics of students who repeat class/grade of study (in particular level of education, in one generation)	Repeaters by gender, mode of study, socioeconomic background, etc.	Slovenia: particular research studies

Element of production model/field, group of indicators	Narrower group of indicators/indicator	Indicators – title	Sources of indicators (international[a], national - Slovenia)
	Transfer/progress of students between levels of education (by ages)	Division of special age groups (15-29 years) among different levels of education (%)	EAG, EAE
Quality of instruction	Size of classrooms	Number of students per teacher	EAG, EAE
DIRECT (IMMEDIATE) RESULTS			
"Graduates" (enrolled, who have completed a certain level of education)	Number	Per inhabitants (total, of particular ages), graduation rate	EAG, EAE
	Characteristics (age, level of education, mode of study, field of study, gender, etc.)	Structure by gender, etc.	EAG, KDE, EAE
Knowledge of enrolled	Knowledge of pupils in primary and secondary education (reading, mathematical and science literacy)	Average score, structure of students by level of literacy attained	EAG, SIE
Intergenerational transfer of education	Mobility in education among youth (who finish schooling) and their parents		EAE
Stock of educational/knowledge capital[c]	Size of the stock (quantity) – educational attainment of adults	Structure of adults by educational attainment, percentage of those with finished particular level of education (by age)	EAG, KDE, SIAE , population census
		(Actual) average years of schooling of adults	EAG, for Slovenia – particular calculations
	Quality of the stock (knowledge of adults) – functional literacy of adults (prose, quantitative, documentation)	% of population with at least third level of literacy	IALS (OECD- Canada), SIAE
INDIRECT RESULTS (economic and other benefits of education and knowledge for an individual and society)			
Economic benefits (for an individual and for society)	Employment, activity	Rate of employment, rate of activity of particular "educational" categories of population	EAG, EAE
	Unemployment	Rate of unemployment of particular "educational" categories of population	EAG, KDE
	Salaries	Relative earnings of particular "educational" categories of employees	EAG, SORS
	Risk of poverty	Rate of risk of poverty threshold for different "educational" categories	EAE, SORS
	Returns to investment in education	Rate of return to investment in education (for society and an for an individual)	EAG; Slovenia (particular calculation)

Notes:

[a] On average we include only the two most important international sources for a particular indicator; particular indicators are included also in some other international systems/lists of indicators, but most are dependent on these two sources. Where the indicator is derived from another international source, it is mentioned.

[b] This group of indicators is possible to place also among indicators of "process".

[c] This group of indicators is possible to place also among indicators of "context".

Legend: EAE – Education Across Europe, Eurostat; EAG – Education at a Glance – OECD Indicators, OECD; IALS – International Adult Literacy Survey; KDE – Key Data on Education in Europe, Eurostat – Eurydice; SIAE – Slovene Institute for Adult Education; SIE – Slovene Institute for Education; SORS – Statistical Office of the Republic of Slovenia.

Table B

Overview of selected indicators for which precise description by special model was also made and their availability for Slovenia - national case study

Sign of indicator[a]	Indicators – title (also group of indicators and field in the extended production model)	International source[b]	Slovenia-calculation[c]
	S Y N T H E S I S FIELD/INDICATORS		
	I N P U T S – ENROLLED/STUDENTS		
F1	Rate of enrolment of different age groups into formal education (net rate of enrolment)	OECD, EAG, 2004	B
F2	Rate of enrolment of age group 15-24 in formal education (ISCED 1-6) (net rate of enrolment of age group 15-24 into education)	CEC, 2005	A
F3	Pupils and students (ISCED 1-6) aged 5-29 years, as percentage of this age group (gross enrolment ratio of population, aged 5-29 years in all levels of education)	Eurostat, EAE, 2003	A
F4	Gross enrolment ratio of population in formal education (ISCED 1, 2, 3, 2+3, 5)	Unesco, GED, 2005	A
F5	Enrolled, aged 30 years and more – percentage in total number of enrolled (ISCED1-6)	Eurostat, EAE, 2003	A
	I N P U T S – FINANCIAL RESOURCES AND SYSTEM OF FUNDING		
	Total expenditure with an emphasis on public expenditure		
F6	Public expenditure on education – % of GDP (ISCED 1-4, 5-6, 1-6)	OECD, EAG, 2004; Eurostat, EAE (2003), KDE (2005)	A
F7	Public expenditure on education - % of total public expenditure (ISCED 1-4, 5-6, 1-6)	OECD, EAG, 2004	B
F8	Expenditure on educational institutions – % of GDP (ISCED 1-4, 5-6, 1-6)	OECD, EAG, 2004	A
F9[a]	Expenditure on educational institutions – % of GDP (ISCED 1-4, 5-6)	Eurostat, KDE, 2002	A
	Expenditure per student		
F10	Expenditure on educational institutions per student (levels of education, programs of tertiary education), in USD	OECD, EAG, 2004	A (in SIT)
F11[a]	Expenditure in public educational institutions per student (levels of education, ISCED 1-6 altogether), in Euros	Eurostat, EAE (2003), KDE (2005)	C
F12	Expenditure on educational institutions per student – % of GDP per capita (levels of education, programs of tertiary education, ISCED 1-6 altogether)	OECD, EAG, 2004	A
	Sources of funds		
F13	Expenditure of households on education – % of total household expenditure (per household)	Eurostat, EAE, 2003	C
F14	Structure of expenditure on education – public and private expenditure (ISCED 1-4, 5-6, 1-6)	Eurostat, EAE, 2003, KDE, 2005	B
F15	Structure of expenditure on educational institutions – public expenditure and different types of private expenditure (ISCED 1-4, 5-6, 1-6)	OECD, EAG, 2004	B
	Public expenditure on education to private sector		
F16	Percentage of public subsidies to education (by types) to private entities in total public expenditure on education (ISCED 1-4, 5-6)	OECD, EAG, 2004	B (in aggregate form)
F17	State financial support to students – % of total public expenditure (ISCED 1-4, 5-6, 1-6)	Eurostat, EAE, 2003	B
	P R O C E S S		
	Relationship between number of students and teachers		
F18	Relationship between number of students and teachers in public and private institutions by level of education (ISCED 1-6) – calculation on the basis of full-time equivalents	OECD, EAG, 2004	C
	Transfer of students between levels of education		
F19	Enrolment of annual age groups (15, 16, 17, 18, 19 and 20 years) into particular levels of education (ISCED 3, 4, 5-6) (net enrolment ratios)	OECD, EAG, 2004	C
	Expected years of schooling		
F20	Expected years of schooling at particular levels of education (ISCED 1-6) for 5 years old child	OECD, EAG, 2004; Eurostat, KDE 2005	A
F21[a]	Expected years of schooling at all levels of formal education, including pre-primary level (ISCED 0 to 6) in age period 5-65	Eurostat, KDE, 2002	A
	Education and work status of youth		
F22	Percentage of population, aged 18-24 years, with lower secondary education, who are not in education or training (early school leavers)	Eurostat, EAE, 2003	A

Sign of indicator[a]	Indicators – title (also group of indicators and field in the extended production model)	International source[b]	Slovenia-calculation[c]
	D I R E C T OUTPUTS		
	Graduation		
F23	*Gross graduation rate (ISCED 1, 2-3,5A)*	Unesco, GED, 2005	A
	Inter-generation transfer of education		
F24	Mobility between recent school-leavers' educational attainment and their parents' educational attainment (absolute rate of stability, upward and downward mobility)	Eurostat, EAE, 2003	A
	Educational attainment of population		
F25	Structure of population by educational attainment, age group 25–64 years	OECD, EAG, 2004, Eurostat, EAE, 2003	A
F26[a]	Structure of population, aged 25-64 years, by educational attainment and age groups	Eurostat, EAE, 2003	A
F27	Average years of schooling of adults, aged 25-64 years	OECD, EAG, 2004	A
F28	*Rate of employment of population, aged 25-64 years, by educational attainment*	OECD, EAG, 2004	B
F29[a]	*Rate of employment of particular age groups (in overall age group 25-64 years) by educational attainment*	Eurostat, EAE, 2003	A
	Unemployment and education		
F30	*Rate of unemployment of population, aged 25-64 years, by educational attainment*	OECD, EAG, 2004; Eurostat, KDE, 2005	A
F31[a]	*Rate of unemployment of particular age groups (in overall age group 25-64 years) by educational attainment*	Eurostat, EAE, 2003	A
	Earnings, returns and education		
F32	*Relative earnings for different consecutive educational categories of employees (for age groups 25-64 and 30-44)*	OECD, EAG, 2004	B
F33	*Private rate of return to education (ISCED 3, 5-6)*	OECD, EAG, 2004	C
F34	*Social rate of return to education (ISCED 3, 5-6)*	OECD, EAG, 2004	C
	C O N T E X T OF FORMAL EDUCATION		
	Demographic potential		
F35	Percentage of population in ages for particular level of education (primary, secondary, tertiary) in total population	OECD, EAG, 2004	B
	P R I M A R Y AND S E C O N D A R Y EDUCATION		
	C O N T E X T		
	Organisation of lessons/education and educational institutions		
F36	Age for entrance/start of primary education	Unesco, GED, 2005	A
F37	Primary education – duration (in years)	Unesco, GED, 2005	A
F38	Starting and ending age in compulsory education	Unesco, GED, 2005; Eurostat, EAE, 2003	A
F39	Recommended minimal annual number of hours of instructions in full-time compulsory education	Eurostat, KDE, 2005	A
F40	Total number of intended instruction hours in public institutions, for selected age groups of pupils	OECD, EAG, 2004	C
	I N P U T S – ENROLLED/STUDENTS		
	Enrolment ratio, age		
F41	Rate of enrolment of children, aged 3-7 years, in pre-primary (ISCED 0) and primary education (ISCED 1)	Eurostat, KDE, 2005	A
F42	Rate of enrolment of population in formal education at ages at the end of compulsory education	Eurostat, KDE, 2005	A
F43	Net enrolment ratio in primary and secondary education (ISCED 1, 2+3)	Unesco, GED, 2005	A
	Types of institutions and mode of education		
F44	Enrolled in primary and secondary education – structure by type of institutions (public, private, state-dependent private)	OECD, EAG, 2004	B
F45[a]	Enrolled in primary, secondary and post-secondary education – structure by type of institutions (public, state-dependent private, independent private, undefined private)	Eurostat KDE, 2005	A
F46	Enrolled in primary and secondary education – structure by mode of study (part-time, full-time)	OECD EAG, 2004	B

Sign of indicator[a]	Indicators – title (also group of indicators and field in the extended production model)	International source[b]	Slovenia-calculation[c]
	Citizenship, foreigners		
F47	Percentage of foreigners among enrolled in levels ISCED 1-3	Eurostat, EAE, 2003	A
	I N P U T S – CADRES (TEACHERS)		
	Teachers/population		
F48	Percentage of teachers in total economic active population – primary and secondary education (ISCED 1-3), public and private schools	Eurostat, EAE (2003), KDE (2005)	A
	Teachers – age		
F49	Structure of teachers in public and private institutions by age – primary and secondary education (ISCED 1-3)	Eurostat, EAE (2003), KDE (2005)	A
	Teachers – salaries		
F50	Average salaries of teachers in public educational institutions in comparison to GDP p.c. – primary and secondary education (ISCED 1-3)	OECD, EAG, 2004	B
F51[a]	(Minimum and maximum) salaries of teachers in comparison to GDP p.c. – primary and secondary education (ISCED 1-3)	Eurostat, EAE (2003), KDE (2005)	A
	Management personnel – gender		
F52	Percentage of women in the total number of school level management personnel (ISCED 3)	Eurostat, EAE, 2003	A
	I N P U T S – FINANCIAL RESOURCES AND SYSTEM OF FUNDING		
	Total expenditure, public expenditure		
F53	Public expenditure for primary and secondary education (ISCED 1-4 altogether) – percentage of GDP	OECD, EAG, 2004	A
F54	Expenditure on educational institutions in primary, secondary and post-secondary non-tertiary education – percentage of GDP (ISCED 1-4 altogether and by levels)	OECD, EAG, 2004	B
	Expenditure per student		
F55	Expenditure on educational institutions per student – primary, secondary and post-secondary non-tertiary education (in full-time equivalents, in USD) (ISCED 1-4 altogether and by levels)	OECD, EAG, 2004	A (in SIT)
F56	Expenditure per student in public educational institutions in primary, secondary and post-secondary non-tertiary education (in 1000 Euros) (ISCED 1, 2-4)	Eurostat, EAE, 2003	B
F57	Expenditure on educational institutions per student in primary, secondary and post-secondary non-tertiary education – percentage of GDP p.c. (by levels of education)	OECD, EAG, 2004	A
	P R O C E S S		
	Size of classes (number of students per class)		
F58	Average size of classes in primary and lower secondary education by type of institutions (public, private, state depended private)	OECD, EAG, 2004	B
	Foreign languages		
F59	Average number of foreign languages per student in primary and general lower secondary education (ISCED 2-3)	Eurostat, KDE, 2002	A
F60	Structure of students in secondary education (lower and upper) by number of foreign languages learned	CEC, 2005	A
	D I R E C T OUTPUTS		
	Finishing of schooling – graduation		
F61	*Graduation rate in upper secondary education (public and private institutions), by type of programmes (gross graduation rate)*	OECD, EAG, 2004	C
F62	*Graduation rate in post-secondary non-tertiary education (gross graduation rate)*	OECD, EAG 2004	C
	Knowledge of students		
F63	Reading literacy for 15-years old children – average level and structure of children by the attained level of literacy (by PISA scale)	OECD, EAG, 2004; CEC, 2005	B (in preparation)
F64	Mathematical literacy for 15-years old children – average level and structure of children by the attained level of literacy (by PISA scale)	OECD, EAG, 2004; CEC, 2005	B (in preparation)
F65	Scientific literacy for 15-years old children – average level and structure of children by the attained level of literacy (by PISA scale)	OECD, EAG, 2004; CEC, 2005	B (in preparation)
	Stock of educational/knowledge capital		
F66	Percentage of persons, aged 22 years, with at least upper secondary education	Eurostat, 2002; EC, 2003	A

Sign of indicator[a]	Indicators – title (also group of indicators and field in the extended production model)	International source[b]	Slovenia-calculation[c]
	I N D I R E C T OUTPUTS		
F67	*Private rate of return to education for those with finished upper secondary or post-secondary non-tertiary education in comparison to those with lower secondary education*	OECD, EAG, 2004	C
F68	*Social rate of return for those with finished upper secondary or post-secondary non-tertiary education in comparison to those with lower secondary education*	OECD, EAG, 2004	C
	T E R T I A R Y EDUCATION (TI)		
	I N P U T S – ENROLLED/STUDENTS		
	Number of students and rates of enrolment		
F69	Number of students (ISCED 5-6) per 1000 inhabitants	Eurostat, EAE, 2003	A
F70	Percentage of students in tertiary education (ISCED 5-6) among all students	Eurostat, EAE (2003), KDE (2005)	A
F71	New entrants in tertiary education – percentage in population of same ages (net enrolment ratio)	OECD, EAG, 2004	C
F72	Rate of enrolment into formal education for selected age groups after 18 years (net enrolment ratio)	Eurostat, EAE, 2003	A
	Types of institutions		
F73	Structure of students by type of institutions	OECD, EAG, 2004	
	Field and mode of study		
F74	Number of students (ISCED 5-6) in science, mathematics&computing and in engineering, manufacturing&constructions fields per 1000 of population, aged 20-29	Eurostat, EAE, 2003	A
F75	Percentage of students in science, mathematics&computing and in engineering, manufacturing&constructions fields among all students in tertiary education (ISCED 5-6)	Eurostat, EAE, 2003; KDE, 2005	A
	Foreign students in the country and domestic students abroad		
F76	Percentage of foreign students in total enrolment in TI (ISCED 5-6)	Unesco, GED, 2005; CEC, 2005	A
F77	Structure of foreign students in TI by type/level of programmes	OECD, EAG, 2004	B
F78	Structure of foreign students by field of study	OECD, EAG, 2004	B
F79	Students in TI (ISCED 5-6), who study in other EU country, candidate country or EFTA/EEA – percentage among all students (at home and abroad)	Eurostat, KDE, 2005; EAE, 2003	A
	International mobility of students and teachers		
F80	International mobility of students and teachers by Erasmus program	CEC, 2005	A
	I N P U T S – FINANCIAL RESOURCES AND SYSTEM OF FUNDING		
	Total expenditure and public expenditure		
F81	Percentage of public expenditure on tertiary education in GDP	OECD, EAG, 2004; Eurostat (EAE, 2003; KDE, 2005)	A
	Expenditure per student		
F82	Expenditure on educational institutions per student (in full-time equivalents), in USD	OECD, EAG, 2004	A (in Euros)
F83	Expenditure per student in public educational institutions (in 1000 Euros)	Eurostat, EAE, 2003; KDE, 2005	B
F84	Cumulative expenditure on educational institutions per student in period of average duration of study (in USD)	OECD, EAG, 2004	B
	Sources of funding		
F85	Structure of expenditure on tertiary education – public, private	Eurostat, EAE, 2003	B
F86	Structure of expenditure on educational institutions - sources of funds (public, private)	OECD, EAG, 2004	B
	P R O C E S S		
	Expected years of schooling		
F87	Expected years of schooling in tertiary education (for 17-age old)	OECD, EAG, 2004	C
	D I R E C T OUTPUTS		
	Finishing of schooling – graduation rate		
F88	*Graduation rate in tertiary education by type of programmes*	OECD, EAG, 2004	C
F89	*Survival rate in tertiary education*	OECD, EAG, 2004	C
F90	*Number of graduates in tertiary education (ISCED 5-6) per 1000 inhabitants, aged 20-29 years*	Eurostat, EAE, 2003	A

Sign of indicator[a]	Indicators – title (also group of indicators and field in the extended production model)	International source[b]	Slovenia-calculation[c]
	Graduates – field of study		
F91	Structure of graduates in TI (ISCED 5 in 6) by field of study	Eurostat, KDE, 2005	A
F92	Percentage of graduates in mathematics, science and technology among all graduates in TI (ISCED 5-6)	Eurostat, EAE, 2003	A
F93	Number of graduates in TI (ISCED 5-6) in mathematics, science and technology per 1000 inhabitants, aged 20-29 years	Eurostat, KDE, 2005	A
F94	Number of graduates in mathematics, science and technology per 1000 inhabitants, aged 20-29 years (ISCED 5A, 5B, 6 altogether)	Eurostat, EAE, 2003; CEC, 2005	A
	Stock of education/knowledge		
F95	Percentage of population with TI (ISCED 5 in 6) in age group 30-64 years, by 5-year age groups	Eurostat, KDE, 2005	A
	I N D I R E C T OUTPUTS		
F96	*Private rate of return to education for those with attained tertiary education in comparison to those with upper-secondary or post-secondary non-tertiary education*	OECD, EAG, 2004	A
F97	*Social rate of return to education for those with attained tertiary education in comparison to those with upper-secondary or post-secondary non-tertiary education*	OECD, EAG, 2004	A

Source: Bevc, Čelebič, 2006.

Legend:

a Substitute indicator for the previous one in the table.

b The following publications are presented:
- Eurostat-Eurydice (2005). Key data on education in Europe 2005 (Eurostat, KDE, 2005),
- Eurostat-Eurydice (2002). Key data on education in Europe 2002 (Eurostat, KDE, 2002),
- Eurostat-EC (2003). Education across Europe 2003 (Eurostat, EAE, 2003),
- EC (2003). Report on the performance and progress of education and training systems in Europe, Indicators and Benchmarks – 2003, European Commission (EC, 2003),
- CEC (2005). Progress towards the Lisbon objectives in education and training - Report 2005, Commission of the European Communities (CEC, 2005).
- Unesco (2005). Global Education Digest 2005 (Unesco, GED, 2005),
- OECD (2004). Education at a Glance – OECD Indicators 2004 (OECD, EAG, 2004).

c Calculation of indicators for Slovenia (in sources considered in the analysis – Bevc, Čelebič, 2006)
- A: yes; calculation is available
- B: calculation is possible
- C: calculation is possible, but is very demanding
- D: there is no data for calculation

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