

# Baseline Study on the State of Innovation in the Thematic Fields of the eSchool4S Network

2016 Update

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## LIST OF ABBREVIATIONS:

CPD – Continuous Professional Development

DAE - Digital Agenda for Europe

DESI - Digital Economy and Society Index

DESD – Decade of Education for Sustainable Development

ESD - Education for Sustainable Development

EU – European Union

ICT - Information and Communication Technology in Education

ISCED - International Standard Classification of Education

LLL - Lifelong Learning

PISA - Programme for International Student Assessment

SD - Sustainable Development

TALIS - Teaching and Learning International Survey

TIMSS - TIMSS - Trends in International Mathematics and Science Study

UNESCO – The United Nations Educational, Scientific and Cultural Organization

VLE - Virtual Learning Environment

## CONTENT

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1. INTRODUCTION.....</b>	<b>3</b>
<b>2. AIM OF THE BASELINE STUDY AND RESEARCH METHODOLOGY.....</b>	<b>4</b>
<b>3. EUROPEAN OVERVIEW.....</b>	<b>5</b>
3.1. ICT IN EU COUNTRIES .....	10
3.2. ESD IN EU COUNTRIES .....	14
<b>4. REGIONAL (ESCHOOL4S) OVERVIEW .....</b>	<b>17</b>
4.1. ICT CAPACITIES.....	17
4.2. STAKEHOLDERS' VIEW OF NEED FOR ICT IMPROVEMENT .....	23
4.3. SUSTAINABLE DEVELOPMENT (SD) IN EDUCATION .....	25
4.4. STAKEHOLDERS' VIEW OF SD THEMES THAT SHOULD BE INCLUDED INTO NATIONAL CURRICULUM.....	28
4.5. TEACHERS' VIEW OF E-LEARNING AND ESD .....	30
<b>5. REGIONAL (ESCHOOL4S) OVERVIEW UPDATE FOR 2015.....</b>	<b>33</b>
5.1. NEW NATIONAL DATA CONCERNING TECHNICAL CAPACITIES FOR E-LEARNING.....	33
5.2. NEW NATIONAL DATA ABOUT TEACHERS' AND STUDENTS' ICT USE .....	33
5.3. OECD DATA ABOUT ICT CAPACITY .....	34
5.4. NEW NATIONAL DATA ABOUT REPRESENTATIONS OF SD THEMES IN NATIONAL CURRICULUM .....	36
5.5. ADDITIONAL NEW NATIONAL DATA AND INITIATIVES.....	37
<b>6. REGIONAL (ESCHOOL4S) OVERVIEW UPDATE FOR 2016.....</b>	<b>37</b>
6.1. NEW NATIONAL DATA CONCERNING TECHNICAL CAPACITIES FOR E-LEARNING, TEACHERS' AND STUDENTS' ICT USE .....	37
6.2. NEW NATIONAL DATA ABOUT REPRESENTATIONS OF SD THEMES IN NATIONAL CURRICULUM .....	39
6.3. ADDITIONAL NEW NATIONAL DATA AND INITIATIVES.....	40
<b>7. CONCLUSIONS AND RECOMMENDATIONS.....</b>	<b>41</b>
<b>8. REFERENCES.....</b>	<b>45</b>
<b>9. APPENDIXES.....</b>	<b>47</b>
APPENDIX 1: METHODOLOGICAL FRAMEWORK .....	47
APPENDIX 2: AN EXAMPLE OF THE CONTENT ANALYSIS OF PRESENCE OF SUSTAINABLE DEVELOPMENT (SD) IN NATIONAL CURRICULUMS .....	49
APPENDIX 3: GUIDELINES FOR A FOCUS GROUP WITH TEACHERS AND AN INTERVIEW WITH STAKEHOLDERS .....	41
APPENDIX 4: COUNTRY REPORTS .....	43
APPENDIX 5: COUNTRY REPORTS UPDATE FOR 2015.....	129
APPENDIX 6: COUNTRY REPORTS UPDATE FOR 2016.....	154

## Executive summary

This report presents the baseline study with the aim to give a comprehensive up-to-date overview on the status of innovation in the thematic fields of the eSchool4S network. This baseline study will present the status in eSchool4S network Countries (Austria, Bulgaria, Germany, Croatia, Hungary, Romania, Serbia and Slovakia) from the Danube Region concerning temporary capacities related to the use of ICT in schools and preconditions for implementing Education for Sustainable Development (ESD). The methodology captures those aspects through various ways and by gathering different types of data in order to have a sufficiently comprehensive picture of the ICT status in teaching and ESD in different countries through desk analysis of relevant data, analysis of content of schools' curriculum, interviews with relevant stakeholders and focus groups with teachers.

Desk analysis showed that European countries in most cases include general or cross-curricular skills in their steering documents. ICT is seen as one of the most important cross-curricular skills, which should empower other cross-curricular skills, such as problem solving, critical thinking, creativity, collaboration and communication. Regarding the availability of computers and Internet at home level, the majority of partner countries in the project are far below the EU average (Romania, Bulgaria, Serbia - according to national data and Croatia) - below 76% which is EU-28 average.

Recommendations for innovative pedagogical approaches regarding the usage of ICT in teaching, at both primary and secondary school level (e.g. in project learning, personalised learning, scientific investigations, online learning) are present in great majority of European countries. The European Commission has also put digital literacy as a learning outcome high on its agenda for the next decade. The countries which have all the listed objectives about ICT competencies in their steering documents for either primary or secondary education are Bulgaria, Germany, Greece, Spain, Latvia, Hungary, Malta, Poland, Slovakia and the United Kingdom (Wales and Scotland) (European Commission, Eurydice, 2011). In the meantime, the same listed objectives have entered the national educational goals of Romania and in Serbia.

In most European countries, at least 50 % of students are in schools where one computer is available for every two students but there are large disparities between countries and countries in South-eastern Europe have the smallest number of computers per child (Serbia, Croatia, Romania, and Bulgaria). In Romania, at the age of 15, there are almost 3 students per one computer, in Bulgaria, near 2.6, in Slovakia near 2.5, in Germany, somewhat above 2, in Austria, around 1, in Hungary, around 2.6. In their national report for the purpose of this project, Croatia reports about one IT classroom per school and in Serbia, there are some studies reporting a large number of students per one computer (19 students per one computer). On average, 3.06 students come on one computer in upper secondary education. In Slovenia, this ratio is the best, where 1.37 students come to 1 computer, and, on the other hand, the fewest computers per children are in Greece, where there are 16.6 students per one computer. The assessment of teachers' confidence in social media skills is also uniform among the countries participating in eSchool4S, ranging around the European average (European Commission, Eurydice, 2011).

Regarding ESD, results of various researches show ESD is increasingly perceived as a catalyst for innovation in education and something that loosens boundaries between schools, universities, communities and the private sector and also something that develops new pedagogical methods due to the interdisciplinary character of SD (UNESCO, 2012). Results show many positive changes regarding ESD and one of them is that ESD is not important only for SD per se but it also has a positive influence on developing new teaching methods and innovative pedagogy, although the causal relationship between ESD and new teaching practices should be confirmed in further studies.

Comparative analysis shows that ESD is implemented in all countries involved in the eSchool4s network and that the implementation models are somewhat different. In the majority of countries

ESD is not a separate subject but the elements of ESD are implemented at different levels of education (ISCED 1-3) and different types of schools through the programs of different subjects. ESD has been a Cross-curricular Principle overarching all subject areas and all types of schools in Austria. The analysis of the school curriculum in Bulgaria shows that the SD themes are most dealt with in the education area of Sciences and Ecology. In Croatia, they are not included in one separate subject but are rather distributed among various subjects. In Germany, the national educational standards for certain subjects and subject combinations contain knowledge and competencies in the field of sustainability. In Hungary, since environmental education has no separate school subject, SD topics are realised mainly in other subjects or in extracurricular teaching activities. In Romania, key themes of sustainable development are included in modules from the common core curriculum or optional subjects at all levels of education, including vocational and technical education. In Serbia, SD is not a separate school subject but the elements of SD are integrated in the objectives and tasks of a number of subjects such as Chemistry, Biology, Geography, Physics, Sociology, Civic Education and Foreign Language. In Slovakia, SD is present in several subjects, but mainly in a cross-cutting subject Environmental Education which includes basic concepts from ecology and environment. Additionally, the topic of environmental education is an integral part of a study programme at vocational schools.

Teachers' attitudes towards ICT differ in all countries between highly motivated and low motivated teachers. High motivated teachers see ICT primarily as a tool that serves for increasing students' achievement. Low motivated teachers, on the other hand, take e-learning as a must because their colleagues have agreed upon the use of e-learning for certain parts of their lessons. These findings suggest caution in selection of teachers for eSchool4S. It might be the case, according to the teachers' reports that even motivated teachers in some cases lack ICT competencies. Regarding teachers' attitudes towards ESD, there are more positive views about the importance of SD in the curriculum, but teachers generally think that there are more difficulties in connecting SD to the real life problems as well as to interconnect different themes of SD across different subjects.

The general conclusion is that teachers have a more positive opinion on EDS than on e-learning but the majority of teachers are interested to participate in the eSchool4S project.

Based on the existing data and analysis, the following conclusions and recommendations should be made. Strategies for the implementation of ICT and SD in education exist in each country for eSchool4S network and digital competence is recognised as one of the key competencies, but in some cases national policy documents are not correlated (like in Romania) and/or there are no action plans and practical guidelines on how to introduce ICT and SD in teaching. Free training for teachers on the use of ICT should be provided both in pre-service and in-service teacher education. Rural schools should be better equipped with computers and a high-speed internet should be provided (especially in Romania and Serbia, and some islands in Croatia). The eSchool4S network should rely on the existing results and positive experience in ESD at the European and international level. There is a recommendation that the specific part of the program should contain SD topics of particular importance for each member of the eSchool4S network. If we want teachers to successfully teach the content relating to sustainable development, it is necessary that they themselves are committed to this system of values, which should be taken into account in the selection of teachers who will participate in the eSchool4S project. The need for creating basic ICT training for using web classroom should be taken into consideration in order to ensure participation of motivated teachers without ICT competence. It is necessary that schools form interdisciplinary eSchool4S teams of teachers. In addition to science teachers (disciplines where SD is already represented in the subject curricula), team members should also be teachers of social science disciplines. The eSchool4S web-classroom needs to increasingly take into account the social aspects of SD issues, as well as to largely incorporate SD issues in social science subjects, due to the practical importance, motivation of teachers and students and better connection of SD to the real life problems.

# 1. Introduction

This report presents the baseline study with the aim to give a comprehensive up-to-date overview on the status of innovation in the thematic fields of the eSchool4S network. The project needs this baseline study in order to accomplish strategic project objective of creating innovative methods and tools for the design and implementation of interactive web-based classrooms.

In addition, the baseline study is needed in order to create virtual project partnerships involving teachers and students from different countries in the Danube Region through establishment of the website [www.eSchool4S.eu](http://www.eSchool4S.eu). This web portal will be the main internet portal for the joint development and exchange of innovative teaching concepts, contents and methods bringing Europe to the schools in the Danube Region and involving the youth in the Sustainable Development of their home region.

This baseline study will present the status in eSchool4S network Countries (Austria, Bulgaria, Germany, Croatia, Hungary, Romania, Serbia and Slovakia) concerning temporary capacities related to the use of ICT in schools and preconditions for implementing Education for Sustainable Development (ESD). The Institute of Psychology (Belgrade, Serbia) with the support of the project partners has created the baseline study methodology in order to assess baseline conditions before implementing the project activities through the eSchool4S network implementation.

The concrete aims of the eSchool4S network are (taken from the project application):

- Initiation and sustainable development of a regional network of stakeholders, decision makers of national education systems, school managers, teachers and students from countries in the Danube Region.
- Creation of an operational platform for the regional cooperation and the exchange of information, opinion, know-how and experience between projects and programmes as well as between teachers and teacher training institutes from all countries in the Danube Region.
- Raising awareness of decision makers as well as of teachers for the needs of ESD in an interdisciplinary setting in the context of European integration and regional cooperation.
- Compilation of a baseline study report (and annual updates) on the status of innovation in the thematic fields addressed by the eSchool4S network.
- Development and demonstration of innovative methods and tools for the design and implementation of interactive web-based classrooms and virtual project partnerships involving teachers and students from different countries in the Danube Region.
- Establishment of the website [www.eSchool4S.eu](http://www.eSchool4S.eu) as the main internet portal for the joint development and exchange of innovative teaching concepts, contents and methods bringing Europe to the schools in the Danube Region and involving the youth in the SD of their home region.
- Demonstration of the application of the jointly developed e-teaching concepts and materials in the eSchool4S web-based classrooms.
- Efficient promotion of the eSchool4S network and consequent dissemination of outputs from the network.
- Development of ICT competences and practical experiences

This baseline study report helps continuous monitoring and evaluation of the development of the eSchool4S network and its activities through identification of baseline capacities and country conditions.

Strategic objectives of eSchool4S network are coherent to the objectives of the Life Long Learning European Programme. This means that capacities of participants should be strengthened and enhanced. This will demand commitment of teachers and students to promote the objectives of SD of the Danube Region within the on-going European integration. Teachers will expose themselves to extensive and innovative approaches of web-based learning environments and advanced e-teaching materials for use in an intercultural context. They will also benefit in terms of technical and methodical skills acquisition.

Students will be motivated and trained to join a web-based learning environment and to work with interactive e-teaching materials. They will directly benefit from the interaction and intense exchange with partners from other countries. Exposure to a variety of contents and views will prompt them to form their own opinions and address these issues in their own voice. They will develop a firmer grasp on national and regional specificities, and gain intercultural skills, which will equip them for working and adult life in the EU labour market.

In order to assess how the project has helped these processes, it is important to estimate prior countries' condition regarding all relevant issues in the baseline study.

## 2. Aim of the baseline study and research methodology

Aim of development of the methodology was to grasp different aspects of current country baseline conditions important for the project purposes. The methodology captures those aspects through various ways and by gathering different types of data in order to have a sufficiently comprehensive picture of the status of ICT and ESD in different countries. Consequently, there are analyses of current strategic documents regarding ICT and SD, which contain analysis of current technical capacities for e-learning at the national and school level, national data analysis, content analysis of school curriculums and focus groups with teachers and relevant stakeholders (see Appendix 1).

The key partner in the methodology development was the Institute of Psychology from Belgrade, Serbia, but all partners contributed with their suggestions and comments, so the methodology was developed in a participative manner, with the help of all partners.

*Desk analysis.* Desk analysis uses the existing national statistical data to get an overview of available offers concerning e-learning and e-teaching courses for teachers and students in partner countries and in Europe, to get an overview of available offers concerning e-learning and e-teaching courses for teachers and students and to capture the status of initial teacher training in the respect of development of ITC competence.

Analysis of available statistical data and existing reports (Eurydice, Eurostat) regarding ICT equipment in schools and homes will help assess the school capacities for participating in web-based classroom. Rooms for improvements are important also in the analysis of ways of funding (state versus private resources) for school equipping for implementation of ICT in teaching.

Analysis of national documents and national strategies (if they exist) for ICT use and ICT implementation in teaching and learning is important in order to see the development path in using technology in schools that will be possible to rely on in future at the state level. Analysis of national strategic documents about SD aims to show current awareness about SD in different countries.

*Analysis of content.* Analysis of content of school curriculum helped to see available teaching programs regarding issues of SD and how they are represented in national curricula.

Analysis of the structure of different areas of Sustainable development (Economics, Culture, Ecology, Politics, Chemistry and Biology), underlining the main themes in every area will help mapping the interconnection in curriculum and will make room for better comprehension of SD at the interdisciplinary level. See Appendix 2 for an example of the content analysis of Biology curriculum in Serbia.

*Interview with relevant stakeholders.* Interviews with relevant stakeholders will help identify gaps between proscribed ICT use in schools and actual use (based on the existing national data). In addition, they will help underline priorities of relevant subject matters of SD in public dialogue and assess preparedness of schools and teachers to include these priority issues in their teaching. Opinions of stakeholders will help in formulating recommendations and possible paths for improving ESD and ICT use in teaching.

*Focus groups with teachers.* Focus groups with teachers aim at exploring teachers' perception regarding needs and potentials for ESD in secondary schools, as well as exploring existing experience in participation in international education networks and their motivation, willingness and ability to participate in the eSchool4S network and to contribute to the eSchool4S web-based classrooms. Two groups of teachers were interviewed, those very motivated for innovations and those who were not, according to the assessment of the principal and other experts.

### 3. European overview

In this chapter, we will provide a brief comparative analysis of some of the key indicators of education of EU countries. This perspective aims to capture a longitudinal dimension change in policies in education in the last 10 years, which can give some evidence about how much countries have changed and in what directions. Comparative analysis will try to grasp changes in the selected indicators for past ten years in order to have a development perspective of the European education systems.

The selected comparative indicators we used for brief comparative analysis are: total public expenditure on education, financial aid to students as a percentage of total public expenditure, student to teacher ratio and educational attainment levels in EU countries. We relied on EUROSTAT data<sup>1</sup> regardless of the fact that some other databases are also very important (e.g. PISA, TALIS) but they did not enter this brief overview due to the small room for analysis and because they are more directed towards an international picture of education and education outcomes. We selected the above indicators because they can show a rough picture of EU differences and because they are the most general and least sensitive to different contexts, and in our opinion the most comparable.

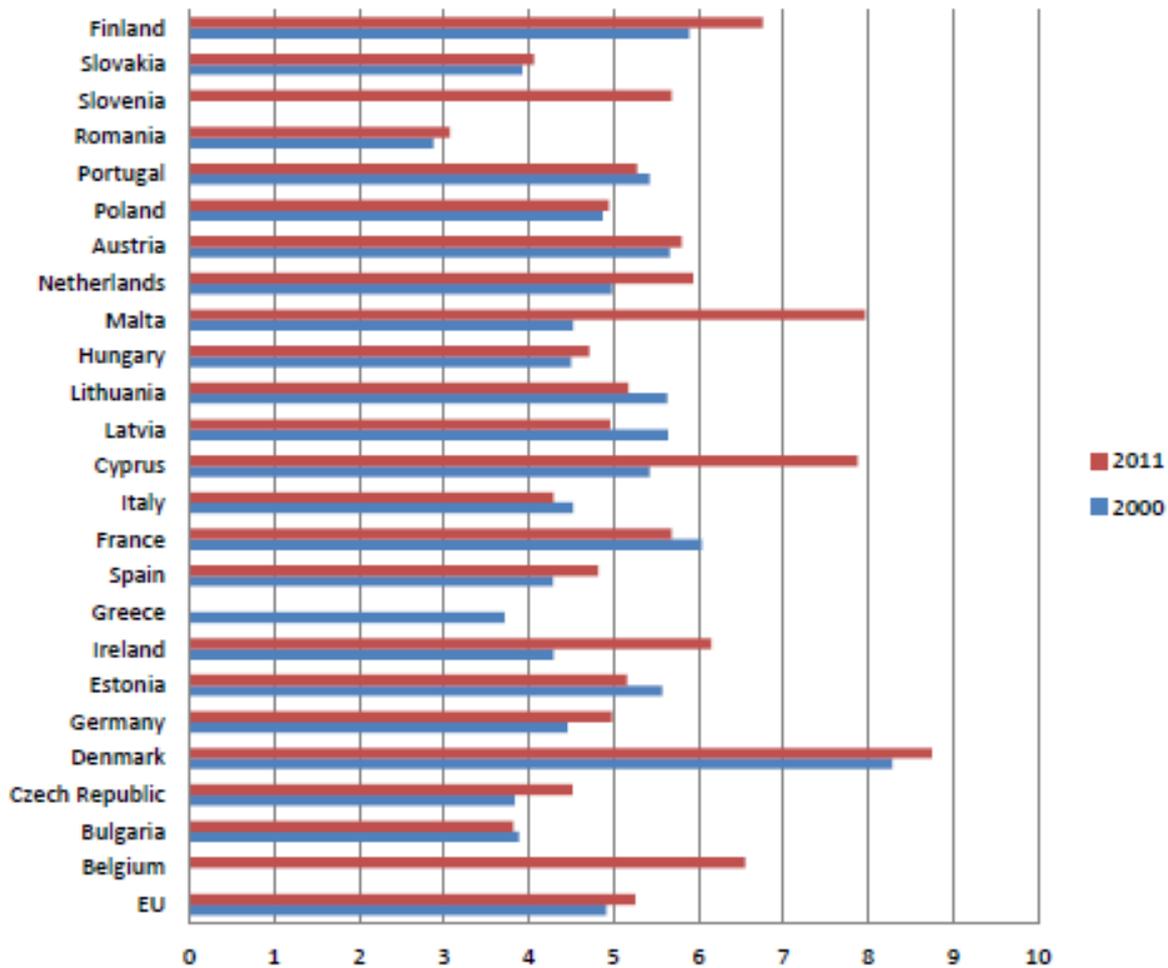
Regarding the total public expenditure on education as a part of GDP, EU average in 2011 was 5.25% and for eleven years, it has increased by 0.35% (Graph 1).<sup>2</sup> Public expenditure has rapidly increased for the past eleven years in Malta, Cyprus and Ireland. Public expenditure has decreased for the last eleven years for Lithuania, Latvia, France and Estonia probably because of specific situations in those countries and due to the austerity measures. Countries of North Europe together with Nordic countries allocate most finances for education (Finland 6,76%, Denmark 8,75% and Belgium, 6,55%) together with Slovenia, Ireland, Slovakia, Portugal, Lithuania, France, Estonia, Netherlands and Austria (all above 5%). Malta and Cyprus allocated near 8% of GDP for education in 2011. Investing in education at the national level is an indication of awareness of education importance and the connection between education and growth of economy highlighted in EU 2020 strategy. EU, on

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<sup>1</sup> <http://ec.europa.eu/eurostat/web/education-and-training/statistics-illustrated>.

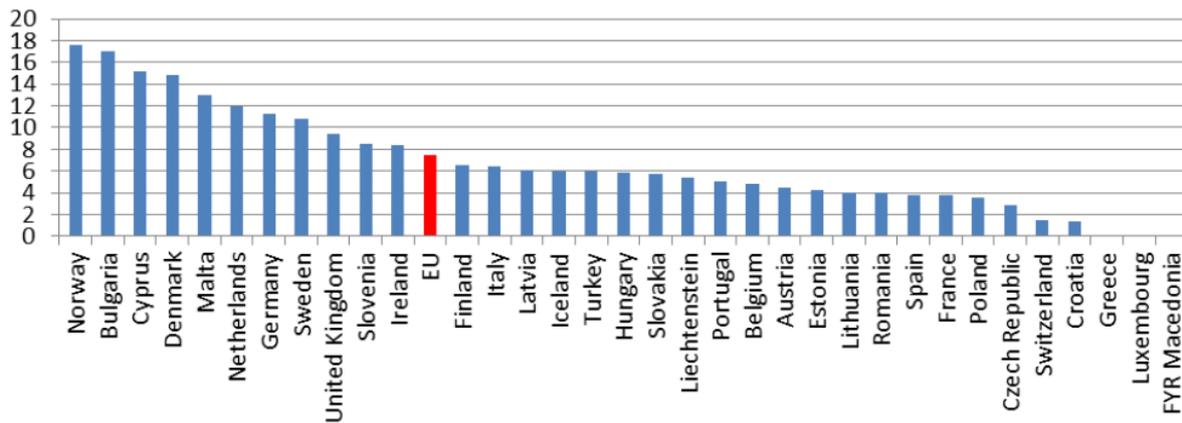
<sup>2</sup> Note: When data is missing in graph for some country, it means that data were not available for that country in public EU statistic.

average, has increased investment in education, but the investment could be more substantial regarding the importance of diffusion of knowledge for social mobility and decreasing economic inequalities in the economies based on knowledge and technology.



**Graph 1 Total public expenditure on education as % of GDP**  
 Source: Eurostat, date: 19/09/2014

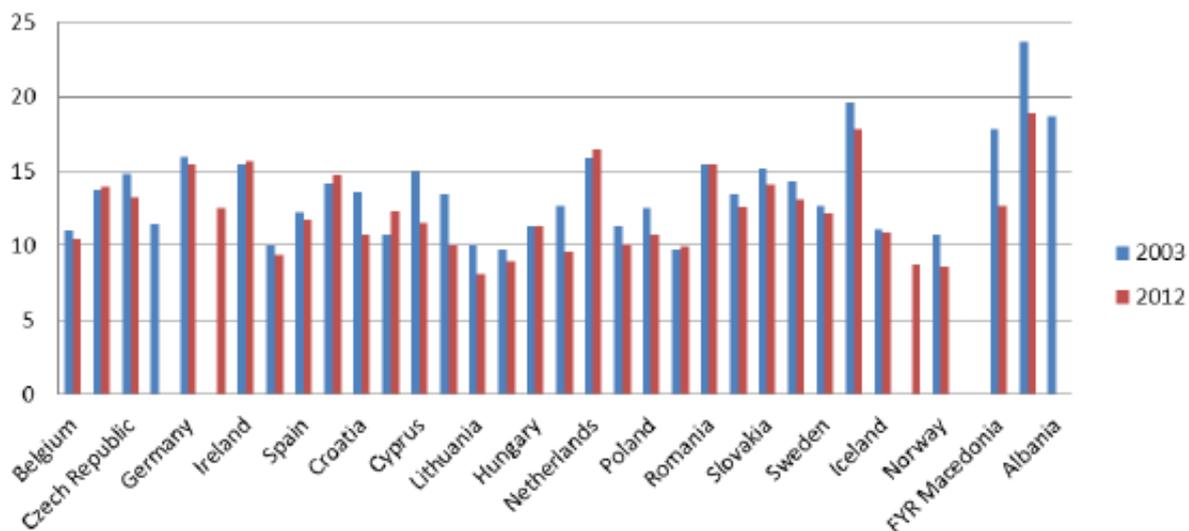
If we look at how much countries invest from their total public expenditure on education in financial aid to students, we see that countries differ a lot regarding the extent of support to impoverished students. It can be due to different national policies regarding social security as well as public budget amounts. Norway allocates 17.6% of public budget for education for financial aids for students. Out of EU countries, Bulgaria provides the most financial aid to students (17%) of the total national budget for education, while Croatia the least (1.3%) according to Eurostat data (Graph 2).



**Graph 2 Financial aid to students as % of budget for education**

Source: Eurostat, date: 19/09/2014

Regarding the number of students per teacher in pre-tertiary education, Turkey and UK have the most students per teacher (18.9 and 17.8 respectively). Norway and Lithuania have the smallest number of students per teacher (8.6 and 8.1, respectively). This ratio can provide evidence about network of schools, teacher employment policies and conditions for quality of teaching (Graph 3).

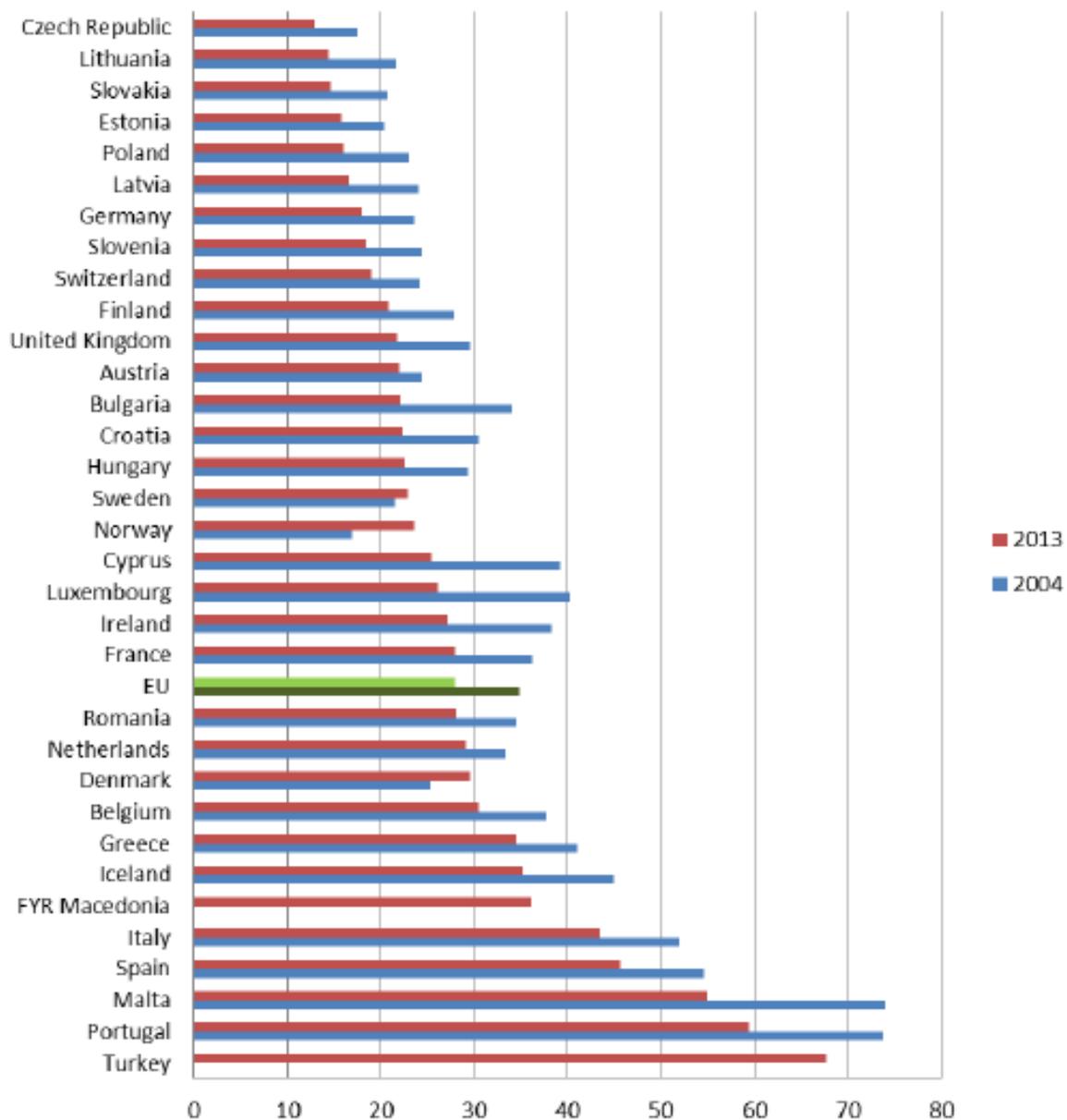


**Graph 3 Ratio of students to teachers (ISCED 1-3)**

Source: Eurostat, date: 19/09/2014

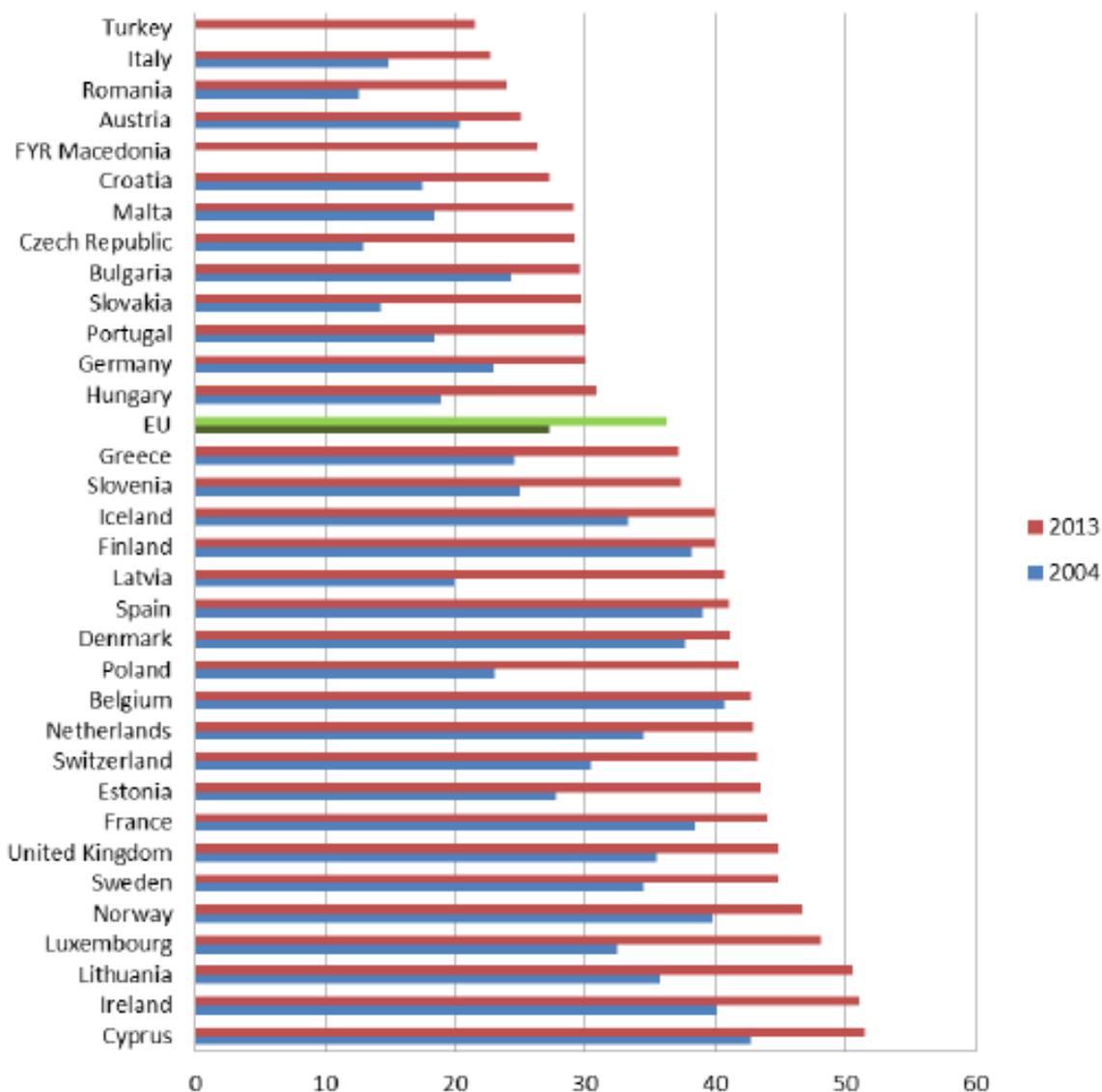
When we look at the biggest changes in teacher-student ratio, Cyprus, Croatia, Latvia, Malta, UK, Norway, FYR Macedonia and Turkey have decreased the teacher-student ratio in the past ten years which can be evidence of changes in their education policies and tendencies for improving conditions for good educational practice.

There is a positive trend in the EU to increase the number of people with faculty degree and to decrease the number of people with secondary and lower secondary degrees in order to establish more competitive knowledge-based economies. If we look at the percentages of people with low-level educational degree we can see the trend of decreasing the number of less qualified people for labour market (Graph 4). Turkey, Portugal and Malta are the countries with the highest percentage of people with the low level of education in 2013.



**Graph 4 Percentage of population with lower secondary and below education level for 2004 and 2013.**  
 Source: Eurostat, date: 19/09/2014

Spain and Italy are countries that also have a large number of people with the low level of education (45.6% and 43.4%, respectively). EU average is 28% of people with the low level of education. Czech Republic, Lithuania, Slovakia, Estonia, Poland, Latvia and Germany are countries with the lowest percentage of people with the low level of education (Czech Republic – 12.9%, Germany – 18%).



**Graph 5 Percentage of population between 25 and 34 with higher education level for 2004 and 2013.**  
 Source: Eurostat, date: 19/09/2014

When we look at the data regarding percentage of people joining the labour market who are in the first decade of their working careers (aged 25-34), relying on the EUROSTAT data, the generation that could have been influenced by new EU policy recommendations for the increase in the number of highly educated people in the EU, we see that Cyprus, Ireland and Lithuania are the only countries with 50% and above of selected population with tertiary degrees. Norway, Sweden, UK, France, Estonia, Belgium and Netherlands have percentages high above the EU average regarding people with university degree in population from aged 24-35. Italy, Romania, Macedonia, Croatia and Austria have below average percentages of selected population with university degree. Encouraging for EU economy, as well as for positive social outcomes (life satisfaction, democracy, and social participation) is the increase in the percentage of population with the university degree. Today in the EU, compared to the situation ten years ago, there are 9% more people with a university degree. In Latvia, Poland, Czech Republic and Estonia, percentage of people aged 24-35 with the university degree has almost doubled.

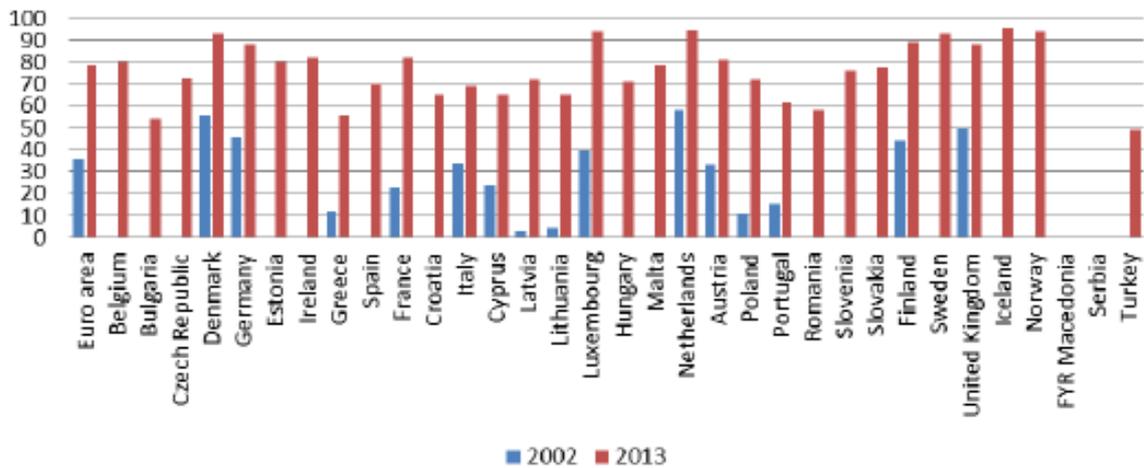
### 3.1. ICT in EU countries

The importance of ICT for the economy can be seen through the objectives of Digital Agenda for Europe (DAE) which aims to reboot Europe's economy and help Europe's citizens and businesses to get the most out of digital technologies. It is the first of seven flagship initiatives under Europe 2020, the EU's strategy to deliver smart sustainable and inclusive growth. EU data are showing that the digital economy is growing at seven times the rate of the rest of the economy. The full implementation of the Digital Agenda goals would increase, according to the estimation, European GDP by 5%, or 1500€ per person, over the next eight years, by increasing investment in ICT, improving ICT skills levels in the labour force, enabling public sector innovation, and reforming the framework conditions for the internet economy (*Digital Agenda for Europe*, 2010). ICT in education is, in this context, very important for entering the new labour market and increasing the economy.

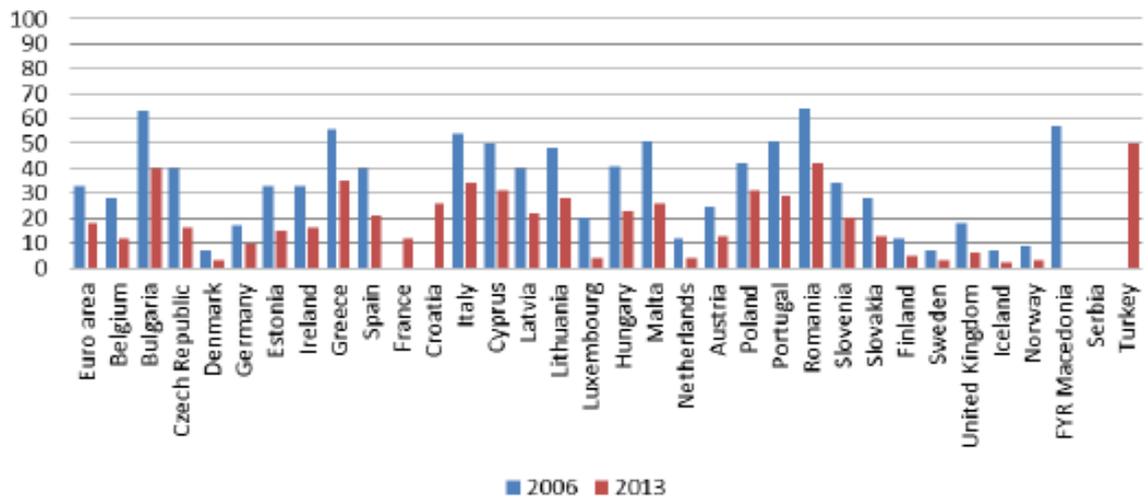
According to the last European report about ICT usage in homes and schools (Eurydice, 2011), the percentage of households with children with access to computers and the Internet has increased in all countries even in countries with GDP per capita. PISA study from 2009 shows that children's usage of computers at home is almost twice as more about entertainment than about education and school-related activities (46% students use it once a week for educational purposes). The analysis of the use of ICT in schools shows that 60% of students on EU average have teachers who have never asked them to use a computer for studying natural phenomena through simulation and 51% of them have never been asked to use ICT for some kind of experimentation (European Commission, Eurydice, 2011; Martin, Mullis & Foy, 2008). In European countries, according to PISA 2009, at least 50 % of students attend schools where one computer is available for every two students. This data reveals a significant reduction in the disparities between schools in the last 10 years given that in PISA 2000 there were between 25 and 90 students per computer across countries (OECD, 2010). On average, during their Math classes, almost 55 % of fourth grade students and 45 % of eighth grade students have available computers.

Perceiving the ICT as an important tool in improving teaching practices is recognised in the great majority of countries. Regulations in more than half of European countries foresee ICT competence as an obligatory part of an initial teacher education. In addition, the majority of countries suggest innovative pedagogical approaches that include ICT as well as ways to help teachers implement these teaching methods in their teaching. The development of teachers' ICT skills is included in all centrally promoted programs for CPD (European Commission, Eurydice, 2011).

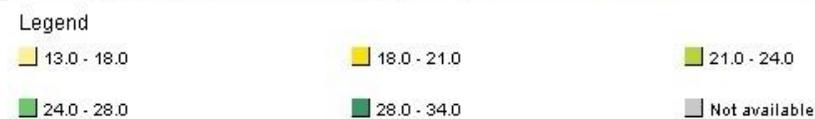
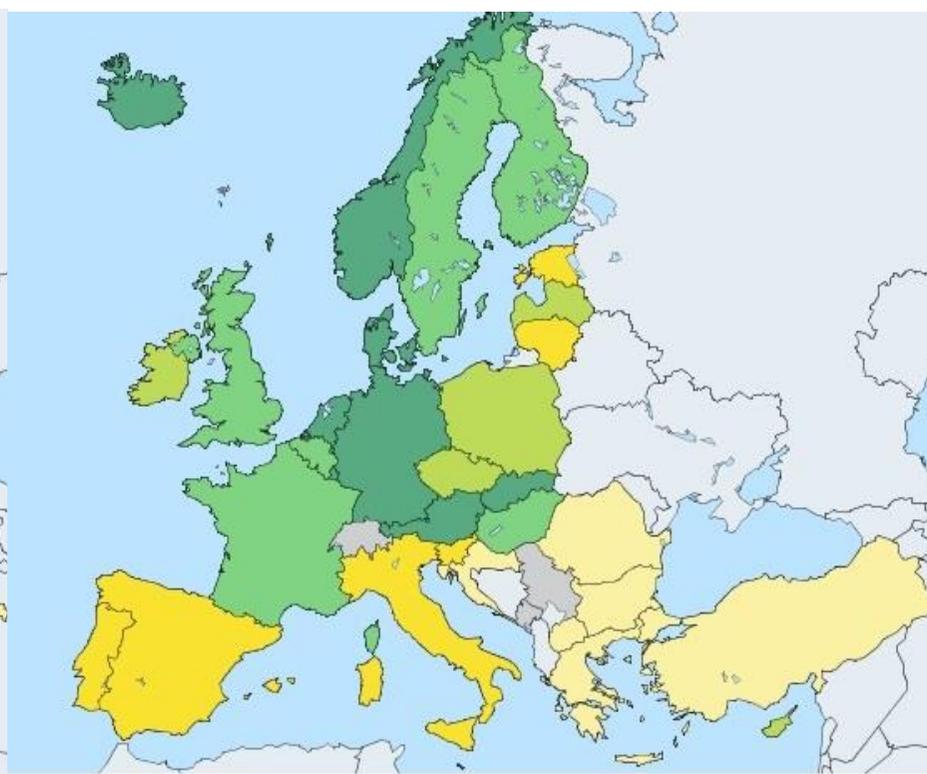
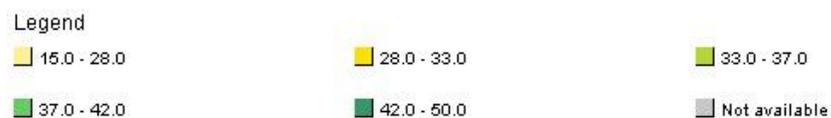
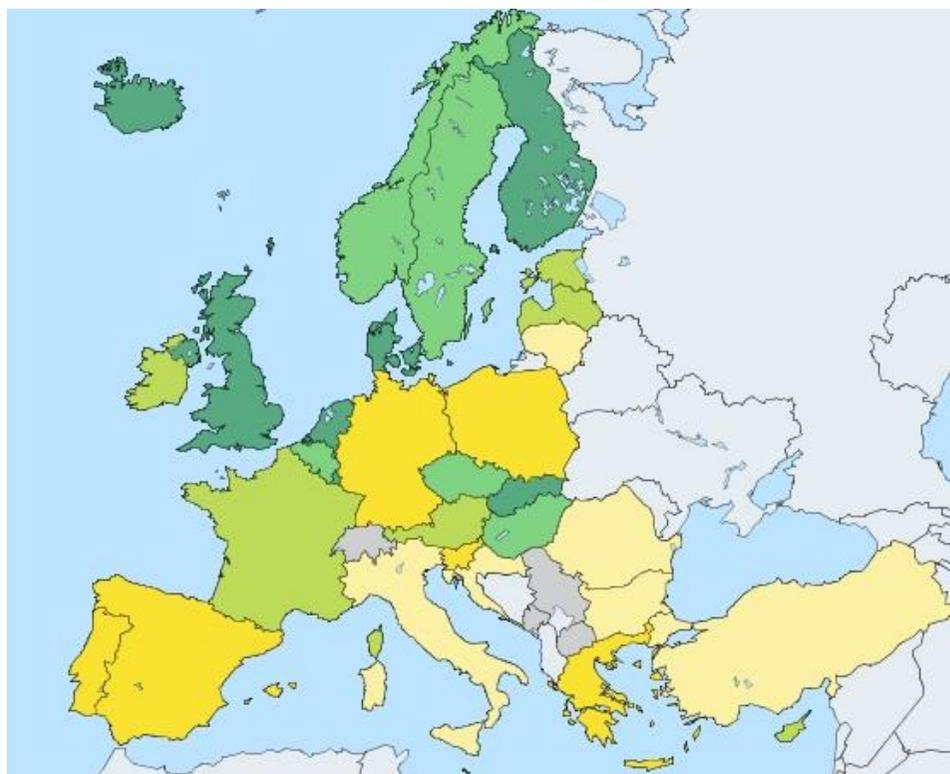
Regarding the availability of computers and internet at home level, looking at some more recent data (Eurostat, 2014; Graph 6 and 7), most partner countries in the project are far below the EU average (Romania, Bulgaria, Serbia - according to national data and Croatia) - below 76% which is EU-28 average. Slovakia and Hungary are little below EU-28 average while Germany and Austria are above EU-28 average. Regarding internet and computer competencies, countries from the Danube region, except Germany, are below EU-28 average (Map 1 and Map 2).



**Graph 6 Availability of Internet in households (% of households with internet connection) for 2002 and 2013**  
 Source: Eurostat, date: 19/09/2014



**Graph 7 Individuals who have never used Internet (% of individuals aged 16-74) for 2006 and 2013**  
 Source: Eurostat, date: 19/09/2014



**Map 1 Individuals' level of internet skills - % of the total number of individuals aged 16-74 in 2013 who have developed internet skills (3 and 4 out of 6)<sup>3</sup>**

**Map 2 Individuals' level of computer skills - % of total number of individuals who have developed computer skills (3 and 4 out of 6)<sup>4</sup> - Source: Eurostat, date: 19/09/2014**

<sup>3</sup> "Level of Internet skills are measured using a self-assessment approach, where the respondent indicates whether he/she has carried out specific tasks related to Internet use, without these skills being assessed, tested or actually observed. Six Internet-related items were used to group the respondents into levels of Internet skills in 2005, 2006, 2007 and 2011: use a search engine to find information; send an e-mail with attached files; post messages to chat-rooms, newsgroups or any online discussion forum; use the Internet to make telephone calls; use peer-to-peer file sharing for exchanging movies, music etc.; create a web page. Low level of basic Internet skills: Individuals who have carried out 1 or 2 of the 6 Internet-related items. Medium level of basic Internet skills: Individuals who have carried out 3 or 4 of the 6 Internet-related items. High level of basic Internet skills: Individuals who have carried out 5 or 6 of the 6 Internet-related items" (Eurostat, 19/09/2014).

<sup>4</sup> "Level of basic computer skills are measured using a self-assessment approach, where the respondent indicates whether he/she has carried out specific tasks related to computer use, without these skills being assessed, tested or actually observed. Six computer-related items were used to group the respondents into levels of computer skills in 2006, 2007, 2009, 2011 and 2012: from copy and moves file to connected printer and so on" (Eurostat, 19/09/2014).

European countries include other general and cross-curricular skills in their strategic documents. ICT is seen as one of the most important cross-curricular skills, which should empower other cross-curricular skills, such as problem solving, critical thinking, creativity, collaboration and communication. In some countries (e.g. Bulgaria), only one cross-curricular skill is aimed to be assessed (in this case creativity) while in most of the countries all skills are assessed and ICT is seen as a tool for their increase (European Commission, Eurydice, 2011).

The European Commission has also put digital literacy as a learning outcome high on its agenda for the next decade (European Commission, 2010).

The countries which have all the listed objectives in their strategic documents for pre-university education are Bulgaria, Germany, Greece, Spain, Latvia, Hungary, Malta, Poland, Slovakia and the United Kingdom (Wales and Scotland). In the meantime, some objectives entered into the national educational goals of Romania (*Strategy Education and Research for the Knowledge Society*, with its main purpose to develop the education and research for the period 2009-2015) and in Serbia with *Guidelines for Improving ICT Use in Education*.

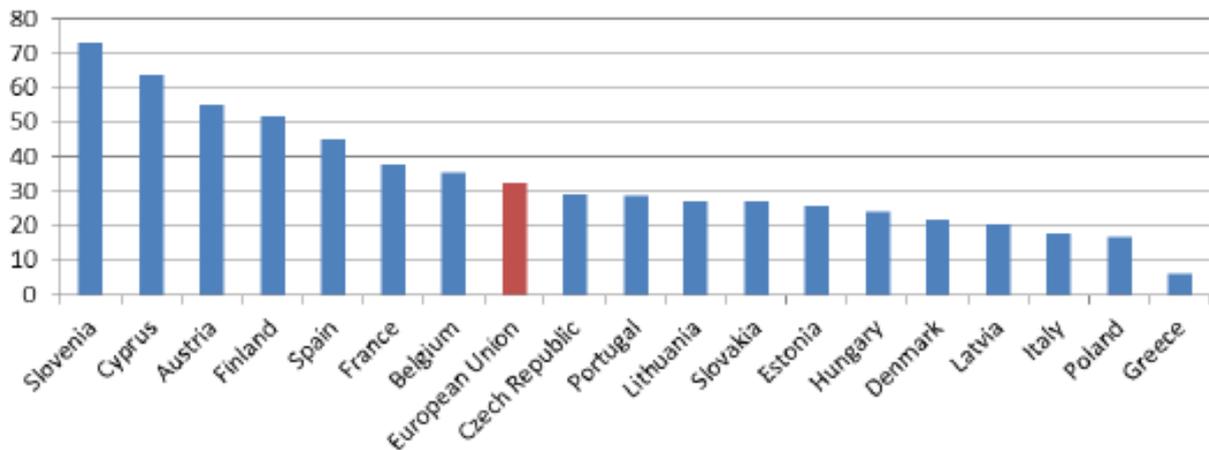
Recommendations for innovative pedagogical approaches regarding the usage of ICT in teaching, at both primary and secondary school level (e.g. in project learning, personalised learning, scientific investigations, online learning) are present in majority of European countries. In countries of the Danube region and partners on the projects, there are more informal ways of support than formalised recommendations (European Commission, Eurydice, 2011, p. 43).

Fourth grade students attended schools that had, on average, one computer for 4 students (European Commission, Eurydice, 2011) in most European countries in 2007. At the secondary school level there was, on average, one computer for two students. The situation is better in Denmark and in England and Scotland. There, at the secondary school level, at least one computer was available for each student. On the other hand, only three countries (Italy, Austria and Turkey) have more than six students per computer (European Commission, Eurydice, 2011).

According to *Key Data on Learning and Innovation through ICT at School in Europe* "in most European countries, at least 50 % of students are in schools where one computer is available for every two students. Nevertheless in Greece, Italy, Poland and Slovenia and to a lesser extent Belgium (French Community), Bulgaria and Sweden, larger disparities exist in computer availability. In these countries, one computer is available for four to eight students. In Turkey, the gap is even greater as there are fewer than 4 students per computer in some schools and more than 11 in others. These data reveal a significant reduction in the disparity between schools in the last 10 years. In 2000 there were between 25 and 90 students per computer in the different countries" (European Commission, Eurydice, 2011, p. 75).

In Romania, at the age of 15, there is almost 3 students per one computer, in Bulgaria, near 2.6, in Slovakia near 2.5, in Germany, somewhat above 2, in Austria, around 1, in Hungary, around 2.6 (European Commission, Eurydice, 2011, p. 76). There are not reliable data for Serbia and Croatia. In their national report for the purpose of this project, Croatia reports about one IT classroom per school and in Serbia, there are some studies reporting a very high number of students per one computer (19 students per one computer).

If we look at some more recent data of Digital Agenda, we can see that on average, 3.06 students come on one computer in upper secondary education (Graph 8). In Slovenia, this ratio is the best where 1.37 students come to 1 computer, and, on the other hand, the fewest computers per children are in Greece, where there are 16.6 students per one computer. There is no available data for all countries in Europe and some countries from the Danube region.



**Graph 8 Number of computers per 100 students in 2012 in upper secondary education.**  
Source: Digital Agenda, date: 14/10/2014

### 3.2. ESD in EU countries

Sustainable development (SD) has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (European Commission, Eurostat, 2011, p.33). Linkage between economic development, protection of the environment and social justice, aims at the continuous improvement of the quality of life and it is of major importance for all EU citizens.<sup>5</sup>

According to the EU Sustainable Development Strategy "Sustainable development is a fundamental and overarching objective of the European Union enshrined by the Treaty" (European Commission, Eurostat, 2011, p. 33).

Education for Sustainable Development is, therefore, an important part of improving SD in the EU. In UNECE strategy for ESD, there are listed themes that should be included in education and studied in holistic approach. "Key themes of SD include among other things poverty alleviation, citizenship, peace, ethics, responsibility in local and global contexts, democracy and governance, justice, security, human rights, health, gender equity, cultural diversity, rural and urban development, economy, production and consumption patterns, corporate responsibility, environmental protection, natural resource management and biological and landscape diversity. Addressing such diverse themes in ESD requires a holistic approach" (United Nations, 2009, p.15).

UNESCO report pointed out that "ESD is emerging as the unifying theme for many types of education that focus on different aspects of sustainability, (e.g. climate change, disaster risk reduction or

<sup>5</sup> European Union has developed indicators for measuring SD. For Socioeconomic development indicator is Real GDP per capita, for Sustainable consumption and production indicator is Resource productivity, for Social inclusion indicator is Risk of poverty or social exclusion, for Demographic changes indicator is Employment rate of older workers, for Public health indicator is Life expectancy and healthy life years, for Climate change and energy indicator is Greenhouse gas emissions and Consumption of renewables, for Sustainable transport indicator is Energy consumption of transport relative to GDP, for Natural resources indicator is Abundance of common birds and Conservation of fish stocks, for Global partnership indicator is Official development assistance. Results of monitoring of SD can be found at

[http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-31-11-224/EN/KS-31-11-224-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-31-11-224/EN/KS-31-11-224-EN.PDF).

biodiversity)" (UNESCO, 2012a, p.5). ESD is increasingly perceived as a "catalyst for innovation in education" and something that loosens boundaries between schools, universities, communities and the private sector which are blurring due to a number of trends and also something that develops new pedagogical methods due to the interdisciplinary character of SD. In this report, UNESCO stated that ESD's role is much bigger than it was two years ago.

Within the UNESCO, several surveys have been conducted: Global Monitoring & Evaluation Survey (GMES) - an on-line survey was created and sent to UNESCO National Commissions of UNESCO Member States to get a better sense from countries of the various types of learning employed and/or emerging under the ESD umbrella in the various educational sectors for 102 countries; National ESD-journeys (NESDJ) – Eight detailed reviews from countries in different regions of the world; Key Informant Survey (KIS) – Key ESD informants around the world represent a range of local, regional, national and trans-national organisations active in ESD, as well as case study in online form and desk analysis of existing and institutional data (UNESCO, 2012a).

According to the document *Shaping education for tomorrow* (Full-length Report on the UN Decade of Education for Sustainable Development) all results mentioned above show many positive changes regarding ESD and one of them is that ESD is not important only for SD per se but it has a positive influence on developing new teaching methods and innovative pedagogy, although the causal relationship between ESD and new teaching practices should be confirmed, according to UNESCO, in further studies.

Something in ESD may have contributed to new and creative teaching methods: the ESD principle that each individual should have a chance to participate in local and global discussions about our common future has been increasingly highlighted (UNESCO, 2012a). Learning is therefore seen as a key component of innovation that leads to social change. However, there is a need for more traditional approaches and ESD materials that teachers use in a more traditional manner (for those teachers who work in education systems with mandated curricula and textbooks). In some cases, national government must approve these materials (UNESCO, 2012a).

Data shows that many new teaching methods have emerged during ESD. ESD also stimulates processes which encourage innovation within curricula as well as through teaching and learning experiences; also processes of active and participatory learning and processes that engage the "whole system", and processes of collaboration and dialogue (including multi-stakeholder and intercultural dialogue) (UNESCO, 2012b).

Several types or forms of learning associated with ESD have been distinguished such as: discovery learning – transmission learning, participatory/collaborative learning, problem-based learning, disciplinary learning (taking questions of a disciplinary nature as a starting point, to better understand underlying principles and expand the knowledge base of that discipline), interdisciplinary learning (taking issues or problems as a starting point, then exploring them from different disciplinary angles to arrive at an integrative perspective on possible solutions or improvements), multi-stakeholder social learning (bringing together people with different backgrounds, values, perspectives, knowledge and experience, from both inside and outside the group initiating the learning process, to set out on a creative quest to solve problems that have no ready-made solutions), critical thinking-based learning, systems thinking-based learning (looking for connections, relationships and interdependencies to see the whole system and recognise it as more than the sum of its parts and to understand that an intervention in one part affects other parts and the entire system) (UNESCO, 2012b).

ESD in primary and secondary schools around the world manifests itself in many forms, sometimes under different names. School autonomy is very important for developing ESD. The more autonomy is allowed to schools, teachers and students will have more freedom to shape curricula and there will be more possibilities for innovation in education and loosening the boundaries of learning and society (UNESCO, 2012b). In some cases, ESD is being included in the curriculum of many schools

through efforts of NGOs, which incorporate ESD into their education on programmes that include field trips, school presentations and environmental summer camps. In some of the countries outside of Europe, ESD is not a part of the curriculum. In EU countries, ESD is integrated into curricula, but there are problems with its interdisciplinarity in some countries of the Danube region. ESD in the EU is in a more advanced stage than in other countries.

In order to achieve better preparation of teachers for ESD, UNECE has published *Learning for the Future: Competences in Education for Sustainable Development*. This document provides recommendations to policy makers on the professional development across all sectors: for teachers/educators, managers and leaders; governing and managing institutions; curriculum development and monitoring and assessment. It also identifies a framework of core competencies in ESD for educators.

The following framework has been selected as it is comprehensive and presents a meaningful set of categories that reflect a wide range of learning experiences: "learning to know refers to understanding the challenges facing society both locally and globally and the potential role of educators and learners; learning to do refers to developing practical skills and action competence in relation to education for sustainable development; learning to live together contributes to the development of partnerships and an appreciation of interdependence, pluralism, mutual understanding and peace, learning to be addresses the development of one's personal attributes and ability to act with greater autonomy, judgement and personal responsibility in relation to sustainable development" (United Nations Economic Commission for Europe, 2012, p. 13).

UNECE strategy policy has provided several recommendations for improving ESD. Empowering educators must be central to any professional development initiative. Providing training and education in ESD for those in management and leadership positions in educational institutions is of a crucial importance. At the national level, one of the recommendations is that initial teacher education should integrate created competences and decide where they might be best integrated into their programs (United Nations Economic Commission for Europe, 2012). There is a recommendation to incorporate some of the key mechanisms for building ESD into the professional development of educators, including those working in NGOs, the media and broader vocational education. There has to be excellent cooperation among international, sub-regional, national and subnational institutions. ESD, according to UNECE strategy, requires the distribution of power across institutions in order to facilitate educational change.

Regarding competences, it is very important to understand that without creating and defining competences for ESD its implementation could not be so efficient or even possible. In Germany, for example, there are developed guidelines for integrating competences for SD into curriculums as a cross-curriculum competence.

Education for sustainable development (ESD) particularly is the acquisition of shaping competence. That ESD competence describes the ability to apply knowledge of sustainable development and to identify the problems of non-sustainable development. It means drawing conclusions on environmental, economic and social developments in their interdependence, based on analyses of the present and studies of the future, and then using these conclusions to make decisions and understand them before implementing them individually, jointly and politically. Shaping competences can be broken down into ten competences: "1. To create knowledge in a spirit of openness to the world, integrating new perspectives; 2. To think and act in a forward-looking manner; 3. To acquire knowledge and act in an interdisciplinary manner; 4. To be able to plan and act in cooperation with others; 5. To be able to participate in decision-making processes; 6. To be able to motivate others to become active; 7. To be able to reflect upon one's own principles and those of others; 8. To be able to plan and act autonomously; 9. To be able to show empathy for and solidarity with the disadvantaged; 10. To be able to motivate oneself to become active" (Transfer 21-programme's Quality and Competencies working group, 2007).

The CSTS Comenius project developed competences for ESD for teachers as a framework for integration of ESD in the curriculum of teacher-training institutions. The CSCT project was developed as a response to the call of the UNECE Ministers of the Environment in 2003 for including education for sustainable development (ESD) in the curricula from pre-school to higher and adult education. This project developed a two-dimensional model of a teacher who is competent for ESD, where one dimension is a dimension of profession (in society, school and solely) and the other dimension is competence, which is encompassed through networking, teaching and reflecting. In teaching and learning for ESD, all five domains (knowledge, systems thinking, emotions, ethics and values and action) have to be applied to each of the professional dimensions and they also relate to all overall competences (Sleurs, 2008).

## 4. Regional (eSchool4S) Overview

### 4.1. ICT Capacities

One of the tasks of the Baseline Study was to show whether the countries of the eSchool4S network have the necessary ICT infrastructure for the realisation of the eSchool4S web-based classrooms, as well as to what extent teachers are trained to use ICT.

To answer this question, data from the final report *Survey of Schools: ICT in Education* was used (European Commission, 2013)<sup>6</sup>, as well as the data from Country Reports (primarily Germany, because the data for this country is not included in the final report due to the low turnout of respondents and Serbia, because it had not participated in this study, see Appendix 4). Since the eSchool4S project will be implemented in general upper secondary schools, this section shows only the results for grade 11 (ISCED level 3).

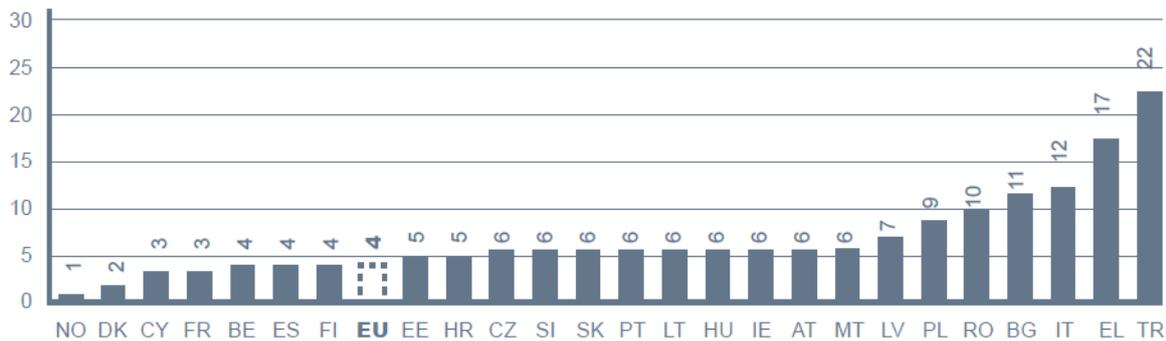
#### 4.1.1. ICT infrastructure

The data shows that, compared to the European average (4 students per one computer), Western European countries from the eSchool4S network are better equipped with computers than Eastern European countries from the same network (European Commission, 2013, p. 35). In Croatia this ratio is 5:1. In Austria, Hungary and Slovakia the student to computer ratio is 6:1 (see graph 9). According to the Country Report, every school in Baden-Wuerttemberg (except primary schools) is equipped with sufficient computers for a whole class and computer rooms. Data from 2012<sup>7</sup> shows that in Germany, student to computer ratio is 2:1. On the other hand, schools in Rumania and Bulgaria have fewer computers than the European average (in Romania the student to computer ration is 10:1 and in Bulgaria 11:1). According to the Country Report, in Serbia there is a high number of students per one computer (19 students per one computer).

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<sup>6</sup> European Commission (2013) *Survey of Schools: ICT in Education, Final Study Report: Benchmarking Access, Use and Attitudes to Technology in Europe's Schools*. Luxembourg: Publications Office of the European Union.

<sup>7</sup> Source: Digital Agenda, date: 14/10/2014



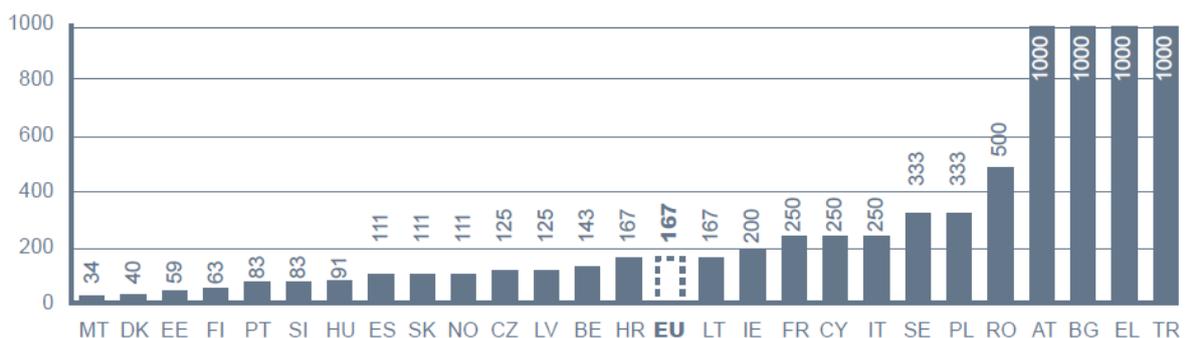
**Graph 9 Students per computer (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 35.

In European schools computers are usually placed in separate classrooms. In Bulgaria, Romania, Croatia, and Slovakia, over 70% of computers in schools are located in the ICT lab. The only exception is Austria where the number is less than 20% (European Commission, 2013, p. 38). There is no data for Germany and Serbia.

Furthermore, a small percentage of the general upper secondary schools are without broadband (4% at the European level). In Austria, Czech Republic and Hungary there are no schools without broadband, and the situation in Croatia, Romania and Bulgaria corresponds to the European average (European Commission, 2013, p. 46). There are no data on broadband for Germany and Serbia.

Countries from the eSchool4S network differ significantly in the number of interactive whiteboards. The European average is (grade 11 general) 167 students per one interactive whiteboard. The situation in Croatia corresponds to this average. A smaller number of students per one interactive whiteboard is present in the Czech Republic (125:1) and especially in Hungary (91: 1). A significantly higher number of students per one interactive whiteboard is in Romania (500:1), especially in Austria and Bulgaria (1000: 1). There is no data about this parameter for Germany and Serbia (European Commission, 2013, p. 41).



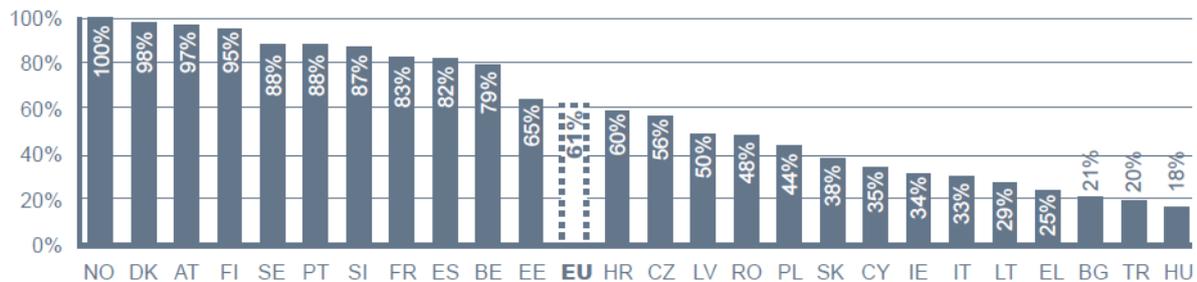
**Graph 10 Students per interactive whiteboard (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 41

At the EU level, a great number of grade 11 students (74%) are in general schools where more than 90% of the ICT equipment is completely operational. However, Croatia appears to have a lot of non-operational ICT equipment at this level (European Commission, 2013, p. 40). There are no data for Austria, Germany and Serbia.

A virtual learning environment (VLE) or learning platform is “the strongest indicator of school connectedness” (European Commission, 2013, p. 48). Among eSchool4S countries, there is a huge

difference regarding the percentages of students in general upper secondary schools with a virtual learning environment (see Graph 11) (the range is from 18% in Hungary to 97% in Austria). With respect to other countries from eSchool4S, by VLE Croatia (60%) is near the European average. In Romania, 48% of general upper secondary schools have learning platforms, while the percentage is lower in Slovakia (38%), and in Bulgaria (21%) (European Commission, 2013, p. 48). There is no data for Germany and Serbia.

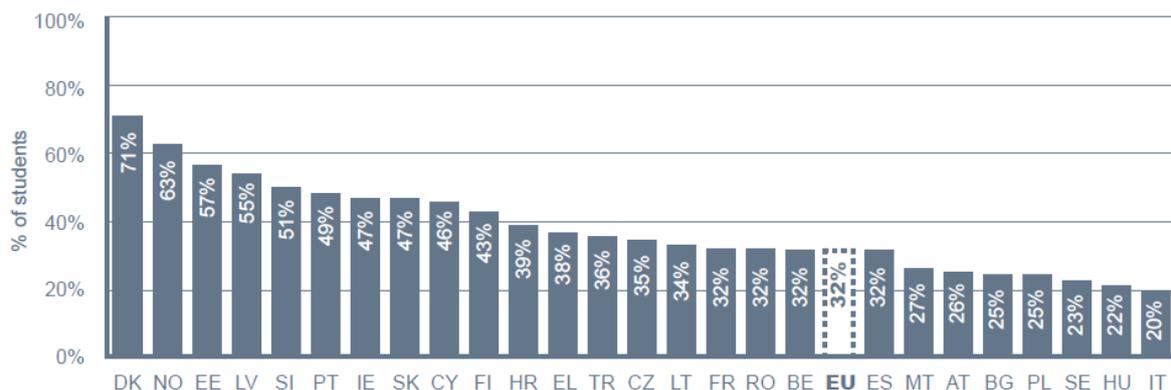


**Graph 11 Percentage of students in school with a virtual learning environment (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 48.

#### 4.1.2. Use of equipment

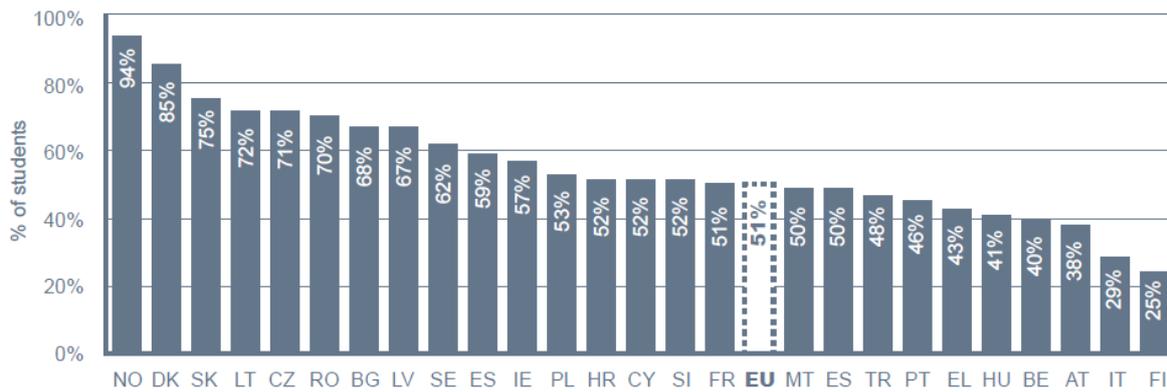
Graph 12 ranks EU countries by “the percentage of students in schools where grade 11 teachers use ICT in more than one in four lessons” (European Commission, 2013, p. 58). Hungary (22%), Bulgaria (25%) and Austria (26%) are below the European average, Romania (32%) is at the European average, and Croatia (39%) and Slovakia (47%) are above the European average (European Commission, 2013, p. 58). There is no available data for Germany and Serbia.



**Graph 12 Teachers’ use of ICT in more than 25% of lessons (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 58.

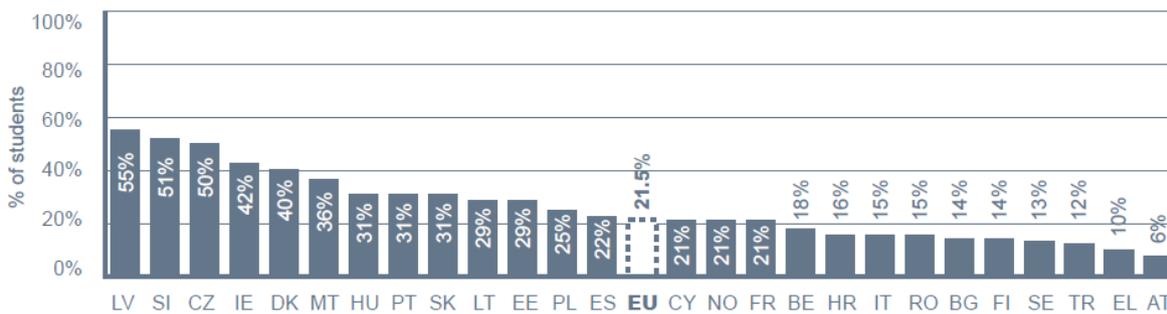
Graph 13 ranks EU countries by the percentage in which students use school computers for learning purposes (European Commission, 2013, p. 62). Compared to the European average, the use of computers by students is the lowest in Austria (38%) and Hungary (41%), the approximate average in Croatia (52%), and higher than the average in Bulgaria (68%), Romania (70%) and Slovakia (71%) (European Commission, 2013, p. 62).



**Graph 13 Use of school desktop/laptop for learning purposes at least weekly (Grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 62.

On average in the EU “one in five grade 11 students use interactive whiteboards in lessons at least weekly” (European Commission, 2013, p. 63). Among the countries of the eSchool4S network, on a weekly basis, most students from Hungary use interactive whiteboards, while in other countries the use of interactive whiteboard is below the European average, especially in Austria (6%) (European Commission, 2013, p. 63). There is no data for Germany and Serbia.



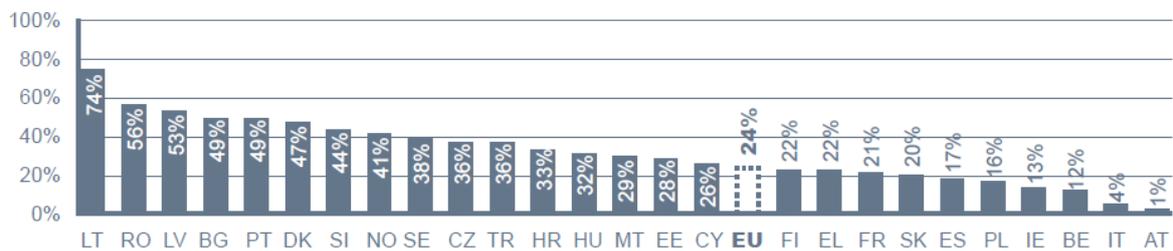
**Graph 14 Percentage of students using white board at least weekly (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 63.

### 4.1.3. Professional development of teachers

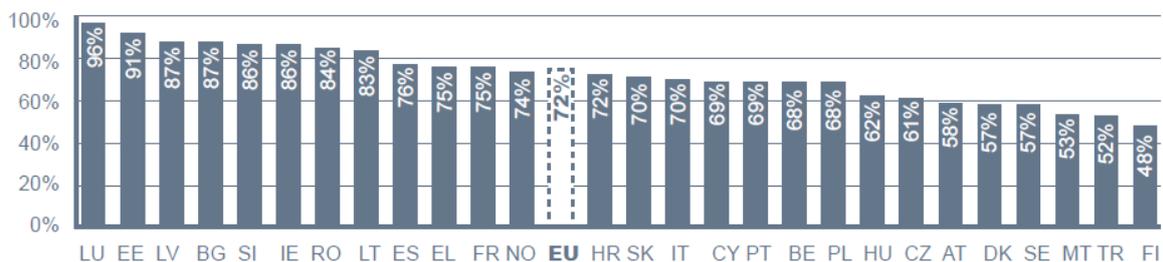
According to *Key Data report on learning and innovation through ICT at schools in Europe*, ICT training is part of an initial teacher education (pre-service) in more than half of EU countries (European Commission, 2013, p. 91). However, in practice implementation varies from country to country, which is confirmed by Country Reports. For example, in Germany the education curricula for teachers at general elementary, secondary and high schools do not contain specific ICT courses. Compulsory courses such as media pedagogics and also courses centring the studied subjects always include lessons where ICT is used to present modern approaches and methods to teach certain topics. The education curricula for teachers at vocational schools determine the attendance of at least one computer course (e.g. business informatics) as requirement to pass the final exam. In Serbia, ICT courses are a mandatory part of initial education of teachers to work in a primary school, as well as the teachers who teach ICT in schools. Initial education of other teachers (e.g. teachers of Biology, Chemistry, History, and Geography) does not contain any elective or compulsory ICT courses (see Germany Country Report, Appendix 4).

In addition, in European countries the modalities of in-service education of teachers also differ. For example, graph 15 shows “that country varies to some degree regarding the percentage of students taught by teachers for whom participation in ICT training is compulsory” (European Commission, 2013, p. 91). Among eSchool4S countries, ICT training is mainly compulsory in Romania (56%), and to the least extent in Austria (1%), while the EU average is (24%). On the other hand, graph 16 shows that 73% of students at general schools (grade 11) are educated by “teachers who have engaged in personal learning about ICT in their own time” (European Commission, 2013, p. 94). Among the countries of the eSchool4S network this type of professional development is most common in Bulgaria (87%) and Romania (84%), while it is the least common in Austria (58%). Another modality of in-service education is ICT training delivered by school personnel (see graph 17). This type of professional development of teachers is most common in Croatia (65%) and least common in Hungary (36%).



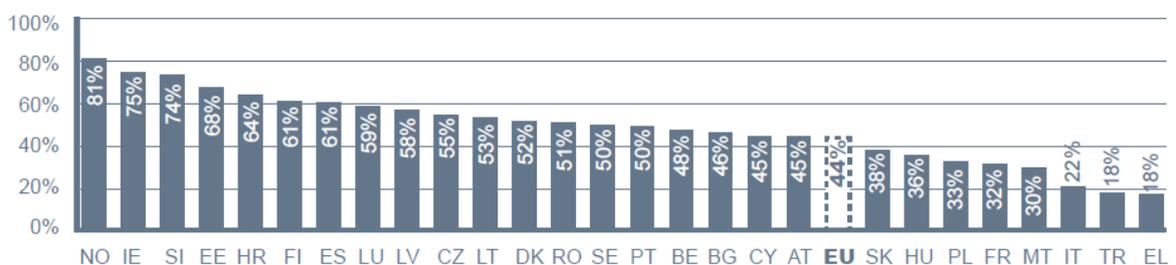
**Graph 15 Teachers' compulsory participation in ICT training (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 91.



**Graph 16 Teachers' involvement in personal learning about ICT in their own time (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 94.



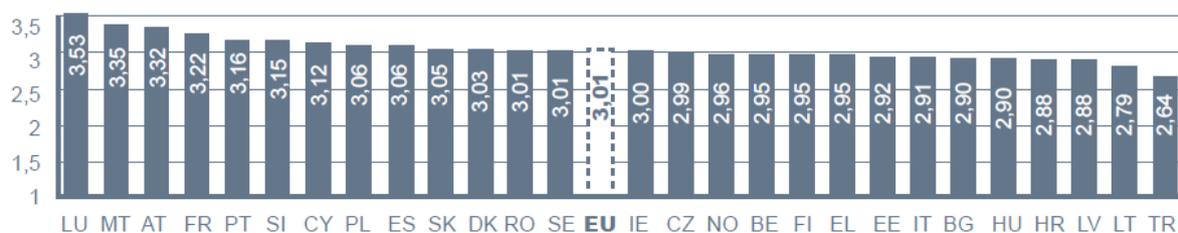
**Graph 17 Teachers' participation in ICT training provided by school staff (Grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 95.

#### 4.1.4. Teachers' confidence regarding operational and social media skills

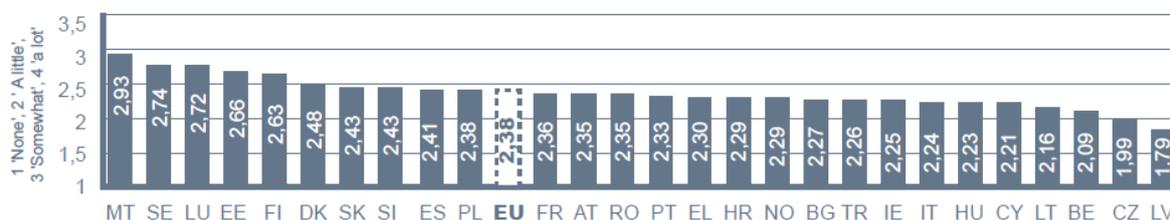
*Operational ICT skills* are “the basic skills needed to use ICT tools such as Word, Excel, Outlook, PowerPoint, Internet explorer, etc.” (European Commission, 2013, p. 100). These skills, for example encompass text production by using a programme for word processing, creating a database, emailing a file to someone, creating a presentation with simple animation functions, downloading software and installing it on a computer, etc. *Social media skills* are the skills needed for interaction and collaboration with other people. This group of skills “encompasses the ability to participate in an online discussion forum, the ability to create and maintain blogs or websites, the ability to participate in social networks, etc.” (European Commission, 2013, p. 100).

In *Survey of Schools: ICT in Education* (European Commission, 2013), teachers assessed the possession of these skills on a four-point scale. The results show (see graph 18 and 19) that teachers have “greater confidence in the operational ICT skills than in the social media skills” (European Commission, 2013, p. 102 and 103). When comparing the countries participating in the eSchool4S project (Austria, Bulgaria, Croatia, Romania and Slovakia), teachers' confidence in their operational skills is somewhat bigger with teachers in Austria (3,32), and is at the European average (3,01) with teachers from other countries (see Graph 18). There is no data for Germany and Serbia.



**Graph 18 Teachers' confidence in their operational skills (grade 11 general, country and EU level, 2011-2012)**  
Source: European Commission, 2013, p. 102.

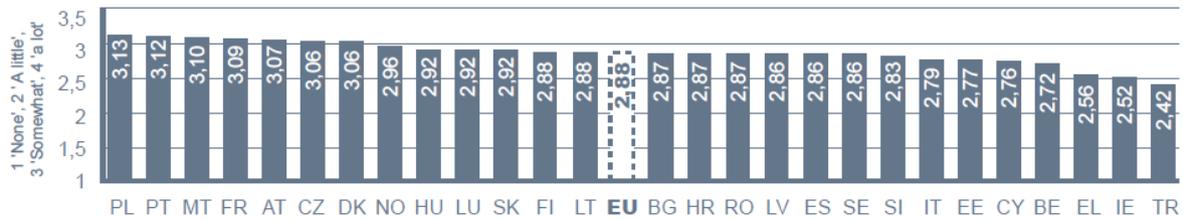
The assessment of teachers' confidence in social media skills is also uniform among the countries participating in eSchool4S, ranging around the European average. Hungary has the lowest result compared to other members of the eSchool4S network; however, the differences are quite small (European Commission, 2013, p. 103).



**Graph 19 Teachers' confidence in their social media skills (grade 11 general, country and EU level, 2011-2012)**  
Source: European Commission, 2013, p. 103.

### 4.1.5. Students' confidence regarding operational and social media skills

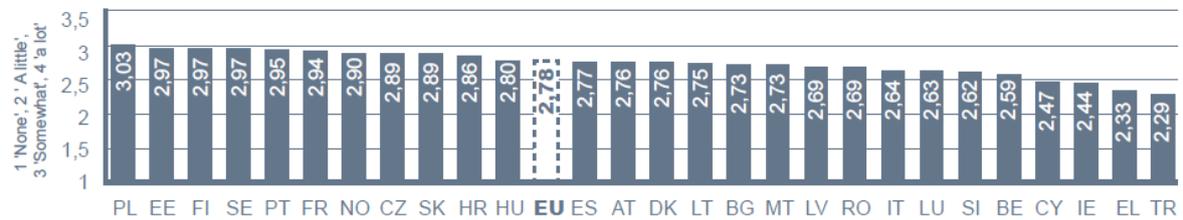
Students' confidence in their operational use of ICT is at the European average, slightly lower than the teachers' confidence (see graph 20). Slightly higher confidence in their operational skills, compared to the European average, is expressed by students from Austria, while the confidence of students from other countries is at the European average (European Commission, 2013, p. 106).



**Graph 20 Students' confidence in their operational use of ICT (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 106.

When we compare how students from countries of the eSchool4S network experience their capability for social media skills (see graph 21), it is evident that their assessment of their own competence is within the limits of the European average, while somewhat lower confidence in social media skills than the European average is that of students from Romania, although the difference is not significant (European Commission, 2013, p. 106).



**Graph 21 Students' confidence in using social media (grade 11 general, country and EU level, 2011-2012)**

Source: European Commission, 2013, p. 106.

## 4.2. Stakeholders' view of need for ICT improvement

As a part of the baseline study, interviews with relevant stakeholders were conducted in order to underline upgrading ICT infrastructure in the past five years, identify gaps between prescribed ICT use in schools and actual use and examine the need for ICT improvement. In this section an overview of stakeholders' opinions is presented, while more detailed results can be seen in the Country Reports (for more details see Appendix 4).

The majority of Bulgarian stakeholders consider that there is not enough available offers concerning e-learning and e-teaching courses for teachers and students in the country, there is no required equipment, and no technical expertise of teachers. Around 75% of respondents think that there is a strong necessity for technical support for schools to enable teachers to join web-based classrooms (Appendix 4, Bulgaria Country Report, p. 58-59).

In the opinion of stakeholders, no major improvements have been made in Croatia in the last five years regarding ICT usage in education. Even though national and strategic documents stress the importance of ICT in education and the development of ICT competences in students, nothing has been done on a larger scale. Schools depend upon themselves in efforts to implement positive changes and rely heavily upon their staff and skilled students. Some schools have introduced e-directories and smart boards. The methods of using ICT in education are lacking. Teachers require training and examples of good practice and time and space to experiment personally with the possibilities of ICT application in their own subject(s). There is also a problem of procurement of hardware and continuous update of software used in schools (Appendix 4, Croatia Country Report 2014, p. 67).

Stakeholders in Germany emphasise that training measures concerning the use of media in the classroom has improved the knowledge and skills of teachers in Baden-Wuerttemberg in the last five years. The training addressed the following topics: Moodle, e-learning, design and media techniques, information management and business computer science, multimedia and net-supported learning arrangements, object-oriented programming, etc. The main problems that remain to be solved regarding ICT at schools in Baden-Wuerttemberg are the implementation of data security and copyright regulations in schools when working with Moodle classrooms, establishing websites or using the school network (Appendix 4, Germany Country Report, p. 79).

The main improvement in Hungary in the last five year has been made regarding virtual learning environment - 70% of teachers have access to VLEs from home. In schools, teachers and students can use notebooks, special software, screen-reading software and self-developed educational materials and devices. Presently, the central issue is the implementation of the new Frame Curricula<sup>8</sup> at the local level (local pedagogical programmes), which is associated with the innovation of the teaching content and implementation of ICT in teaching. Another central issue is the failure of the ICT contents to be largely incorporated in teacher training. In addition, it is necessary to gather good practice examples of how ICT is used in schools and then to ensure their dissemination (Appendix 4, Hungary Country Report, p. 88).

In the stakeholders' opinion, a lot has been done in Romania in the last five years regarding the improvement of ICT infrastructure and teachers' training. In some of the schools, e-learning platforms, like Moodle or Advanced eLearning (AeL) have been purchased. Despite the mentioned efforts, in almost all schools computers connected to the Internet are needed because the existing ones are outdated and because there are not enough computers compared with the number of students. In addition, a better Internet connection (wireless), smart interactive whiteboards and tablets are needed. Furthermore, training for teachers is still needed, because only a small percentage of them are using e-learning platforms (Moodle, AeL) during their classes, even if they have the necessary equipment (Appendix 4, Romania Country Report, p. 97).

Main improvements in Serbia, in the opinion of stakeholders are schools equipped with computers and other devices, introduction of teacher training in ICT in a catalogue of in-service programs, development of the "Guidelines for Improving ICT Use in Education"<sup>9</sup> and many project activities related to improving ICT use in schools. However, there is a strong need for spreading teacher training for all teachers – courses dealing with ICT should be introduced both into pre-service and in-service teacher education programs. Internal seminars, organised in schools and led by those who are experts in ICT use (e.g. Computer Science teachers) have to be organised. Online teaching materials in Serbian should be developed and made accessible to all teachers in Serbia. Schools from municipalities with lower GDP should be better equipped (Appendix 4, Serbia Country Report, p. 107-108).

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<sup>8</sup> <http://www.nefmi.gov.hu/english/hungarian-national-core>

<sup>9</sup> [http://www.nps.gov.rs/wp-content/uploads/2013/12/Smernice\\_sredjeno\\_cir.pdf](http://www.nps.gov.rs/wp-content/uploads/2013/12/Smernice_sredjeno_cir.pdf)

In the last five years, in Slovakia, the number of computers in primary and secondary schools has increased, as well as the number of fast internet connections but the use of didactic technology and ICT has been rather low and the reason for this is the low level of ICT skills of teachers. There is no systemic support for the use of e-learning (e.g. technical support for hardware and software in schools is missing). Another problem is outdated ICT and insufficient funds for new purchases. It is expected that two recently launched national projects (2013-2015): Modern Education – Digital Education for General Knowledge Subjects<sup>10</sup> (introducing new education content in schools and using innovative teaching forms and methods) and Electronisation of Education System in Regional Schools Sector<sup>11</sup> (a number of schools will be equipped with digital facilities, such as tablets, notebooks, printers and 100 digital classrooms will be set up providing a complex solution to digital teaching and learning) will improve situation in Slovakia (Appendix 4, Slovakia Country Report, p.119).

### 4.3. Sustainable Development (SD) in Education

Comparative analysis of Country Reports shows that ESD is implemented in all the countries involved in the eSchool4s network but that the implementation models are somewhat different. The starting point for ESD implementation is the Decade of Education for Sustainable Development proclaimed by UNESCO for 2005-2014 according to which the integration of Sustainable Development in national curricula is of the greatest importance to the future for succeeding generations, and in accordance to which most countries have developed their own national strategies for the implementation of ESD. In the majority of countries ESD is not a separate subject but the elements of ESD are implemented at different levels of education (ISCED 1-3) and different types of schools through the programs of different subjects (see Appendix 4). In Slovakia the topic of SD is included in a cross-cutting topic of Environment Education which is reflected in teaching regular subjects (Appendix 4, Slovakia, Country Report, p. 120). In some countries, such as Romania the implementation of ESD is supported by various extracurricular activities, primarily by various projects implemented in cooperation with local communities, NGOs and international partners (Appendix 4, Romania Country Report, p. 98). A brief overview of the different models and the specifics of the implementation of ESD in the countries involved in the eSchool4s network are presented in the remainder of this text, while a more detailed review can be seen in the attached national reports.

ESD has been a cross-curricular principle overarching all subject areas and all types of schools in Austria. ESD is also listed as an “Educational Concern” taking up the initiative established by the UN Decade of ESD, which includes environmental protection as a strategic field of action<sup>12</sup>. The goal of the Austrian Strategy for ESD<sup>13</sup> is to transform the consciousness of sustainability amongst teachers and learners alike, and to link the actors. The ÖKOLOG-Network<sup>14</sup> supports schools in their ecological plans and initiatives. Furthermore, ÖKOLOG schools are encouraged to identify ecological projects as part of their quality plan. Austrian policy statement from 2013 recommends the inclusion of ESD in the new curricula for teacher education in University Colleges for Teacher Education & Universities (Appendix 4, Austria Country Report, p.47-48).

In addition to cross-curricula principles, ESD is also specifically mentioned in Austrian curricula at primary (ISCED1) and secondary level (ISCED2 and ISCED3). For example, the Chemistry curriculum refers to the interaction between Economy and Ecology and an environmentally aware use of the

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<sup>10</sup> [https://www.iedu.sk/digipedia/np\\_uips/Stranky/default.aspx](https://www.iedu.sk/digipedia/np_uips/Stranky/default.aspx)

<sup>11</sup> [https://www.iedu.sk/digipedia/elektronizacia\\_rs/Stranky/default.aspx](https://www.iedu.sk/digipedia/elektronizacia_rs/Stranky/default.aspx)

<sup>12</sup> <https://www.bmbf.gv.at/schulen/unterricht/index.html>

<sup>13</sup> [https://www.bmbf.gv.at/enfr/school/bine\\_strategiefolder\\_e\\_19458.pdf?4du97u](https://www.bmbf.gv.at/enfr/school/bine_strategiefolder_e_19458.pdf?4du97u)

<sup>14</sup> <http://www.oekolog.at/welcome.html>

environment (in class 4 there is a specific reference to the use of sources of energy); the curricula for Geography & Economics include knowledge and understanding of societal structures and the relationship between nature and man as the impact of man's actions on our environment (Appendix 4, Austria Country Report, p. 49).

At ISCED 3 level in Austria there is a large choice ranging from general academic education to vocational education. There are specific ESD content mentioned in curricula for general education within the subject areas of Biology and Environmental Education, Chemistry, Physics, Geography and Physical Education. Topics of ESD are mentioned in all branches of schools (Commercial, Tourism, Agricultural and Technical) specifically within subject areas such as technical workshops where the focus is on materials (Appendix 4, Austria Country Report, p. 50).

The analysis of the school curriculum in Bulgaria shows that the SD themes are most dealt with in the education area of Sciences and Ecology. The basic principles of Sustainable Development are intergraded in many subjects of Bulgarian curriculum such as Chemistry, Physics, Geography and Economics, Informatics, etc. For example, certain themes dealt with in teaching Computer Science are related to grid systems, safe use of the Internet and using technology for solving world global problems. In addition, the analysis shows that the concept of SD is profoundly discussed in the subject Geography and Economics. In some subjects, themes related to Sustainable Development are addressed and are studied in detail, but outside the context of SD. For example, in the subjects of Chemistry and Environmental Protection there is no emphasis on Sustainable Development, but many of the themes addressing the principles of SD (Appendix 4, Bulgaria, Country Report, p.56).

Moreover, in Bulgaria the concepts relating to the SD appear in the form of educational outcomes of individual subjects. For example, through teaching Geography and Economics the following educational outcomes directly related to SD should be accomplished: students will be trained to explain global issues related to natural resources and the environment, which should be protected and used rationally; to assess Sustainable Development as a global policy; to debate on the issues of Sustainable Development of Bulgaria (Appendix 4, Bulgaria Country Report, p. 57).

The SD themes are incorporated in the Croatian National Curriculum. They are not included in one separate subject but are rather distributed among various subjects. The number of themes and their teaching differ by types of secondary schools and differ in general high schools and vocational schools. Some of the themes present are: protection of the environment, conservation of nature and management of natural resources, diversity in biology and landscape, renewable energy sources and energy efficacy, management of waste, corporate social responsibility, sustainable production and consumption, etc. (Appendix 4, Croatia Country Report, p. 68).

The concept of SD is greatly stressed in the Croatian National Curriculum<sup>15</sup> and the Action Plan for Sustainable Development<sup>16</sup> is ongoing. However, as the operational development of the implementation of Sustainable Development into classrooms is missing, the obligation to follow certain guidelines is lacking. Therefore, it is up to every teacher to decide the extent of importance they plan to give to the Sustainable Development topics in their teaching. It is also up to every school and its teachers to decide whether and to what extent the Sustainable Development topics in various subjects will be interconnected (Appendix 4, Croatia Country Report, p. 65).

In Germany (Baden-Wuerttemberg), the national educational standards for certain subjects and subject combinations contain information and competencies in the field of SD. Thus every relevant curriculum also contains topics concerning sustainability. In the framework of the national educational standards, general guiding perspectives (ESD; prevention and health promotion; education for tolerance and interaction with diversity) and topic specific guiding perspectives

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<sup>15</sup> [http://www.azoo.hr/images/stories/dokumenti/Nacionalni\\_okvirni\\_kurikulum.pdf](http://www.azoo.hr/images/stories/dokumenti/Nacionalni_okvirni_kurikulum.pdf)

<sup>16</sup> [http://www.mzoip.hr/doc/Zastita\\_okolisa/Education\\_for\\_Sustainable\\_Development\\_AP.pdf](http://www.mzoip.hr/doc/Zastita_okolisa/Education_for_Sustainable_Development_AP.pdf)

(professional orientation; media education; consumer education) are formulated. These perspectives are approached across different subjects (Appendix 4, Germany Country Report, p. 79).

SD topics are explicitly mentioned at secondary and high schools (general and vocational schools) in the following subjects: Biology, Business Administration, Chemistry, Economics, Ethics, Geography and Scientific work. In addition, the topics like globalisation in politics or cultural knowledge in foreign languages also include Sustainable Development in a broader sense and do not name the topic explicitly. Sustainable Development itself is represented to a smaller extent in the curricula of Baden-Wuerttemberg. Nevertheless it depends on the teacher to what extent this topic is included in the lessons. There are subject combinations at general secondary schools such as MNT (man-nature-technology), scientific work (Biology, Chemistry and Physics) that deal with SD related themes (Appendix 4, Germany Country Report, p. 80).

SD themes are present in the national curriculum of Hungary. At the school level various forms of extracurricular methods (activities, camps, museums and zoo pedagogy, special days, local initiatives competitions, exhibitions, etc.) are used for harmonisation of school subjects related to the environment. Since environmental education has no separate school subject, SD topics are realised mainly in other subjects or in extracurricular teaching activities. This is so-called “diffusion” educational approach. The learning content includes the natural, the constructed environment as well as aspects of economic, civic and democratic education (Appendix 4, Hungary Country Report, p. 88).

The National Strategy for Environmental Education<sup>17</sup> is widely appreciated and the Hungarian Society for Environmental Education<sup>18</sup> has launched a widespread initiative for “school-greening” aiming to enlarge school-based and extracurricular environmental educational good practice. Furthermore, a possibility of introducing a compulsory subject in the secondary schools is considered for the age 11-14, which would integrate the knowledge from other subjects in the holistic concept of Sustainable Development (Appendix 4, Hungary Country Report, p. 89).

In Romania, ESD is promoted by the Ministry of National Education policies. Key themes of Sustainable Development are included in modules from the common core curriculum or optional subjects at all levels of education, including vocational and technical education. Sustainable Development themes are included in several subjects in different extent, according to their specifics. Among the most common subjects that integrate SD themes, are: Biology, Geography, History, Economics, Ecology, but also: Advice and Guidance, Entrepreneurship Education, Civic Culture, Developing Human Resources, Sustainable Tourism Development and others. The SD themes are not presented as separate lessons, but integrated in other lessons (Appendix 4, Romania Country Report, p. 98).

Additionally, ESD in Romania is supported by development and implementation of projects, such as: After School, Environmental Education, Eco-Kindergarten, Health Education; and by organisation of competitions and school contests (for example, Earth Sciences-interdisciplinary contest, FOOD4U, etc.). In the domain of informal education various competitions are organised by NGOs in order to increase awareness about ESD (Appendix 4, Romania Country Report, p. 98).

In Serbia, SD is not a separate school subject but the elements of SD are integrated in the objectives and tasks of a number of subjects such as Chemistry, Biology, Geography, Physics, Sociology, Civic Education and Foreign Language. For example, the goal of learning Chemistry is to develop a responsible relationship toward oneself, others and environment. Tasks in chemistry teaching related to SD are understanding of importance of chemical production for contemporary society; understanding of connection between chemistry, technology, social sciences and humanities; understanding the importance of chemistry and chemical production for SD; development of

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<sup>17</sup> <http://www.ofi.hu/2-quality-education-for/2-5-education-for>

<sup>18</sup> [http://mkne.hu/index\\_english.php](http://mkne.hu/index_english.php)

responsible attitude toward substance use in everyday and professional life; understanding the relationship between chemistry and technological development, and ecology. Concepts related to SD present in Chemistry are hazardous waste; air, water, soil pollution; petroleum and natural gas; water resources and treatment, roles and importance of vitamins, hormones, antibiotics; carcinogenic substances, etc. (Appendix 4, Serbia Country Report, p. 108).

However, subject curricula in Serbia rarely comprehensively present SD. Although SD is mentioned in the goals and tasks of most curricula, it is not visible in the thematic blocks and lessons. It remains present only at the abstract level (especially in the case of Physics). In some cases (Biology, Geography and Sociology), there are many topics implicitly related to SD (Appendix 4, Serbia Country Report, p. 108-109). Therefore, it is recommendable to introduce SD in more details and more explicitly into all levels – from the level of goals and tasks, to the level of concrete lessons and subtopics, and to provide guidelines for teachers as to how to achieve these goals through concrete teaching methods and materials.

In Slovakia, SD is present in several subjects, but mainly in a cross-cutting subject *Environmental Education* which includes basic concepts from ecology and environment, biochemistry and geochemistry of the environment, processing and protection of (drinking) water, alternative sources of energy, collection and processing of waste (Appendix 4, Slovakia Country Report, p. 120). At general secondary schools, information about SD is revealed through the subjects such as Biology, Geography and Chemistry, and to a smaller extent through Civic Education and languages. The most frequently mentioned topics are protection of nature and land, human activity and the environment, relationship of the man and the environment (local and global problems). SD is included in teaching within thematic areas (e.g. within the area Man and the Nature covering the subjects of Biology, Chemistry, Physics, Geography and cross-cutting topic of Environment Education). Secondary vocational schools included the environmental issues into general subjects as well as professional subjects (Appendix 4, Slovakia Country Report, p. 120).

Additionally, participation in various projects, in Slovakia provides the opportunity to make interconnections among subjects in the topic of SD (e.g. “A Chance for the Blue Danube”<sup>19</sup>- an international competition of young artists on ecological topics; Green School - a holistic methodology of environmental protection in schools<sup>20</sup>; participation in the EU LLP programme (Comenius, Leonardo)<sup>21</sup> aimed at SD or environment, etc.) .

#### 4.4. Stakeholders’ view of SD themes that should be included into national curriculum

As a part of the baseline study, interviews with relevant stakeholders were conducted in order to underline priorities of relevant subject matters of SD that should be included in the national curriculum and assess preparedness of schools and teachers to include these priority issues in their teaching. Opinions of stakeholders will help in formulating recommendations and possible paths for improving ESD use in teaching. In this section an overview of stakeholders’ opinions is presented, while more detailed results can be seen in the national reports.

According to the opinion of Bulgarian stakeholders, the representation of sustainable development in the national curriculum matches the importance of that concept for today's world coincides,

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<sup>19</sup> <http://www.danubeparks.org/?story=404>

<sup>20</sup> <http://www.zelenaskola.sk/en>

<sup>21</sup> [http://www.naep.cz/index.php?a=view-project-folder&project\\_folder\\_id=336&](http://www.naep.cz/index.php?a=view-project-folder&project_folder_id=336&)

although not fully. Despite their belief that the performance of SD in the national curriculum is not complete, stakeholders haven't committed to specific recommendations and ideas to include new topics in the national curriculums (Appendix 4, Bulgaria Country Report, p. 58).

In the opinion of Croatian stakeholders, all the themes listed by the UNECE are important for the national curriculum, but the problem lies in the lack of a defined working framework (e.g. there is no regulation of the teaching process for SD, no methods recommended, no criteria for the assessment and the relation of the subjects teaching SD remains undefined). Some of the most important themes are citizenship, democracy and government, human rights, elimination of poverty, biodiversity, environment protection, climate changes, and environmental health, corporate and social responsibility (Appendix 4, Croatia Country Report, p. 69).

Stakeholders in Germany pointed out that policy paper *Education for Sustainable Development 2005 to 2014 in Baden-Wuerttemberg – designing the future – learning about sustainability* underlines the importance of SD themes in German national curricula. For that reason, the National Committee of the UN Decade has defined annual topics for the implementation of the UN Decade. The objectives of the annual topics are to better focus on the activities of the decade, to activate new partners and to accentuate the concerns of ESD. The annual topic for 2014 is review of the topics from previous years such as Cultural Variety; Water; Energy; Money; Town; Nutrition and Mobility (Appendix 4, Germany Country Report, p. 80).

Key issues raised by stakeholders in Hungary are elementary values and life quality; learning and organizational thinking; labour market and employment; reformation of the public administration; development of regional and rural areas; equality; family, population, and issues between generations; sustainable communities; cooperation on an international level; infrastructure; innovation & comparative advantages; participation of the public; sustainable consumption and production; health; environment suitable for living (Appendix 4, Hungary Country Report, p. 89).

According to the opinion of stakeholders, the main problem in Romania regarding the SD themes is not their inclusion into national curriculum, but the issues of inter-disciplinarily approach and the level of understanding and awareness of students. The children are receiving important information about these topics, but they are not able to make connections between them, to have a global overview and approach about what Sustainable Development means as a whole. In addition, it is important to approach Sustainable Development at a global scale and to understand equity issues and cultural differences (Appendix 4, Romania Country Report, p. 99).

Serbian stakeholders indicate the problem of inconsistencies in the existing Law on Education. One of the goals of primary school education is to raise awareness about Sustainable Development and protection of the environment but there is no such statement in the Law on Secondary Education (see Official Gazette of RS, 72/09). Instead, secondary schools have to develop the program for environmental protection in cooperation with the local government. In the opinion of Serbian stakeholders all SD relevant themes are included in the curricula, but their interconnections could be better and more stressed. Additionally, the economic crisis and poverty in Serbia are obstacles to thinking of SD as a necessary and important subject for our future (Appendix 4, Serbia Country Report, p. 109-110).

Stakeholders in Slovakia are waiting for the last draft of a comprehensive *Strategy of Environmental Education in Slovakia till 2030* (Appendix 4, Slovakia Country Report, p. 121). A part of the Strategy is formulating a new content of the cross-cutting topic Environmental Education at ISCED 1-3 levels; reflect it to the training of future teachers, as well as present teachers. Regarding the themes, Environmental Education will cover the following: development of relationship between the man and the environment, links between the global and local environmental problems, 16 principles of SD, economic and social aspects of environmental problems, and impact of consumerism on the environment, ecological footprint, and adaptation to climatic change, self-reliance of the individual and communities, environmental legislation, green economy. The Strategy stresses the need to

strengthen Environmental Education in social science subjects, especially Civic Education, Ethical Education and History, bring back the subject of technical skills (e.g. gardening workshops) to the national curriculum and preserve the school gardens and other green areas and use them during teaching (Appendix 4, Slovakia Country Report, p. 121).

## 4.5. Teachers' view of e-learning and ESD

Teachers' view of e-learning and education for Sustainable Development, as well as their interest to engage in the eSchool4S project were received on the basis of a focus group (see Appendix 3). In each country of the eSchool4S network two focus groups were carried out, where one focus group involved “highly motivated”, and the other one “moderately motivated” teachers<sup>22</sup>. Such selection of teachers reflects the real situation in schools, where teachers often differ significantly in terms of their motivation and willingness to engage in various extracurricular activities, as well as readiness for continuous professional development. This yields a better insight into how the different categories of teachers perceive e-learning and ESD. It was expected for teachers in these two groups to have contrasting views on certain topics, which was most evident in teachers from Germany. The obtained data reflect trends in the attitudes of teachers distinctive for individual countries from the e-School4S network. However, these results should be treated solely as guidelines in the project implementation, which suggest everything that should be taken into account (including the cultural specificities of the countries in the eSchool4S network) in order to realise the project successfully, and not as the results that can be generalised to the entire population of teachers. Below are the findings that reflect typical attitudes and opinions of teachers, while the detailed results can be seen in the national reports.

### 4.5.1. Teachers' attitude towards ICT and e-learning

Teachers in Bulgaria are more confident in using ICT and its influence on learning among students. They also organize more activities based on ICT. This is especially the case when schools have general equipment, but also even when the equipment provision is low (Appendix 4, Bulgaria Country Report, p. 59).

Teachers in Croatia generally express a positive attitude towards e-learning, but there is a lack of implementation of e-learning in the Croatian education system. It seems there is still a large number of teachers in Croatia who are not interested in expanding their ICT knowledge (outside the basics) or intimidated by the concepts of web-based classroom (Appendix 4, Croatia Country Report, p. 69).

Teachers' attitudes towards e-learning in Germany are divided. On the one hand, there are teachers who take e-learning as a must because their colleagues have agreed upon the use of e-learning for certain parts of their lessons. On the other hand, some interested teachers are aware of the chances and benefits e-learning brings to students. Both sides support the view that the use of e-learning in lessons depends on the subject, the age of the students and even on the type of school (Appendix 4, Germany Country Report, p. 81).

The attitude of teachers towards ICT supported education is largely negative in Hungary. The available e-learning materials are not fully utilised, since teachers lack competence and motivation (Appendix 4, Hungarian Country Report, p. 89).

Teacher in Romania are willing to further implement ICT in educational activities and they have a positive attitude and interest in specific techniques regarding the ICT. Some of them are doing their

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<sup>22</sup>The involvement in extra-curricular activities was the indicator for dividing the teachers in two groups.

lessons by using e-learning platform like Moodle or AeL (Appendix 4, Romania Country Report, p. 99).

Teachers in Serbia perceive ICT technology as a tool that serves for increasing students' achievement. They usually use ICT in project teaching and multidisciplinary teaching, as well as for research and cooperative learning. Implementation of ICT in teaching is mainly the results of individual teachers' endeavours and engagement and not of systemic support and actions. Teachers also see ICT as a way to "extend" the lesson – to motivate students to learn at home and to prepare themselves for upcoming lessons. According to teachers' opinion ICT can enable teachers and students to, for example, do quick tests or quizzes, which can result in effective assessment and self-evaluation. Additionally, teachers believe that they have a role of moderators in classrooms and therefore it is necessary for them to be familiar with ICT, to be able to show students how to use ICT correctly and as a tool for improving their critical thinking (Appendix 4, Serbia Country Report, p. 110).

Regarding e-learning, the teachers from Slovakia had very little experience and were not ready to provide opinions. The interviewed teachers do not have experience in online teaching. E-learning is not widely used at secondary schools in general. Some teachers use some e-learning features in their teaching. However, teachers use various ICT tools (Appendix 4, Slovakia Country Report, p. 121).

#### **4.5.2 Teachers' attitudes toward SD and ESD**

Teachers in Bulgaria are not familiar with the topic of sustainable development and its principles, although they understand that a good education is essential to achieving sustainable development (Appendix 4, Bulgaria Country Report, p. 60).

In general, teachers in Croatia are aware of the importance of Sustainable Development in teaching and see Sustainable Development as a teaching element crucial for progress and a better world. They search for ways to ignite the consciousness of the importance of Sustainable Development in their students. They are looking for ways to implement Sustainable Development into classroom and ways to make it more interesting to students (Appendix 4, Croatia Country Report, p. 69-70).

There is division regarding teachers' attitudes toward SD and ESD in Germany. On the one hand, SD is a must for those teachers who are supposed to teach sustainability in their lessons according to the specific curriculum. On the other hand, there are teachers who have a positive view of SD topic and who are active on integrating Sustainable Development in the education of their students (Appendix 4, Germany Country Report, p. 81).

In Hungary many teachers had difficulties in defining the concepts of SD and ESD in their own words. Teachers' definitions and attitudes are embedded in their value system. According to teachers' opinion, people's behaviour can be changed if they obtain more information about the issues regarding SD, but it is crucial to have pro-environmental norms beforehand. In order to influence future generations and their attitudes and SD behaviour, the main strategy would be to approach students with pro-environmental values to teacher education programmes (Appendix 4, Hungary Country Report, p. 89-90).

Although teachers in Serbia perceive the SD issue as highly relevant, they believe that both they and their colleagues do not feel at ease when it comes to this issue because they do not have adequate knowledge and competence. Some teachers express attitude that the concept of "Sustainable Development" is more "for developed countries" and that there is not enough awareness in Serbian culture about the care for people and their health, for nature and resources. Additionally, teachers believe that in primary education there are more possibilities to influence pupils' values and habits

and to teach them to appreciate nature, their own health, and to contribute positively to their own society (Appendix 4, Serbia Country Report, p. 111).

In general, the teachers in Slovakia are not aware of the national Strategy of SD from 2001. They teach topics they see important such as the greenhouse effect, invasive plants, and illegal landfills. The teachers feel that more attention should be paid to SD's practical aspects in people's lives and therefore their classes take part in various environmental projects and environment-friendly activities (e.g. cleaning of streams, collection of old batteries, looking for illegal landfills, separation of waste, examination of water quality, etc.) According to the opinion of teachers, SD is important as it relates to all spheres of life. It relates to all natural science topics but also civic education, foreign languages and physical education (Appendix 4, Slovakia Country Report, p. 121).

The teachers in Slovakia believe that SD should be more dealt with, preferably continuously, not divided into several subjects (for example, before 2008, there was a specific subject of Ecology at 4<sup>th</sup> grade of secondary general schools and so a concentrated attention could be devoted to SD issues). Additionally, teachers think that a more interdisciplinary approach towards the topic of SD is needed. The teachers are ready to include SD into their teaching and they try to coordinate the coverage of SD within thematic areas but it is their decision how much time they spend on these topics (Appendix 4, Slovakia Country Report, p. 122).

### 4.5.3. Participation in the eSchool4S project

A small number of Bulgarian teachers have the opportunity to participate in international education networks and the majority of them need methodological and technical assistance to use the web-based classroom. One of the main problems in Bulgaria is the lack of teachers' motivation (Appendix 4, Bulgaria Country Report, p. 59).

Teachers from Croatia see the project as a way of personal and professional development and aim to enrich their range of skills, develop their competencies and implement new methods and strategies to teach more successfully. Some teachers recognized eSchool4S project as a continuation of their education in the field of use ICT in teaching and some of them are interested in the topics of e-education and/or Sustainable Development and because of that would like to join the project. Many teachers in Croatia are interested in international cooperation and are excited about the possibilities of cooperation and exchange of ideas with colleagues on an international level. Regarding participation in the eSchool4S project, the major problem for teachers is not so much ICT knowledge and competences, but the knowledge of the English language, as the official language of the project (Appendix 4, Croatian Country Report, p. 70).

The preferred way to work internationally for German teachers is twinning with foreign schools as there is the chance to talk to foreign teachers and students in person and to visit them and get to know their culture in person (Appendix 4, German Country Report, p. 81).

The majority of teachers, in Croatia and Germany, lack experience in cooperation with international educational networks and the work in an international educational network are rather rare. However, some teachers in Croatia are already involved in European projects and want to continue their participation in such projects and others are looking for ways to include students in international projects (Appendix 4, Croatian Country Report, p.70 and German Country Report, p. 81).

Regarding the Romanian teachers' experience in international educational network, most of them participated in projects like *Leonardo da Vinci*, *Comenius* and in several strategic projects (Appendix 4, Romania Country Report, p. 99).

All teachers in Serbia are willing to participate in web-based classrooms. They think that SD is very important, but they do not feel very competent about ICT and SD (Appendix 4, Serbia Country Report, p. 112).

Older teachers in Slovakia were not much interested in the project. However, younger teachers are much more active. Participation in the project means that the school has sufficient ICT equipment, that the teachers know how to use it, and have a good command of English (Appendix 4, Slovakia Country Report, p. 122).

## **5. Regional (eSchool4S) Overview Update for 2015**

### **5.1. New national data concerning technical capacities for e-learning**

In 2015, 82% of the Austrian households were equipped with an Internet connection, 81% of these households have broadband connections. The Internet is used mostly for sending or receiving e-mails, social networking, gathering information about goods or services, reading online news, newspapers or magazines, and Internet banking (Appendix 5, Austria Country Report Update for 2015, p. 129).

In Bulgaria, there is no official information published about Internet connectivity, number of school computers per child, the amount of use of ICT in the classroom and existing courses, etc. (Appendix 5, Bulgaria Country Report Update for 2015, p. 131).

Out of 39,409 households in Germany around 85% have internet access. There are around 51,000 computer users in these households out of which 49,000 use the internet (Appendix 5, Germany Country Report Update for 2015, p. 135).

In Hungary 73% of households have internet connection. 72.4% of them have broadband internet connection (Appendix 5, Hungary Country Report Update for 2015, p. 139).

In 2015, according to National Institute of Statistics, more than 61% of households from Romania had access to the Internet. Regarding the Internet broadband connections from fixed points, in June 2015 there were 4.1 million connections, with 0.5 million more compared with the situation from 2 years ago, June 2013, namely 3.6 million connections (Appendix 5, Romania Country Report Update for 2015, p. 142).

According to the Statistical Office of the Republic of Serbia of 2015, 63.8% of the population are Internet users (Appendix 5, Serbia Country Report Update for 2015, p. 146).

In Slovakia 79% of the households have internet access (Appendix 5, Slovakia Country Report Update for 2015, p. 149).

### **5.2. New national data about teachers' and students' ICT use**

Austrian Country Report is based on the data of the OECD study (OECD, 2015) as presented in section 5.3.

Regarding teachers' and students' ICT use the situation in Bulgaria has not changed significantly compared to 2014 (Appendix 5, Bulgaria Country Report Update for 2015, p. 131).

In Croatia, new *Education, Science and Technology Strategy* recognised the need to invest into education for teachers in the field of ICT usage in teaching and to develop their digital competences, as well as need to invest into equipment at schools, so that ICT may be implemented into classroom (Appendix 5, Croatia Country Report Update for 2015, p. 133).

In Germany, the use of tablets in school classes will be piloted in 40 vocational schools with up to 5,400 students in total. The pilot schools have been equipping their classes with tablets to develop and test pedagogical concepts - especially under the aspect of individual advancement of students. Teachers will be accordingly qualified at the Landesakademie Esslingen. A training concept for the support of the teachers at the pilot schools will also be developed by the Landesakademie in cooperation with the State Institute for School Development (Appendix 5, Germany Country Report Update for 2015, p. 135).

In Hungary, the *National Education Portal* was launched, developed by the Education Development Institute. Interactive exercises, knowledge tests, digital curricula and textbooks will be available on the site. Students, parents and teachers can use it for free of charge for classroom learning and teaching, as well as, for learning at home (Appendix 5, Hungary Country Report Update for 2015, p. 140).

In Romania, ICT is part of the initial education of all teachers and “Computer-Assisted Instruction” being a mandatory subject in Initial Teacher Training courses. Additionally, there are several introductory and/or advanced ICT courses dedicated to teachers, organised by Teacher Training Centre or by different universities, most of them being developed on the Moodle platform (Appendix 5, Romania Country Report Update for 2015, p. 142).

In Serbia, the use of ICT is recognised as an important learning outcome for a number of high school subjects (Computer Science, Psychology, Philosophy, History, Music Culture, Physical Education, etc.). The *National Curriculum Framework – Foundations of Learning and Teaching: Guidelines* for application lists several examples of good practice in the domain of ICT use, but it lacks the statistical data as to the percentage of students / teachers actively using ICT in regular daily activities (Appendix 5, Serbia Country Report Update for 2015, p. 146).

In Slovakia, the teachers’ ICT competencies have increased and more teachers report that their level of ICT competency has changed from basic to intermediate. The Methodology and Pedagogy Centres offer accredited courses for teachers on use of ICT in teaching in general, and specifically for using ICT for some subjects. Additionally, the application of ICT in teaching of social science subjects has increased. (Appendix 5, Slovakia Country Report Update for 2015, p. 149).

### 5.3. OECD data about ICT capacity

In 2015, OECD published the report ‘Students, Computers and Learning - Making the Connection’ providing “comparative analysis of the digital skills that students have acquired, and of the learning environments designed to develop these skills” (OECD, 2015, p. 4). The OECD report presents data from the PISA 2012 study which involved all the countries from the eSchool4S project. This section will present the data about ICT capacity for eSchool4S countries and outline the differences among countries.

According to the OECD data, 95.8% of students, on average, have at least one computer at home (OECD, 2015). Among eSchool4S countries situation is the best in Austria and Germany where every student has one computer at home, and the worst in Romania where 87.1% of students reported to have one computer at home (see Table 1). Additionally, the highest percentage of students from Germany (54%) and Austria (45.3%) reported to have three or more computers at home, compared to Romania where only 8.7% students have three or more computers at home.

Table 1: OECD data about the number of computers per student at home (OECD, 2015)

	Students with at least one computer at home	Students with three or more computers at home
Austria	99.5	45.3
Germany	99.4	54.0
Croatia	97.5	16.2
Hungary	96.2	24.2
Serbia	95.7	10.7
Slovakia	94.4	26.4
Bulgaria	93.5	17.0
Romania	87.1	8.7
<b>OECD average</b>	<b>95.8</b>	<b>42.8</b>

Countries from the eSchool4S network differ in the number of school computers. The data about the ICT use at school shows that OECD average is 4.7 students per school computer (OECD, 2015). The situation in Slovakia and Bulgaria corresponds to this average (see Table 2). The best student-computer ratio is in Austria and Germany with two students per school computer, following Croatia and Hungary with three students per one school computer. A significantly higher number of students per one computer are present in Romania (9:1).

Compared to the OECD average (72%), the highest percentage of students from Romania (82%), Hungary (81.4%) and Austria (80.2%) say that they use computer at school (OECD, 2015). Regarding the usage of computers at schools (see Table 2), students from Germany are close to the OECD average but students from Serbia are below the OECD average (68.7% of Serbian students say that they use computer at school). For Croatia and Slovakia there are no data for this indicator (see Table 2).

Table 2: OECD data about ICT use at school (OECD, 2015)

	Number of students per school computer	Students using computers at school
	Mean	%
Austria	2.0	80.2
Germany	2.2	74.7
Croatia	2.6	/
Hungary	2.9	81.4
Serbia	4.2	68.7
Slovakia	4.6	/
Bulgaria	5.0	78.3
Romania	8.8	82.0
<b>OECD average</b>	<b>4.7</b>	<b>72.0</b>

On average, students spent 25 minutes on weekdays using the Internet at school (OECD, 2015). The use of the Internet in school on weekdays is above the OECD average in some eSchool4S countries, such as Slovakia (32 minutes per day), Hungary (30 minutes per day) and Austria (29 minutes per day). In Croatia and Serbia the use of the Internet at school on weekdays is around the OECD average (see Table 3). Among eSchool4S countries, the lowest amount of time spent using the

Internet in school on weekdays is registered in Germany (14 minutes per day) possible due to high rate of the use of tablets in school (Germany Country Report Update for 2015, p. 135). For Bulgaria, Romania and Slovakia there are no data available about the time students spend using the Internet in school during weekdays.

Table 3: OECD data about the time spent using the Internet (OECD, 2015).

	In school, on weekdays	Outside of school, on weekdays	Outside of school, on weekends	Students who reported using the Internet outside of school for more than 6 hours during a typical weekday
	Minutes	Minutes	Minutes	%
<b>Slovakia</b>	32	116	152	8.1
<b>Hungary</b>	30	112	156	8.0
<b>Austria</b>	29	96	119	6.6
<b>Croatia</b>	23	103	143	7.4
<b>Serbia</b>	20	110	136	9.9
<b>Germany</b>	14	114	144	8.6
<b>Bulgaria</b>	/	/	/	/
<b>Romania</b>	/	/	/	/
<b>OECD average</b>	<b>25</b>	<b>104</b>	<b>138</b>	<b>7.2</b>

In general, the time spent in using the Internet outside of school (both on weekdays and weekends) is higher than the OECD average among students from Slovakia (116 and 152 minutes per day), Hungary (112 and 156 minutes per day) and Germany (114 and 144 minutes per day) (see Table 3). Students from Croatia reported only higher usage of the Internet than the OECD average during weekends (143 minutes per day) and students from Serbia during weekdays (110 minutes per day). Austrian students use their computers outside of school less often than in other OECD countries. On average an Austrian student spends 96 minutes a day on the Internet during weekdays and 119 minutes during weekends. On the other hand, the OECD average is 104 and 138 minutes per day. For Bulgaria and Romania there are no data about the time students spend using the Internet outside of school during weekdays and weekends.

On average across OECD countries, 7.2% of students reported using the Internet outside of school for more than 6 hours during a typical weekday (OECD, 2015). Among eSchool4S countries, only Austrian students are below this average (6.6% students reported using the Internet more than 6 hours per day). In other countries participating in the eSchool4S project, the number of students reported using the Internet more than 6 hour during a typical weekday are higher than the OECD average (see Table 3). For Bulgaria and Romania there are no data for this indicator.

## 5.4. New national data about representations of SD themes in national curriculum

Since 2014 there have been no amendments to national curricula concerning ESD in Austria, Bulgaria, Croatia, Hungary, Germany, Serbia and Slovakia.

In Romania, the Ministry of Education has introduced an optional subject for secondary schools, called "Education for Development". This course proposes an interdisciplinary approach of issues

such as globalisation, development/sustainable development and global citizenship (Appendix 5, Romania Country Report Update for 2015, p. 143)

In Serbia, the new *National Curriculum Framework – Foundations of Learning and Teaching* recognised several competencies related to SD (responsible participation in the democratic society, responsible relationship to one's own health and responsible relationship to the environment) as important competencies for the end of secondary education (Appendix 5, Serbia Country Report Update for 2015, p. 147)

In 2015, the Methodology and Pedagogy Centres (Institution for In-service Teachers' Education and Training) in Slovakia offered to teachers continuing education related to environmental and global education, such as Human rights, Environmental education, Multiculturalism, Global development education, Environmental ethics, Inclusive education, Geography, Global education and its application in practice (Appendix 5, Slovakia Country Report Update for 2015, p. 151)

## **5.5. Additional new national data and initiatives**

In Germany, within the action programme "To Design Future - Education for Sustainable Development" different projects are implemented to raise awareness of elementary level students on how to think and act sustainably (Appendix 5, Germany Country Report Update for 2015, p. 136).

In Hungary, as an initiative of the EMMI (Ministry of Human Resources) the theme about sustainability will be carried out in April 2016 (Appendix 5, Hungary Country Report Update for 2015, p. 141).

In Romania, in the new adopted National Strategy on Climate Change and Economic Growth based on Low Carbon Emissions and National Action Plan on Climate Change (2016-2020) there are references to Education for Sustainable Development (Appendix 5, Romania Country Report Update for 2015, p. 146).

In Slovakia, ESD has got important position in 3 issued documents that support ESD: 1). National Strategy related to Youth in the Slovak Republic for 2014-2020; Pedagogical-Organisation Instructions for Schools in the academic year 2015/16 and 3) Midterm Strategy for Development of Cooperation of SR for 2014-2018 (Appendix 5, Slovakia Country Report Update for 2015, p. 154).

## **6. Regional (eSchool4S) Overview Update for 2016**

### **6.1. New national data concerning technical capacities for e-learning, teachers' and students' ICT use**

In Bulgaria, high-speed broadband is available for almost 72% of the households, but rural areas completely lack the high-speed coverage. Only 55% of the Bulgarian households are subscribed to a fixed broadband connection, and half of them use broadband (Appendix 6, Bulgaria Country Report Update for 2016, p. 155). The Strategy for the Effective Implementation of ICT in Education 2015-2017 foresees ICT training of Bulgarian teachers and students; development of electronic content and a unified IT backbone network and cloud infrastructure. Up to now, a part of the short-term objectives has been met (Appendix 6, Bulgaria Country Report Update for 2016, p. 156).

In Germany, the “tabletBS” project for developing and testing the digital lesson scenarios is still going on. During 2016, even more schools have joined the project to establish tablet classes in their schools and besides vocational schools, general education schools are following this trend. Within this project, over 5,000 students will study with digital support in the near future. Consequently, there is also a rapidly growing demand for further teacher training in the field of tablet usage in school lessons. The usage of tablets in school lessons is being tested in vocational schools in Baden-Wuerttemberg through several pilot projects. For example, after a project in the Vocational Gymnasium started in 2015/16, another pilot project was initiated within dual education in cooperation with the training companies (Appendix 6, Germany Country Report Update for 2016, p. 159).

In Hungary, 73% of households have internet connection and 72.4 % of them have broadband internet connection (Appendix 6, Hungary Country Report Update for 2016, p. 162). The broadband internet coverage should be present in the entire country by the end of 2018 and 1 million households will have super-fast internet (Appendix 6, Hungary Country Report Update for 2016, p. 162). Hungary participates in the eTwinning project that promotes school collaboration in Europe through the use of ICT by providing support, tools, services for schools, and opportunities for free and continuing online professional development for teachers (Appendix 6, Hungary Country Report Update for 2016, p. 162). Additionally, for monitoring and self-evaluation of how ICT is incorporated into the different areas of school pedagogical work, Hungary uses the eLEMÉR assessment tool (Appendix 6, Hungary Country Report Update for 2016, p. 162). The Working Group on Digital and Online Learning works in Hungary and continuously supports development of educational materials, educational websites, services related to innovative learning serving (Appendix 6, Hungary Country Report Update for 2016, p. 163). Furthermore, Hungarian students and teachers will have the opportunity to improve their ICT competences within the Human Resources Development Operational Programme (Appendix 6, Hungary Country Report Update for 2016, p. 163).

In 2016, 89% of the Romanian households were connected to the fixed internet broadband and 72% of homes were covered with the Next Generation Access (NGA) network (with speeds of more than 30Mbps). In terms of take-up, the number of subscriptions to fast broadband is among the highest in the EU (Appendix 6, Romania Country Report Update for 2016, p. 165). A national study conducted in 2016 by GfK, shows that in rural areas 95% of the schools are connected to the internet but use connection only for administrative purposes; 90% of the schools have an IT lab but only 50% of it are connected to the internet; and only 75% of the ICT equipment in schools are actually in use (Appendix 6, Romania Country Report Update for 2016, p. 165). The GfK study shows that 63% of teachers have an open attitude regarding the use of new technologies in the classroom but their experience in teaching digital literacy is very low. Additionally, results show that 80% of students have the internet access at home but their computer-related activities are more linked with entertainment than with school activities and educational purpose (Appendix 6, Romania Country Report Update for 2016, p. 165).

The latest information on the technical capacities for 2016 issued by the Statistical Office of the Republic of Serbia is that 65.8% of the Serbian households own a computer and that 64.7% of the households have the internet access (Appendix 6, Serbia Country Report Update for 2016, p. 167). At the beginning of 2016 there were 42 accredited University programs for online learning, which is 83% more than in 2014 and 23% more than in 2015, thus reflecting the increased recognition of the

potentials of and the need for e-learning among higher education institutions (Appendix 6, Serbia Country Report Update for 2016, p. 167). In addition, the Ministry of Education, Science and Technological Development has started several initiatives directed towards ICT development such as the “Open Method of Coordination in Education and Training” program, which includes digital and online learning, the possibility for school principals to propose some system changes, development of the infrastructure necessary for successful ICT implementation in educational and scientific institutions (Appendix 6, Serbia Country Report Update for 2016, p. 167).

In Slovakia, the inspection reports show that up to 93.1% of the inspected general education schools are well equipped with the didactic technology, including IC (Appendix 6, Slovakia Country Report Update for 2016, p. 170). Over the years, the technical capacity for e-learning in Slovakian schools such as a number of PCs/tablets, interactive boards, data projectors, internet connections, fast connections has been improved and owing to the nationwide projects financed by the EU funds, more digital contents have become available for teachers (Appendix 6, Slovakia Country Report Update for 2016, p. 170). According to the national regulations all newly established general education schools in Slovakia must have a multimedia classroom and all the schools without such classrooms have to establish them within a 5 year period. Regardless the ICT availability, the use of ICT in the educational process and the development of digital competence of teachers is not satisfactory (Appendix 6, Slovakia Country Report Update for 2016, p. 171). For 2015/16, it is recommended to schools/teachers to create positive environment for implementation of innovative pedagogical methods using ICT and develop ICT competences of students, to use open educational resources along with classical methods, and to participate in the European partnership projects (Appendix 6, Slovakia Country Report Update for 2016, p. 171).

In spite of the fact that the improvement regarding technical capacity for e-learning, teachers’ and students’ ICT use is evident, huge differences among eSchool4S partner countries is evident. For example, according to the Digital Economy & Society Index (DESI 2016)<sup>23</sup>, Austria and Germany are among the ‘running ahead countries’ (score above the EU average and score grew faster than that of the EU over the last year); Croatia and Romania are among the ‘catching up countries’ (score below the EU average and score grew faster than that of the EU over the last year) while Bulgaria, Hungary and Slovakia are among the ‘falling behind countries’ (score below the EU average whose development was slower than that of the EU). Being a non-EU member, Serbia was not included in this survey but it could be estimated that it also belongs to the ‘falling behind countries’.

## **6.2. New national data about representations of SD themes in national curriculum**

When it comes to representations of SD themes in national curriculum, the 2016 Baseline Study Update shows that there have been no changes in the national curricula in Austria, Bulgaria, Croatia, Germany, Romania and Serbia.

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<sup>23</sup> <https://ec.europa.eu/digital-single-market/en/desi>

In Bulgaria, there is the general orientation towards the implementation of principles of sustainable development into the new curricula developed upon the adoption of the new Law on Pre-school and School Education (Appendix 6, Bulgaria Country Report Update for 2016, p. 156).

In Hungary, the Curriculum Framework specifies objectives related to ESD (e.g., students have to understand the various factors that hamper sustainability and sustainable development; students have to be gradually able to understand and interpret certain global issues, as well as the correlations between local and individual lifestyles, etc.) (Appendix 6, Hungary Country Report Update for 2016, p. 163).

In Serbia, there are several ongoing small-scale projects and initiatives dealing with ESD (e.g. the international Eco-schools and Eco-quiz programs for students realised by the NGO Environmental Ambassadors for Sustainable Development) (Appendix 6, Serbia Country Report Update for 2016, p. 168).

In Slovakia, in harmony with the National Strategy for Global Education in 2012-2016 it is recommended to schools to apply global dimensions of sustainable development in the school educational programs; to develop awareness raising activities for students in order to realise interconnectedness of social, economic, political and environmental processes at the local, national, regional and international levels; support volunteering of students in environmental activities, support participation of schools in various green projects and support in-service training of pedagogical staff on this topic (Appendix 6, Slovakia Country Report Update for 2016, p. 171).

### **6.3. Additional new national data and initiatives**

Based on research and observations, Bulgarian partner - 73 SOU "Vladislav Gramatik" recommends that the subjects of *Informatics* and *Information Technology* remain as integral part of the general education curriculum because these subjects acquaint students with basic concepts of ICT and create prerequisites and interest of students towards digital technology in general (Appendix 6, Bulgaria Country Report Update for 2016, p. 156). Despite the active involvement of Bulgaria in a variety of European programs and implementation of activities provided by them, the emphasis on the sustainable development is not at the desired level. On the other hand, although the official EU data have not placed Bulgaria on the top positions regarding the use of the internet and mobile communications, or distribution of communication devices among the population, schools in Bulgaria are invested in innovative e-learning practices (Appendix 6, Bulgaria Country Report Update for 2016, p. 157).

In Baden-Wuerttemberg (Germany), the "Education in the Digital World" strategy of the KMK (Kultusministerkonferenz - Standing Conference of the Education Ministries) implies the expansion of the existing and new teaching and learning training and its incorporation in the curricula. The initial and further training of teachers should focus on implementing the digital media in learning scenarios sustainably - in all phases of education. The access to a supportive IT structure for learners and teachers is a necessary precondition for the success of this digital strategy (Appendix 6, Germany Country Report Update for 2016, p. 159). An additional impetus is the "DIGITAL@BW"

strategy introduced by the new state government of Baden-Wuerttemberg, led by the coalition of two parties, BÜNDNIS 90/DIE GRÜNEN (Green party) and CDU (Christian Democratic Union). Furthermore, the state government plans to support the schools in Baden-Wuerttemberg by equipping them with digital technologies and by establishing a safe digital educational platform that functions, on the one hand, as a saving space for teaching and learning materials and on the other as a digital teaching and learning space available for all teachers and learners (Appendix 6, Germany Country Report Update for 2016, p. 160). Concerning ESD, the state government plans to develop a common “Education for Sustainable Development” strategy that activates and qualifies young people and adults for topics of sustainability. A sustainability network platform will be built to link and consolidate the voluntary sustainable engagement in Baden-Wuerttemberg (Appendix 6, Germany Country Report Update for 2016, p. 160).

In Hungary, the Digital Educational Strategy (DOS) has been developed with the main objective to spread digital literacy at all levels of the education system, helping to increase the competitiveness of Hungary. The strategy covers the entire Hungarian education and training system, such as public education, vocational training, higher education and adult learning (Appendix 6, Hungary Country Report Update for 2016, p. 164).

In Romania, the new National Strategy for Education and Training 2016 – 2020 considers topics of e-learning and ESD as relevant for achieving the EU average performance in education and training (Appendix 6, Romania Country Report Update for 2016, p. 166).

In Serbia, the Working Group for Defining Draft Amendments to the Elementary and High School Curricula in the Field of Technology and Informatics outlines the need for changes of The Rulebook on the Number of Classroom Hours, for the development of the Professional Guidelines for integration of ICT in different subjects and for the establishment of an online platform for exchange of teaching materials and examples of good practices (Appendix 6, Serbia Country Report Update for 2016, p. 168).

In Slovakia, the Pedagogical and Organisational Rule Book for the School Year 2016/2017 recommends to schools to participate in educational programs and themes relevant for social inclusion such as multicultural education, education supporting humanism, education supporting human rights, rights of children, gender equality, prevention of all forms of discrimination, xenophobia, anti-Semitism, intolerance and migration (Appendix 6, Slovakia Country Report Update for 2016, p. 171).

## 7. Conclusions and recommendations

The following conclusions and recommendations were made, based on the results of the baseline study and updates:

- **Building up on existing national practice.** The most common form of implementation is the treatment of individual SD topics through different subjects. The existing practice in the ESD implementation in the educational system of the eSchool4S network countries is a good starting point for the development of the eSchool4S web-based classroom because a number of teachers have already implemented some SD content into their regular classes and most of the teachers, although lacking the knowledge about the problems of

Sustainable Development believe it is a significant issue that should be included in school curricula.

- **Building up on EU and international experience.** The School4S network should rely on the existing results and positive experience in ESD at the European and international level. For example, the Environment and School Initiatives (ENSI)<sup>24</sup> is an international network which has reinforced progress in education, appreciation of the environmental, active methods of teaching and learning by exchanging research and experience. On this network's website there are a lot of useful resources, information about various projects and examples of good practice (among others, example from the eSchool4S network countries – Austria and Germany are presented there).
- **No high priority areas.** The topics that the UNECE Strategy for ESD emphasises as important – improvement of poverty, nationality, peace, ethics, duty a local and global scale, democracy and governance, justice, human rights and human security, health, equality of the sexes, cultural diversity, advance in rural and urban settings, economy, patterns of production and consumption, corporate responsibility, protection of the environment, management of natural resources and biological and landscape diversity, in the opinion of stakeholders are still topical and should be handled in the eSchool4S web-based classroom.
- **Interdisciplinary and holistic approach.** The issue of Sustainable Development is a very complex issue, which means that the above-mentioned topics can be accessed from the perspective of different disciplines. This should be taken into account when developing curricula to be used in the eSchool4S web-based classroom. In addition to the interdisciplinary approach, such diverse themes of Sustainable Development require a holistic approach, for example, it is necessary to take into account all three aspects of Sustainable Development – environmental, economic and social as a complex interrelationship that exists among them.
- **SD is not viewed as part of social sciences as it should be.** SD is more present in natural sciences curricula than in humanities, but some aspects of SD are very important to be understood from the perspective of social sciences. The issue of Sustainable Development should not be focused only on the aspect of environment regardless of the fact that it is easily understandable for children and youth, motivating them to action most easily. The economic and especially the social aspect of Sustainable Development should also be in the focus of the eSchool4S web-classroom in order to develop socially responsible behaviour.
- **Format of the eSchool4S program.** Optimal format of the program to be implemented in eSchool4S web-based classrooms would require two parts – a core part and a national specific part. The core part would contain topics to be dealt with in all the countries of the eSchool4S network. The core part contents should be specified with the participation of all partners in the project. The specific part of the program would contain SD topics of particular importance for each member of the eSchool4S network. When implementing the program in schools the ratio between the core and the specific part of the program should be tailored to the characteristics of schools and students.
- **Individualised approach.** When developing programs that will be used in the eSchool4S web-based classroom the students' prior knowledge is necessary to be taken into account. It is desirable for the eSchool4S program to develop at two levels – the basic and advance level. The basic level would be intended for students who have so far had little opportunity to learn about SD. Another option is that students go through the core part of the program at a different pace depending on their prior knowledge, and that during the implementation

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<sup>24</sup> <http://www.ensi.org/>

of the program more time and attention is given to the issues that the students are less familiar with.

- **Forming eSchool4S teams in schools.** It is necessary that schools form interdisciplinary eSchool4S teams of teachers (containing at least 5-6 teachers). In addition to science teachers (disciplines where SD is already represented in the subject curricula), team members should also be teachers of social science disciplines (because the eSchool4S web-classroom needs to increasingly take into account the social aspects of SD issues, as well as to largely incorporate SD issues in social science subjects), ICT teachers (to help other teachers in the web-based eSchool4S platform, and if necessary, provide technical support as in most schools there is not a person who provides this kind of support, but it is usually the teacher who teaches ICT), English language teachers or teachers who speak English well (since in some countries teachers recognised poor knowledge of the English language as the major barrier to participating in the project.) In addition, it is advisable to engage school counsellors and school psychologists in these teams (especially in the countries where they work at the school level) in order to contribute to ensuring that the program is adapted to developmental characteristics and prior knowledge of students.
- **Proper selection of eSchools4S teachers.** Education for Sustainable Development is education for life, and for everyday behaviour and actions. It involves the acquisition of knowledge, but also the formation of attitudes and the adoption of a value system. ESD is not a value-neutral, but is aimed at promoting certain social values such as respect for others (present and upcoming generations); appreciation of diversity; respect for resources; understanding, sense of fairness, responsibility, willingness to dialogue; inquiring spirit and responsible action, etc. In order to successfully teach the content relating to Sustainable Development, it is necessary for teachers that they themselves are committed to this system of values, which should be taken into account in the selection of teachers who will participate in the eSchool4S project.
- **Empowering students.** It should also be taken into account that some of the problems of Sustainable Development are very difficult and that students can have a feeling of helplessness when dealing with them. Moreover, different scenarios of cataclysms and catastrophes that await humanity in the future, often promoted in the media can provoke students' fear regarding the uncertainty that the future holds. Both of these feelings are counterproductive and the natural psychological defence reaction to them is avoidance, that is, the refusal to talk and think about these issues. It is therefore important that through the ESD program, which will be implemented in the eSchool4S web-classroom, a certain amount of optimism is ensured, despite the recognition of the fact that problems exist in society and in the world. The way to achieve this is to show the students positive and successful examples through the ESD program, to encourage their critical thinking and problem-solving orientation in the domain of their power of influence.
- **Tuning education policy and practice.** Strategies for implementation of ICT and SD in education exist in each country for eSchool4S network and digital competence is recognised as one of the key competences but in some cases national policy documents are not correlated (like in Romania) and/or there are no action plans (like in Serbia) and practical guidelines on how to introduce ICT and SD in teaching (like in Croatia). Due to these difficulties, more effort must be invested in some countries.
- **Changing paradigm of teaching.** The need to change the paradigm of teaching is stressed in some countries (like Croatia and Hungary). The education system needs to make a shift from a transmission of facts to teaching which results in critical thinking, reflection and arriving at conclusions based on available facts. The shift is necessary so that the students can comprehend the complexity of SD issues and how they relate to environment, society and

economic development. SD topics and issues need to be placed in a wider context and their interconnectedness must be clear to students.

- **Providing additional teacher training.** Additional ICT teacher training are necessary in some countries. The need for creating basic ICT training for using web classroom should be taken into account so that they guarantee participation of motivated teachers without ICT competence. Free training for teachers on the use of ICT should be provided for in-service teacher education. When financial resources are lacking, internal seminars (peer-teaching, like in Slovakia) should be organised.
- **Supporting e-learning.** In some countries e-learning materials and platforms are provided and relatively frequently used (like Austria and Germany). However, e-learning is underrepresented even in the countries with well-equipped schools. In some countries, like in Serbia, e-learning materials, including e-textbooks should be developed. Good practice in e-learning should be shared and disseminated more (e.g. through common platforms for all schools and other educational and academic institutions).
- **ICT capacity.** In spite of the fact that the improvement regarding technical capacity for e-learning, teachers' and students' ICT use is apparent, huge differences among eSchool4S partner countries is evident and would be a main challenge for eSchool4S network sustainability. For example, according to the Digital Economy & Society Index (DESI 2016), Austria and Germany are among the 'running ahead countries', Croatia and Romania are among the 'catching up countries' while Bulgaria, Hungary are Slovakia among 'falling behind countries'.

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## 9. Appendixes

### Appendix 1: Methodological framework

Thematic issues	Aim of study and information sources	Methods	Responsible organization
<b>Available offers concerning e-learning and e-teaching courses for teachers and students in Europe and, in particular in the Danube Region</b>	Overview of available offers concerning e-learning and e-teaching courses for teachers and students in Europe (LLL program, E	Desk Analysis	Serbia
	Overview of available offers concerning e-learning and e-teaching courses for teachers and students in partner country	Desk Analysis	Each country
	Analysis of initial teacher training and in service teacher training in partner country in the respect of development of ITC competence	Desk Analysis	Each country
<b>Availability of the necessary technical equipment (personal computers, internet access) to the students (at school and at home) which would allow them to join web-based classrooms in the eSchool4S</b>	Overview of available statistical data and existing reports (Eurydice, Eurostat) regarding ICT equipment in school and personal use; ways of funding (state versus private resources).	Desk Analysis	Each country
	Analysis of national documents and national strategies (if they exist) for ICT use and ICT implementation in teaching and learning.	Desk Analysis	Each country
	Identification of gaps between proscribed ICT use in school and actual used (based on existing national data).	Desk Analysis	Each country
	Identification of main stakeholder for ICT (e.g. Institution that created national strategy for implementation of ICT in education).	Interview with stakeholders	Each country
<b>Provisions made in curricula and</b>	Analysis of national curricula and available	Desk Analysis	Each country

<b>teaching programmes for secondary schools regarding ESD (e.g. with regard to nature protection, biodiversity, energy savings, waste recycling ...)</b>	teaching programmes concerning issues of Sustainable Development (SD).		
<b>Understanding of the interdisciplinary character of ESD in secondary schools</b>	Analysis of the structure of different areas of Sustainable Development (Economics, Culture, Ecology, Politics), underlining the main themes in every area and mapping the interconnection	Desk Analysis	Each country
<b>Priorities of relevant subject matters in public dialogue in the countries and preparedness of schools and teachers to include these priority issues in their teaching</b>	Identification of main stakeholders for EDC in order to underline priorities of relevant subject matters in public dialogue and assess preparedness of schools and teachers to include these priority issues in their teaching	Interviews with stakeholders	Each country
<b>Awareness of the needs and potentials of ESD in secondary schools</b>	Exploring teachers' perception regarding need and potential of ESD in secondary schools	Focus group with teachers	Each country
<b>Experience in participating in international education networks in the internet</b>	Mapping teachers' experience in participating in international education networks in the internet Mapping teachers	Focus group with teachers	Each country
<b>Teachers' motivation, willingness and ability to participate in the eSchool4S network and to contribute to the eSchool4S web-based classrooms</b>	Teachers' motivation, willingness and ability to participate in the eSchool4S network and to contribute to the eSchool4S web-based classrooms	Focus group with teachers	Each country

## Appendix 2: An example of the content analysis of presence of Sustainable Development (SD) in national curriculums

### Content analysis Example for content analysis of biology curriculum (Serbia)

Category is present	Category is not present
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Subject	School grade	Themes and concepts of SD are not mentioned	Mentioning of SD - any concept related to SD is mentioned in the lesson in any way	Very comprehensive presentation of SD concepts and themes are present	Description (One should note in which context SD is used, what concepts are mentioned, what are relations of SD to the other themes and everything that might be specific for using that SD concept in teaching).
Biology	1				
	2				
	3				Implicit mentioning of SD in the lesson with content of the basic principles of operation and regulation of living systems. The adaptive character Biological organization. The relationship between organisms and the environment (regulators and Conformers). Biological adaptation: acclimatization and acclimation.
	4				One chapter of the curriculum is devoted to the Sustainable Development and all relevant issues regarding it. Chapter called "Ecology, protection and improvement of environment and Sustainable Development". Concept that are processed are ecology, living conditions, ecological factors, ecological valence, abiotic and biotic factors, , Life forms - concept , examples and classification. The concept of population and its basic features; The size and density of population; spatial schedule; changes in the abundance of population; the composition and structure of community life; trophic relationships and types of food; chains and networks of food chains; trophic pyramid; Ecological niche - definition, examples; Life habitat; Ecosystem as a unity biotope and biocenosis; Circulation of matter and energy flow through the ecosystem; Types and classification of ecosystems; Transformation of the ecosystem; Biosphere - a unique ecological system of the Earth; Biogeochemical cycles in the biosphere; The processes of the circulation of carbon, nitrogen, oxygen, and water; The protection and improvement of the environment and Sustainable Development; The concept of Sustainable Development; A man and his relationship to the inanimate and living nature; Environmental changes under the influence of the nature of man; Changes in the physical conditions of the environment; Changes in the composition of the living world process domestication of the land, plants and animals; The process of urbanization and industrialization; Genetic and health effects of polluted and degraded environment.

## Appendix 3: Guidelines for a focus group with teachers and an interview with stakeholders

Note: This table gives the basic questions for a focus group with teachers and an interview with stakeholders. During the conversation with participants it is advised to ask additional questions in order to gain a comprehensive (complete) insight into participants' opinion.

ICT	Teachers	Stakeholders
According your opinion, are there enough available offers concerning e-learning and e-teaching courses for teachers and students in country?		
To what extent is e-learning used in your school?		
How often do teachers use ICT in class?		
How often do you use ICT in your teaching?		
In what way do you use ICT in your teaching class?		
Do teachers and students in your school have the opportunity to participate in international education networks on the internet?		
What is your experience in participating in international education networks on the internet?		
To what extent is the necessary technical equipment (personal computers, internet access) which would allow them to join in web-based classrooms (such as eSchool4S) available to students (at school and at home)?		
Is there enough necessary technical equipment and relevant technical experience of teachers enabling them to take a role in a web-based classroom?		
How do you assess teachers' motivation, willingness and ability to participate in the network and to contribute to web-based classrooms?		
How do you assess motivation, willingness and ability of your colleagues and yourself to participate in the network and to contribute to web-based classrooms?		
In your opinion, what is the best way to participate in a web based classroom?		
Are you familiar with any national strategies for using ICT technologies in education?		
If you are, what are the good sides of those strategies? What can be improved in them?		

SD	Teachers	Stakeholders
What is, in your opinion, importance of sustainable development?		
Are there enough awareness of the needs and potentials of education for sustainable development in secondary schools?		
How much is sustainable development present in curriculums of secondary education?		
What provisions are made in curriculum and teaching programmes for secondary schools regarding SD?		
Does the representation of sustainable development in national curriculum match the importance of that concept for today's world?		
Are there any elements of sustainable development that should be more stressed?		
Are there enough lessons in which nature protection, biodiversity, energy savings, waste recycling, etc. are made more familiar to the students?		
Is there interdisciplinary approach to the sustainable development in curriculums of secondary education?		
Are there priorities of relevant subject matters stressed in public dialogue in Serbia? Is there enough preparedness of schools and teachers to include these priority issues in their teaching?		
Do the national strategy for sustainable development (if it exists) emphasise the most important issues regarding quality of life of next generation? If your country does not have such a strategy, what are the reasons for that?		

## Appendix 4: Country Reports

### Austria Country Report

Prepared by Christine Lechner and Reinhard Wieser

Pädagogische Hochschule, Tirol

## 1. Introduction

### 1.1. Main characteristics of national education system

Educational administration in Austria is three-tiered. Thus, there are three levels of institutions in charge of monitoring, evaluating and improving the educational system:

#### National level

The Ministry for Education and Women's Affairs (Bundesministerium für Bildung und Frauen, [www.bmbf.gv.at](http://www.bmbf.gv.at)) is responsible for policy execution, for the development of programmes and for implementing EU recommendations in the national curricula. The **Education division** is responsible for the General education system (primary schools; new secondary schools; secondary schools; pre-vocational schools; secondary academic schools; educational institutions specialising in kindergarten and social pedagogy; special education facilities); Technical and vocational education (vocational schools; mid-level and advanced schools and colleges for engineering, arts and crafts; schools and colleges for business and administration; mid-level and advanced schools and colleges for management and service industries, tourism, fashion and social professions; advanced schools and colleges for agriculture and forestry); Adult education; Educational research and quality development; Matters concerning university colleges of teacher education; Diversity and language policy; political education; environmental, consumer and traffic education; school psychological services and guidance counselling; health promotion; School partnerships; Personnel matters; School management; Public service and salary law; School law; School maintenance; Teaching material and media education

#### At the regional level

There are nine Regional School Boards in Austria, i.e. one Board in every province. The Boards are responsible for ensuring the implementation of school laws within the province, for the monitoring of teaching standards. There are school inspectors for the different types of schools and also for certain subjects, such as R.I., P.E., Art and Nutrition. The Boards are also responsible for supporting teachers in various areas, e.g. EU co-operations.

#### At the local level

At the local level, the Local School Boards are responsible for monitoring and supporting teachers in their work. Local school inspectors are responsible for teachers in their area. The number of inspectors depends on the size of the province.

### 1.2. Existing strategic documents in the field of education

The document that forms the basis of school law in Austria is the national school law "Schulunterrichtsgesetz" that covers all areas of school organisation (examinations, laws applying to teachers, language of instruction....). The national curricula set out the general pedagogical

framework, the overarching principles and the subject curricula for the different school types. All documents are to be found at: <https://www.bmbf.gv.at/schulen/unterricht/index.html>

### 1.3. E-learning and education for sustainable development in the context of existing strategies

Policies in both areas are anchored in the national curricula as described above and in detail below in sections 2 & 3.

## 2. National capacities for e-learning

### 2.1 Overview of national data concerning technical capacities for e-learning

In Austria 80,9% of all private households have an internet connection and 79,8% have broadband access to the net. 66% of the Austrian enterprises used mobile broadband connections to access the Internet – via portable computers with modems or by using mobile phones, with 3G or 4G technology. The larger an enterprise, the more frequent it was using mobile broadband in 2013<sup>25</sup>.

#### ***User habits of students***

In Austria, at all grades, the percentages of students in schools with broadband faster than 10mbps is higher at grades 8 and 11 vocational than the EU mean (fig. 2.3), notably at grade 11 vocational where over 40% of students are in schools with speeds of more than 30mbps. Percentages of students in schools without broadband is lower than the EU average at all grades, with the exception of grade 4, where it is considerably higher, with one in five students in schools with no access. In Austria intensive use of a desktop computer is reported at grade 11 vocational level, above the EU average. At other grades use is lower and below the EU mean. Use of their own laptop or mobile phone increases with age and is lowest at grade 4. Use of their own mobile phone is above average at all grades, at least 36 per cent reporting its use – for learning – at least once a week.<sup>26</sup>

#### ***Number of school computers per child***

In Austria there are computers (desktop, laptop, whether or not connected to the internet) available for students at all grades around the EU average, except grade 4 which ranks lower<sup>27</sup> (2012).

#### ***Amount of ICT use in classroom and existing e-learning courses in primary and secondary schools***

In Austria the intensity of use increases with the age of the student, and it is only at grade 11 vocational level that use is above the EU average; *at this grade under 5% of teachers use ICT in fewer than 5% of lessons. Concerning students' ICT-based activities during lessons, Austria is below the EU average as measured by frequency of use at grade 8 and 11 general but higher at 11 vocational*<sup>28</sup>.

#### ***Number of technical staff for ICT in schools***

Because Austria is a federal republic this varies greatly from province to province, and this also depends on the type of school. The local area networks etc. in primary schools in Tirol are maintained by a group of regional consultants (teachers/technicians), whereas the systems in lower and higher sec. education are maintained by – usually one - ICT teacher who – if required - gets support and techn. aid from the above mentioned regional consultants. This service is paid for by the regional school authorities.

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<sup>25</sup> Source: STATISTICS AUSTRIA ([http://www.statistik.at/web\\_en/statistics/information\\_society/index.html](http://www.statistik.at/web_en/statistics/information_society/index.html))

<sup>26</sup> Source: <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf>

<sup>27</sup> Source: <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf>

<sup>28</sup> Source: <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf>

### ***Number and type of used educational software (especially related to SD), ways of financing technical equipment***

Because Austria is a federal republic this varies greatly from province to province, and this also depends on the type of school. The software in primary and lower sec. schools is provided by the local community, whereas federal schools get their software from the ministry in Vienna. Some 15 years ago, the Ministry of Education in Vienna signed an agreement with Microsoft, thus federal schools and their teachers can “buy” resp. lease Microsoft products at an extremely low price.

Most Austrian schools use Moodle or similar learning environments. In Tirol we managed a regional network (the Tyrolean School Network, TSN) was established in '99, which has brought broadband to most schools and which is run by the regional government. Moreover the TSN offers Tyrolean schools and teachers several services, such as a central directory containing the contact data of almost all teachers and several thousand pupils. This central directory is the core database for other services such as the TSN webmail system, the TSN moodle, TSN mahara, webspace for schools and teachers etc. Local school network admins can also hook up their LANs to this directory and create their local network user databases automatically, which saves work. Access to Moodle as well as Moodle courses for all teachers and their classes etc. is/are also created automatically by this central directory, provided a teacher or school wants it.

## **2.2 Analysis of documents about competencies and teacher and student outcomes regarding ICT use**

Because of the autonomy of universities and teacher training colleges it is again difficult to describe the Austrian landscape. The education curricula for teachers at primary, lower and higher secondary schools mostly don't contain specific ICT courses. (The university of Innsbruck eg offers an e-learning course (6EC) for teacher students. Unfortunately the uni can only finance this course for 20 students per year! At the PH Tirol we only offer 24 hours of ICT training (=3 EC) for future primary and lower sec. teachers.) It is a fact that only a few initial teacher training institutions in Austria offer compulsory pedagogical ICT courses resp. media pedagogics courses. At most institutions both the length, impact and intensity of these courses seem insignificant. All in all we must admit that in Austria it is up to the individual teacher to make sure whether her or his (pedagogical) ICT competencies are state of the art!

What has received little attention in Austria so far is the importance of the pedagogical dimension of ICT use in teaching, in particular, the pre-requisite for professional teachers to acquire relevant competences integrating pedagogical and technical skills, i.e. techno-pedagogical competences. The Austrian teacher training institutions require from students functional and administrative ICT skills, but acquisition of techno-pedagogical skills is not a standard requirement (2010 Country Report on Austria 'ICT Use in Initial teacher Training')<sup>29</sup>.

Unfortunately the funding for in-service teacher training courses was reduced considerably in the last few years. Hence it is obvious that also the further teacher training institutions cannot really offer enough courses to promote the pedagogical ICT competencies of a considerable number of teacher students and teachers, because the ICT budget in the province allows for the training of only 600 teachers and thus is not more than the typical “drop in the ocean”.

One result of this is that Austria is placed below EU average in terms of the amount of students at all grades taught by teachers who have recently engaged in training through personal learning about ICT, or ICT training provided by school staff or through online communities. Austria ranks significantly below the EU average when it comes to teachers engaging in voluntary, personal

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<sup>29</sup> [http://www.eun.org/c/document\\_library/get\\_file?uuid=4a576578-e619-4689-84f2-baa468d07396&groupId=43887](http://www.eun.org/c/document_library/get_file?uuid=4a576578-e619-4689-84f2-baa468d07396&groupId=43887)

learning about ICT in their own time, at all grades, and particularly at grades 4 and 8. Austria is also below the EU average, albeit to a lesser extent, in terms of the percentage of students taught by teachers who have participated in training through online communities, at all grades, even if at grade 11 vocational education the percentage almost reaches the EU average<sup>30</sup>.

## 2.3 Identification of current state and rooms for improvement in e-learning

Area	High	Mid.	Low
ICT in teacher training	X		
In-service teacher training	X		
Curriculum development		X	
ICT-based assessment		X	
Infrastructure and maintenance		X	
Digital learning resources	X		
School-home connections		X	
ICT for learners with disabilities/special needs		X	
ICT-related research		X	
e-Safety	X		
Reducing the digital divide	X		
Interactive Whiteboards	X		
Netbook/notebooks		X	
Tablets		X	
Developing key competences	X		
Developing 21st century skills (critical thinking, problem solving, communication, creativity, innovation)	X		

The table<sup>31</sup> above was published by the Ministry of Education in Vienna in 2013 and states the ministry's top priorities. However, as mentioned above, Austria is a federal republic consisting of nine provinces. Therefore these priorities may have some impact – but only in the field of in-service teacher training. Universities in Austria are autonomous and therefore the curricula vary to a considerable extent. It is also evident that bringing this message to the people would require much more money and effort than is available at the moment (cf. above).

## 3. Sustainable Development in Education

### 3.1. Representations of SD themes in national curricula

For many years ESD has been a Cross-curricular Principle overarching all subject areas and all types of schools in Austria.

A recent process consolidated the principles and the 14 remaining principles are now grouped into those directly impacting on: (i) the Individual; (ii) Society & Environment; (iii) Nature & Technology.<sup>32</sup>

The general aim of ESD in Austria is to create an awareness for the limitations of our sources of life and, moreover, to encourage a readiness and competence for active participation in the co-determination of our environment.<sup>33</sup>

<sup>30</sup> Source: <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf>

<sup>31</sup> Source: [http://www.eun.org/c/document\\_library/get\\_file?uuid=4a576578-e619-4689-84f2-baa468d07396&groupId=43887](http://www.eun.org/c/document_library/get_file?uuid=4a576578-e619-4689-84f2-baa468d07396&groupId=43887)

<sup>32</sup> The status quo can be found on the hp of the Austrian Ministry for education: <https://www.bmbf.gv.at/schulen/unterricht/index.html> and specifically under the link to cross-curricular competences: <https://www.bmbf.gv.at/schulen/unterricht/uek/index.html>

The principle is based on the 1985 policy statement, which pointed out the urgency of regarding the development of environmentally orientated behaviour as one of the responsibilities of educational systems. Environmental education is to be seen as an integrated element in school education starting with school enrolment. It was recognised at this time that content would presumably be dealt with primarily in natural science subjects, whereas the principle is to be taken into account in all subjects<sup>34</sup>.

This policy paper played a decisive role in raising awareness and establishing environmental in education in Austria.

Besides the Cross-curricular principle for environmental education, ESD is also listed as an “Educational Concern” taking up the initiative established by the UN Decade of Education for Sustainable Development, which includes environmental protection as a strategic field of action.<sup>35</sup>

The Austrian Strategy for Education for Sustainable Development aims to support a transformation of awareness toward sustainability among teachers and learners alike, and also to interlink the actors. The strategy thus comprises the following relevant elements:

- Establishment within the education system
- Research and innovation
- Partnerships and networks
- Scenario development
- Competence development among teachers
- Monitoring and evaluation<sup>36</sup>

In addition to the Cross-curricular Principle and Educational Concern mentioned above, the ÖKOLOG-Network<sup>37</sup> supports schools in their ecological plans and initiatives. All schools working on ESD in a structured way through a whole-school approach may apply for membership. Currently, 448 Austrian schools belong to ÖKOLOG. Furthermore, ÖKOLOG schools are encouraged to identify ecological projects as part of their quality plan, which has recently become mandatory for all Austrian schools. [www.sqa.at](http://www.sqa.at) or [www.qibb.at](http://www.qibb.at) for VET

Of the 448 schools, 108 schools are upper secondary VET schools, these include Commercial Schools, Technical Schools and Schools for Agriculture.

University colleges for Teacher Education are also members of ÖKOLOG.

At the end of 2013 a policy statement was published<sup>38</sup>. The document urges and recommends the inclusion of ESD in the new curricula for teacher education currently being developed at national level to span all institutions (University Colleges for Teacher Education & Universities) providing teacher education. It is suggested that ESD be integrated across teacher education to mirror the integrative approach at schools. The needs to give students the opportunity to do teaching practice at ÖKOLOG-schools and also to establish BNE as a core theme for teacher-education research are identified in the paper. To ensure that ESD is anchored within life-long teacher development post-graduate courses are suggested.

In addition to cross-curricula principles, ESD is also specifically mentioned in Austrian curricula<sup>39,40</sup>.

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<sup>33</sup> Cited from the description of the cross-curricular principle:

<https://www.bmbf.gv.at/schulen/unterricht/prinz/ub/umweltbildung.html>

<sup>34</sup> [https://www.bmbf.gv.at/schulen/pwi/pa/rundschreiben\\_1994\\_35\\_15069.pdf?4eysu2](https://www.bmbf.gv.at/schulen/pwi/pa/rundschreiben_1994_35_15069.pdf?4eysu2)

<sup>35</sup> <https://www.bmbf.gv.at/schulen/unterricht/ba/bine.html>

<sup>36</sup> [https://www.bmbf.gv.at/schulen/unterricht/ba/bine\\_strategie\\_18299.pdf?4dzgm2](https://www.bmbf.gv.at/schulen/unterricht/ba/bine_strategie_18299.pdf?4dzgm2)

<sup>37</sup> <http://www.oekolog.at/>

<sup>38</sup> [https://www.bmbf.gv.at/schulen/lehr/labneu/bne\\_grundsatzpapier\\_pbneu\\_25855.pdf?4dzgm2](https://www.bmbf.gv.at/schulen/lehr/labneu/bne_grundsatzpapier_pbneu_25855.pdf?4dzgm2)

<sup>39</sup> An overview of all mentions is provided at:

[https://www.bmbf.gv.at/schulen/unterricht/uek/umweltbildung\\_lp\\_25747.pdf?4dzgm2](https://www.bmbf.gv.at/schulen/unterricht/uek/umweltbildung_lp_25747.pdf?4dzgm2)

ESD is specifically mentioned in Nature Studies, General Science as well as Reading in curricula for all 4 Primary School classes, as well as in traffic education in Classes 3 & 4.<sup>41</sup>

The curricula for the first four years include the same mentions as the general Primary school curricula<sup>42</sup>. The second four years include general and subject mentions to ESD as the curricula for Lower Secondary.<sup>43</sup>

From the point of view of innovation, the curriculum for the New Secondary Schools (ISCED 2) is of the most interest. Firstly, it is the most recent and, secondly, developed on the background of a sweeping reform for the Austrian educational system. This curriculum stresses the overarching principles and competences in a much stronger way than previous curricula have done.<sup>44</sup>

The educational objectives are to equip young people for life in a rapidly changing world in particular in the areas of Culture, Science, Economics, Technology, Environment & Law. Environmental education and education for ecological sustainability are identified within the educational areas of Man and Society and Nature & Technology.<sup>45</sup>

Environmental education is specified in the subject curriculum for Biology. The two main topical areas of the subject are: Animals & Plants and Ecology. Within the four years pupils should gain awareness of the dependence of man on nature and the environment and gain knowledge and competences for an environmentally and sustainable way of life.<sup>46</sup>

Steps towards environmental awareness are identified for each of the four classes beginning with an understanding of basic ecological concepts in the first class. Positive and negative consequences of human action with regard to the environment are to be analysed and critically appraised. Causes for environmental problems and solutions should be considered. The protection of the environment, nature and biotope should be demonstrated through concrete examples. The issues are to be dealt with in each class appropriate to the age of the pupils.<sup>47</sup>

The Chemistry curriculum refers to the interaction between Economy and Ecology and an environmentally aware use of the environment. In Class 4 there is a specific reference to the use of sources of energy.<sup>48</sup>

Environmental issues are also specifically mentioned in the curriculum for Physics with the focus being on uses of thermal energy.<sup>49</sup>

The curricula for Geography & Economics includes and knowledge and understanding of societal structures and the relationship between nature and man as the impact of man's actions on our environment. The economic aspect plays an important role including specific points such as the exploitation of the limited natural resources of the earth.

The curriculum for History, Social Studies and Citizenship Education includes aspects of environmental history and critical appraisal of technological developments.<sup>50</sup>

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<sup>40</sup> An overview of the Austrian educational system in English can be found at:

<https://www.bmbf.gv.at/enfr/school/index.html>

<sup>41</sup> The curricula for Primary Schools are also to be found on the ministerial hp. The specific link is:

[https://www.bmbf.gv.at/schulen/unterricht/lp/lp\\_vs\\_gesamt\\_14055.pdf?4dzgm2](https://www.bmbf.gv.at/schulen/unterricht/lp/lp_vs_gesamt_14055.pdf?4dzgm2)

<sup>42</sup> [https://www.bmbf.gv.at/schulen/unterricht/lp/lp\\_ahs\\_unterstufe.html](https://www.bmbf.gv.at/schulen/unterricht/lp/lp_ahs_unterstufe.html)

<sup>43</sup> [https://www.bmbf.gv.at/schulen/unterricht/lp/lp\\_ahs\\_oberstufe.html](https://www.bmbf.gv.at/schulen/unterricht/lp/lp_ahs_oberstufe.html)

<sup>44</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h)

<sup>45</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.63

<sup>46</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.63

<sup>47</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.63

<sup>48</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.67

<sup>49</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.70

<sup>50</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.42

Within the contributions of the subjects to general educational aims, mother-tongue instruction should contribute to the ability to name and describe phenomena and contexts and L2 instruction should contribute to this competence in the target-language and thus to an international competence.<sup>51</sup>

Mathematics should contribute to the perspective of rationality.<sup>52</sup>

Creative subjects such as Music, Art, Craft and Design should contribute to the aesthetic conception of the environment. The importance of environmentally sound materials is also stressed.<sup>53</sup>

Physical Education and Nutrition should contribute to the awareness of the relationships between the environment and a healthy lifestyle.<sup>54</sup>

Finally, the aspect of ecological aspects is mentioned in the optional subject of occupational choices and career advice in Year 4 of Lower Secondary Education.

Within the more traditional curricula for the academic schools at ISCED 2, the subject curricula are in principle the same.

The “Polytechnische Schule” is a one-year college preparing pupils for the world of work following compulsory education. Ecology is clearly an important aspect in the curriculum for Biology and Ecology, but is also mentioned in other subjects. For instance, the curriculum for Economics includes a regard to ecological consequences and also the P.E. curriculum mentions specifically an “environmental competence” when practising outdoor sports.<sup>55</sup>

Environmental education is especially mentioned in connection with the various job fields. For example, in construction subjects, it is stressed that students should understand processes according to their economic implementation and environmental compatibility. The aspect of environmental compatibility is mentioned as a central issue for all workshops (e.g. metal, wood) and also for nutrition.<sup>56</sup>

At ISCED 3 level there is a large choice ranging from general academic education to vocational education.

There are specific content mentions of environmental education in curricula for general education within the subject areas of Biology and Environmental Education, Chemistry, Physics, Geography and Physical Education.<sup>57</sup>

Furthermore, as at lower secondary level all subjects from History to languages should contribute towards awareness and the ability to reflect and express knowledge-based opinions.

At ISCED 3 level there is a large choice ranging from general academic education to vocational education.<sup>58</sup>

Topics of ESD are mentioned in all branches of schools (Commercial, Tourism, Agricultural and Technical) specifically within subject areas such as technical workshops where the focus is on materials.<sup>59</sup>

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<sup>51</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.105 & 9.34

<sup>52</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.52

<sup>53</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.83

<sup>54</sup> [https://www.bmbf.gv.at/schulen/recht/erk/bgbla\\_2012\\_ii\\_185\\_anl1\\_22513.pdf?4dzi3h](https://www.bmbf.gv.at/schulen/recht/erk/bgbla_2012_ii_185_anl1_22513.pdf?4dzi3h) p.92 & p.96

<sup>55</sup> [http://www.schule.at/fileadmin/DAM/Gegenstandsportale/Polytechnische\\_Schule/Dateien/PTSLehrplan-2012.pdf](http://www.schule.at/fileadmin/DAM/Gegenstandsportale/Polytechnische_Schule/Dateien/PTSLehrplan-2012.pdf) p.32

<sup>56</sup> [http://www.schule.at/fileadmin/DAM/Gegenstandsportale/Polytechnische\\_Schule/Dateien/PTSLehrplan-2012.pdf](http://www.schule.at/fileadmin/DAM/Gegenstandsportale/Polytechnische_Schule/Dateien/PTSLehrplan-2012.pdf) p.60

<sup>57</sup> [https://www.bmbf.gv.at/schulen/unterricht/lp/lp\\_ahs\\_oberstufe.html](https://www.bmbf.gv.at/schulen/unterricht/lp/lp_ahs_oberstufe.html)

<sup>58</sup> The official overview of the Austrian Educational system can be found at:  
<https://www.bmbf.gv.at/schulen/bw/index.html>

Furthermore, there are cross-references to the Curricular Principle in the curricula of the different types of Vocational schools.<sup>60</sup>

The curricula for Vocational Schools (for Apprentices) include specific mentions in the syllabus for Economics. In the P.E. syllabus it is emphasized that students should develop an environmentally compatible attitude to the natural environment. In the syllabus for practical workshops, awareness of environmentally compatible materials is of great importance for every sector.<sup>61</sup>

The curricula for the Commercial Schools also refer to the Curricular Principle.

BNE is taught as a subject. In addition, sustainability plays a major role in Management and Entrepreneurship subjects with specific reference to Eco and Quality Management and the importance of students understanding measures taken within businesses in relations to sustainability and ecological compatibility. Corporate Social Responsibility and instruments of eco-management are also noted. Throughout the five years the links between Economy and Ecology play a particularly important role and there is a focus on the aspect of Ecology within a range of industries.

In the curricula for the Technical Schools, sustainability and environmental compatibility plays a rôle in Economics subjects as in the case of the Commercial Schools and in theoretical technical subjects and workshops as in the curricula of the Vocational Schools for Apprentices.<sup>62</sup>

Sustainability and Environmental compatibility clearly play a central role in the curricula for the Agricultural Schools.<sup>63</sup>

### **3.2. Identification of SD themes that should be included in national curricula**

As above, the anchoring into national curricula in Austria works in a two-fold way in that on the one hand, the cross-curricula principles include principles to be taken into consideration in all subjects. On the other hand, the individual curricula for the subjects also include issues where appropriate. The updating of the principles is by far more flexible than the updating of subject curricula meaning that issues can be included within a short period.

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<sup>59</sup> <http://www.abc.berufsbildendeschulen.at/de/news.asp>

<sup>60</sup> <http://www.abc.berufsbildendeschulen.at/de/news.asp>

<sup>61</sup> <http://www.abc.berufsbildendeschulen.at/de/page.asp?id=15>

<sup>62</sup> <http://www.abc.berufsbildendeschulen.at/de/page.asp?id=15>

<sup>63</sup> <https://www.bmbf.gv.at/schulen/bw/bbs/luf.html>

## Bulgaria Country report

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### 1. Introduction

#### 1.1. Main characteristics of national education system

The level of population's education determines every contemporary country and plays an important economic and social role for the present and the future. School education in Bulgaria aims to preserve and develop children's creative impulse, so that every child can live fully and happily by acquiring additional knowledge and skills, and promote the growth of the child as an independently thinking and socially responsible person, who refers to life with serenity, enthusiasm and significant public commitment.

Ministry of Education and Science is the body that ordered to deal with monitoring, evaluating and improving the educational system in Bulgaria, takes care of the state policy in the field of education. Experts of the Ministry, with prominent academics and experts develop national programs for the development of secondary and higher education. They supervise the implementation of state educational accessory requirements in schools. The Ministry of Education is the main initiator and organizer of events to raise the qualification of teaching staff, coordinate the implementation of national programs and projects, the development of sectorial programs, programs for equal access to education, lifelong learning programs, ICT in education, etc. The Ministry provides policies in national external evaluation, prepares the national examination programs, coordinate and control the activities related to pre-school and school education.

A progressive policy framework for quality was assured by the National Evaluation and Accreditation Agency. The National Evaluation and Accreditation Agency conveys in a written document the comprehensively elaborated, appropriately announced to the public and implemented in the Agency's activities standards, directives, policies, procedures and guidelines, assuring the quality of procedures on external evaluation, accreditation, post accreditation monitoring and control, carried out by the Agency and the outcomes of these activities. The system supports the interaction between the subsystems within its own structure, as well as the interaction of NEAA with the structures from the outer environment, which carry out activities associated with quality assurance in the education at the educational institutions.

#### 1.2. Existing strategic documents in the field of education

In recent years were developed several national strategies and programs were developed for the next programming period in Bulgaria, covering education and young people, relating to the process of Sustainable Development:

- Strategy for the effective implementation of ICT in Education and Science of the Republic of Bulgaria (2014-2020)
- National Strategy for Lifelong Learning 2014-2020
- Program for the Centre for Educational Integration of Children and Pupils from ethnic minorities for period 2013-2015
- National Program for the development of school and pre-school education 2006 - 2015

- National Strategy for Development of Teachers
- Strategy to reduce of early school leavers (2013-2020)
- National Youth Strategy 2010 - 2020
- National Development Program: Bulgaria 2020.

All can be found on the Portal for the public consultation created to the Council of Ministers: <http://www.strategy.bg/StrategicDocuments/List.aspx?lang=bg-BG&categoryId=20&typeConsultation=1&typeCategory=20&docType=1>

### 1.3. E-learning and Sustainable Development in context of existing strategic documents

Bulgaria is working on the development of the ESD Program that serves as a basis for national and regional strategies for ESD. The program takes into account all national and international documents and agreements on environmental education for sustainable development. Serves as the basis for the implementation of the guidelines of the Strategy for Sustainable Development of the Economic Committee of the United Nations, allows each stakeholder to perform activities of education for sustainable development at local, regional and national level. Main objective is to support and promote ESD in all forms of education, as a means of life-long learning skills.

## 2. National capacities for e-learning

### 2.1. Overview of national data concerning technical capacities for e-learning

The Study on Evaluation on Digital Opportunities for People and Businesses, recently accomplished by the Ministry of Education and published in the web site of Digital Agenda for Europe<sup>64</sup>, shows the following state of the technical capacity in Bulgaria:

At the end of 2013, broadband covered 93% of homes in Bulgaria. In rural areas the coverage was 60%. Next Generation Access for downloading of at least 30 Mbps was available to 68% of homes compared to 62% in the EU. Compared to the EU average (76%), much smaller percentage of households subscribed to broadband - about 54%.

Fourth generation mobile connection (LTE) is just beginning to spread. The level of acceptance of mobile broadband is 51%, below the EU average of 62%.

It was found that a large percentage of people have low or no digital skills. It is assumed that the lack of skills is more common among low educated people, among unemployed people in workflow, among retired or inactive and people who live in households without internet access.

But according to the broad definition, the share of ICT specialists in total employment in Bulgaria is more than or nearly equal to the EU average.

Research on Internet use shows that in 2013 51% of Bulgarians used the Internet at least once a week, which is below the EU average of 72%. Bulgaria showed lower rates of daily use of the Internet - 43%, compared with the EU average of 62%. In 2013, 41% of the population had never used the internet before; while for the EU, this value was only 20%.

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<sup>64</sup> Digital Agenda for Europe (<http://ec.europa.eu/digital-agenda/en/scoreboard/bulgaria#1-connectivity>)

According to the research conducted by the Ministry of Education and published in the European Schoolnet website, it was found that about 50% of students in general education were using a desktop or laptop at least once a week during lessons at school, and about 20% had never or almost never used computer.

“Most teachers have been familiar with ICT for teaching and learning but still use it first to prepare their teaching. Only a few use it – and still to a limited extent – to work with students during lessons, and even less frequently to communicate with parents or to adjust the balance of students’ work between school and home in new ways. The overall frequency of use of different types of ICT-based activities in class reported by teachers is around several times a month”<sup>65</sup>, reported the Ministry of Education on the basis of surveys.

## **2.2. Analysis of documents about competencies and teacher and student outcomes regarding ICT use**

ICT sector is among the most modern and developed sectors in Bulgaria. For many years, our country was known as the Silicon Valley of the Eastern bloc and today it regained its position as a leading center for research and development of high technologies. Bulgaria became one of the first European countries which developed mass production of personal computers in the early 1980s. According to the report of IQ Brainbench Global IT<sup>66</sup>, today Bulgaria is among the top in Europe in terms of IT-certified specialists per capita and is the eighth in the world in general specialists in the field of ICT.

Due to the changes determining the development of information society, the Ministry of Education and Science adopted a National Strategy on Information and Communication Technologies (ICTs) for secondary schools with the respective program for realization.

ICT training and application in other subjects aims to enable all students to gain vast knowledge in working with computer devices and Internet needed in everyday life. Due to the dynamics of life and the huge flow of information for young people, it is necessary to be prepared to deal with these challenges. In a professional context, this means, students from professional schools must be prepared for their future jobs. In order to improve the organization of education and find more effective techniques and tools, teachers need to be trained to use ICT to solve various educational issues.

In recent years Bulgarian schools were equipped with desktop computers, wireless internet and laptops for every teacher. At the national level software for schools and teachers was made available; numerous trainings were held for teachers to work with ICT.

The mission of the new Strategy (2014-2020) is to modernize and transform the spheres of education and science by means of ICT as well as to achieve measurable and convincing indicator values in order to improve the quality of education and research in the country.

In the early 80s, ICT training was introduced in mathematical, language and some technical secondary schools. And in the 1999/2000 academic year two new school subjects were established at schools - informatics and information technology. They are now being taught as compulsory subjects from 5th to 10th grade.

Based on the studies of Ministry of Education and Science, it can be concluded that teachers’ confidence and opinions about ICT use for teaching and learning take effect of students’ ICT use for learning. It is necessary to increase teachers’ professional development as a condition for effective

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<sup>65</sup> SURVEY OF SCHOOLS: ICT IN EDUCATION - <https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Bulgaria%20country%20profile.pdf>

<sup>66</sup> The top 100 IT IQ countries in 2001- <https://www.brainbench.com/pdf/globalitiq.pdf>

and efficient use of the available infrastructure. School heads, teachers and stakeholders consider that insufficient ICT equipment (especially interactive whiteboards and laptops) is the major obstacle to ICT use. "Interestingly, no overall relationship was found between high levels of infrastructure provision and teacher use, confidence and attitudes." says a representative of the Ministry of education.

### 2.3. Identification of current state and rooms for improvement in e-learning

Bulgaria is making a great progress in terms of its ICT strategies but it is clear that the country also faces some challenges. In recent years, computer stations have been updated and replaced with modern terminal solutions. The advantages of the technology are its suitability to the learning process, lower cost and lower operating costs, easier management and greater durability over time. In each school involved in the project, computer terminal stations or funds to purchase them were provided. Trainings to increase the teacher's qualification were conducted in order to implement ICT in all subjects. The renewed material base and ensuring connectivity and Internet access are the main guarantee for provision of the school education system for conducting modern and efficient learning process.

The vision for ICT in Bulgarian education and science involves:

- Development of a modern ICT environment for education;
- Implementation of integrated digital control;
- Priority development of universally accessible, universal and consistent (standardized) electronic content;
- Development or adoption of recognized standards and metrics for ICT competence and putting ICT skills as an element in the career development of staff in education and science;
- Development through ICT of new educational tools and scientific services;
- Introduction of national external evaluation of digital competences of students and certification of IT skills.

The main problems that remain to be solved regarding ICT usage in education will be discussed in 10th Jubilee Edition of the National Conference on E-Education<sup>67</sup> which be held on 6 November 2014 in Sofia.

Not only ICT infrastructure itself is important for the effective application of technology, but also the skills to handle it, the suitable legal and administrative procedures, and the availability of appropriate modern educational content and information. Does school equipment fit together with modern requirements? How the Strategy for Effective Implementation of ICT in Education and Science of the Republic of Bulgaria (2014-2020) is going to change the current situation? What is the level of ICT skills of participants in the educational process? What are the ongoing funding programs and public policies for the e-education development? Does the level of young professionals correspond with business requirements? These are the questions included in the Agenda of the 10th Anniversary Edition of the Conference on e-Education. In 2014, the conference focuses on the ICT status in secondary schools and universities, on best practices for successful implementation of ICT and on the development of technological basis in Bulgarian schools and universities.

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<sup>67</sup> National Conference on E-Education (<http://events.idg.bg/bg/2014/education>)

## 3. Sustainable Development (SD) in Education

### 3.1. Representations of SD themes in national curriculum

Sustainable development is an integral part of the state educational requirements which are based on curricula. Environmental Education includes topics that affect the ecological balance and healthy lifestyle, the relationship between nature and culture as well as environmental protection.

Although not introduced as a separate subject in Bulgarian education, sustainable development issues are integrated into various subjects at all school levels. Topics for sustainable development in secondary education are presented in subjects such as biology and health education, chemistry and environmental protection, geography and economics, physics and astronomy, philosophy and democratic citizenship. Thus, within the mandatory training students only gain knowledge and awareness, develop their skills and competencies on key issues of sustainable development.

Cultural and educational field "Science and Ecology" provides the formation of a knowledge system, skills and those of their relations connected with nature. The goal is to give students an idea of the integrity of nature and its diversity.

A significant part of the cultural and educational field is associated with the formation of knowledge, skills and especially relations associated with ecology, environmental protection, health, tolerance to all living things, which are a necessary part of contemporary education.

Students in secondary stage should acquire the following knowledge and skills:

- Name levels of organization of living matter; structures and processes in the ecosystem.
- Describe the ecological factors of the environment, population, relationships and behaviour of organisms.
- Distinguish between structural elements and processes in the biosphere's different levels.
- Explain the state of the environment through natural laws, ecological and human influence.
- Distinguish between structural elements and processes in the biosphere.
- Explain the state of the environment through natural and ecological laws and human influence.
- Analyze the causes and consequences for violation of ecological balance.

The Chemistry is the part of educational field "Science and Ecology" and provides the formation a knowledge system and skills about chemical elements, their structure and distribution in nature. The emphasis is on the substances that are used in everyday life and practice. Particular attention is given to the substances that pollute the environment and the ways of their disposal.

Students in secondary stage should acquire the following knowledge and skills:

- Use scientific data and evidence to explain scientific phenomena and natural processes, define scientific problems.
- One of the main topics in chemistry is pollution and the impact on living organisms.
- Form practical skills for observation of objects and processes in a variety of vertebrates, for self-monitoring and evaluation of health.
- Develop skills for healthy and environmentally lifestyle.
- Become aware of the need for rational use of natural resources.
- Demonstrate the need for secondary use of materials, waste-free and safe production.

- Propose solutions for the recovery or disposal of waste products.
- Qualitatively detect contamination with organic substances in water.
- Know the materials that can and should be subjected to recycling.
- Name principles of waste-free and harmless proceedings and describe the principle of purification systems.
- Describe unsolved problems of environmental protection.

In Physics students in secondary stage should acquire the following knowledge and skills:

- Give examples of energy conservation in mechanics, processes occurring in the cells of living organisms, atomic nuclei, the movement of celestial bodies and others.
- Assess the possibilities for efficient and environmentally sound use of different types of energy.
- Understand that the work of heat engines cause thermal pollution.

Information technology is one of the fastest growing technologies. They become an integral part of the overall literacy. Among the main objectives in education of Informatics and IT are developing skills in problem solving, mastering practical skills to implement a strategy and complex cognitive skills selection, combination, creativity and implementation of different strategies.

Themes and concepts of SD are not mentioned. But, as in other subjects some principles of SD are studied in detail. These are the topics of grid systems, safe use of the Internet and using technology to solve world's global problems. In Information Technology hours for project work are provided. By the decision of the teachers in these classes, topics related to SD can be included.

Concept of Sustainable Development is discussed in detail in the subject Geography and Economics. Students in secondary stage should acquire the following knowledge and skills:

- Explain global issues associated with the protection and rational use of natural resources and the environment and to know the concept of Sustainable Development.
- Identify the causes and consequences of natural disasters - earthquakes, floods, and more.
- Explain the processes of global warming and ozone depletion.
- Become familiar with the principles of environmental monitoring and the need of it.
- Know the modern political map of the world and global political processes.
- Analyze the demographic problem and discuss the geographical aspects of its manifestation in different parts of the world.
- Understand the basic mechanisms of the market economy. To compare level of economic development of individual countries in basic socio-economic indicators.
- Outline the problems of regions and discuss their solution according to the concept of Sustainable Development.
- Assess the role of international organizations to peace and stability in the world.
- Evaluate the concept of Sustainable Development as a global strategy.
- Discuss the problems of Sustainable Development in Bulgaria.

The subject Geography and Economics prepares students to navigate the most important issues of our time. Students learn the importance of natural resources for economic development. They meet with the geographical basis of the problems and conflicts of the modern world in global, regional,

national and local levels; study the prerequisites for integration and the access of Bulgaria to the European economic, political and cultural space.

The basic principles of Sustainable Development are based in many subjects of Bulgarian curriculum. It will be too hard to find what kind of topics and concepts of SD are not mentioned. In some of subjects, topics related to Sustainable Development are studied in detail, but outside the context of SD. For example, the subject Chemistry and Environmental Protection doesn't emphasise Sustainable Development, but many of the topics affect the principles of SD. Most widely issue for SD is considered in the curriculum of Geography and Economics.

### **3.2. Identification of new arisen important themes of SD that should be included into national curriculum**

After interviews with stakeholders the following conclusions were driven:

The majority of Bulgarian stakeholders consider that there are not enough available offers concerning e-learning and e-teaching courses for teachers and students in the country, there is not enough equipment required, and no technical expertise of teachers. Around 75% of respondents think that necessary technical support for schools is required in order to enable teachers to join web-based classrooms.

Both the 88% of stakeholders and 80% of teachers stated that teachers' motivation, willingness and ability to participate in the network and to contribute to web-based classrooms is a matter, they can find something useful. Which means that we need to find the right approach if we want to be able to attract more teachers to our cause.

50% of stakeholders are aware in detail and 35% are superficially aware of the National strategy for using ICT in education. Most of them are convinced of the importance of Sustainable Development and think it is true that a good education is essential to achieving Sustainable Development. Most of them are not convinced that they have enough awareness of the needs and potentials of education for Sustainable Development in secondary schools.

When asked about the presence of SD in different subjects, stakeholders were not aware of it. It is quite understandable that business representatives are not familiar in detail with the curriculums.

67% say that the representation of Sustainable Development in national curriculum match the importance of that concept for today's world coincides, although not fully. Despite their belief that the performance of SD in the national curriculum is not complete, stakeholders haven't committed to specific recommendations and ideas to include new topics in the national curriculums.

## **4. Teacher's and stakeholders view about e-learning and SD**

The survey results provide evidence that teachers give a positive assessment of the use of ICT in education and training of students. Teachers often use ICT in schools because technological development and provision of high equipment and easy access facilitate their work and they very often use ICT in the learning process. Generally speaking must take measures to encourage teachers using ICT, as well as concrete support measures including teacher professional development.

Only 44% of surveyed teachers were familiar with principles of SD and 38% was informed of us. All they understand that a good education is essential to achieving Sustainable Development.

49% find that there is an interdisciplinary approach to the Sustainable Development in curriculums of secondary education.

In the question are there enough awareness of the needs and potentials of education for Sustainable Development in secondary schools the answers are contradictory: 7% Yes, definitely there are, 29% Yes, there are already people who appreciate the benefits of a good education, 40% Somewhat there is awareness, 20% No or very rarely, and 4% without answer. This is due in part to the fact that teachers are not enough familiar with the principles of SD.

According the most of surveyed teachers in schools has the opportunity to participate in international education networks. But only 25% of teachers say they have experience. They need methodological and technical assistance to use the web-based classroom. Most of them didn't answer the question what is the best way to participate in a web based classroom. One of the main problems is the lack of motivation.

The question Is there enough necessary technical equipment and relevant technical experience of teachers enabling them to take a role in a web-based classroom 42% of teachers respond as there are technical support, but teachers do not have the required technological experience, 22% reported lack the rather necessary technical equipment, 27% say that has not required equipment, and no technical expertise of teachers.

58% of teacher's answers are indicative about the state of curricula in subjects including topics on Sustainable Development. 48% of them found interdisciplinary approach to the Sustainable Development in curriculums of secondary education.

An interesting fact is that teachers and stakeholders do not provide specific recommendations for improving the strategy for ICT in school. The same was the result, the question "What provisions are made in curriculum and teaching programmes for secondary schools regarding SD?". Neither teachers nor stakeholders respond.

On many issues the same percentage both, teachers and stakeholders meet similar. This shows that the study indicate the real situation in Bulgarian schools.

For example: In the question "How do you assess teachers' motivation, willingness and ability to participate in the network and to contribute to web-based classrooms?" 80% of Teachers and 88% of stakeholders give the same answer: "Maybe, if they find some useful things teachers would participate in such a network".

At the question: "Are there enough awareness of the needs and potentials of education for Sustainable Development in secondary schools?" 40% of teachers and 37% of stakeholders answered: "Somewhat there is awareness".

This leads to the conclusion that we need a broader campaign to promote web-based training.

In the issue about National Strategy for ICT use in teaching most of the respondents don't have ideas for improvement. The same opportunity was given for public discussion in the presentation of the Strategy. The result was the same.

Given that over 50% of respondents were not familiar with the topic of Sustainable Development, the answer to the question "How much is Sustainable Development represented in curriculums of secondary education?" does not affect the actual condition. So we did own research. In the summer we have made a detailed investigation and analysis of a curriculum in different subjects and found that many lessons are connected with SD. This can be seen in the section: Representations of SD themes in national curriculum.

## 5. National conclusions and recommendations

The higher quality of the educational system encourages the young people to continue their education and thus plays decisive role in attaining the national targets in this area. The modernisation of the education system in Bulgaria will bring better consistency between the educational level, qualification of the labour force and the labour market demand. Being a major element of the education reform, the Law on Pre-school and School Education is a key step for transition from a centralised institutional model to a relatively autonomous one, where rights and responsibilities are delegated to both kindergartens and schools and to the structures of the participants in the educational process – teachers, parents, students, local communities with a view to their needs and personal development. The main measures in the pre-school and school education are introducing a new educational structure and consolidating the institutions in the system of pre-school and school education; updating the standards for the educational content and of the general educational programmes by including key competences; redefining the types of school education with a view to raising the literacy and employability, as well as raising the results in PISA; career guidance of students; ensuring a compulsory periodical qualification courses for the teachers, designed to improve the performance and education results of both children and students; carrying out reforms in the vocational school education in order to raise its quality, attractiveness and consistency with the labour market; using the results of external evaluation as an instrument for improving the students' competences, including in areas like reading, natural science and mathematics; creating and applying systems of quality management in kindergartens and schools, as well as introducing the inspections as an overall external evaluation of the quality of the provided in kindergartens and schools education.

Co-operation between the Ministry of Education and Science in partnership with the local authorities, non-governmental organizations, universities, and business organizations is of essential importance for implementing the strategies in Bulgaria.

Policies for the implementation of ICT strategies in Bulgaria has a strong lobby among the teaching community and stakeholders. In summary, we can say that Bulgaria is among the leading group of countries in the implementation and execution of the ICT strategy. On the other hand, Bulgaria is in the leading group of countries ranked regarding strategies about responsible internet and social media use.

In recent years, Education for Sustainable Development (ESD) has become a priority in response to the aggravating crisis between human beings and the living environment. Bulgarian Government appreciates the necessity of implementation of the Strategy for Education for Sustainable Development. The national strategies from last years supported the development of ESD for all kinds of formal, non-formal and informal learning in Bulgaria and they will cultivate knowledge, skills, relationships and values, which are the prerequisites for a new understanding and attitude towards the environment.

There are some obstacles for implementation of the Strategies in Bulgaria - a lack of a system for ESD and good models for effective education on the problems of Sustainable Development; insufficient training of teachers concerning the limited use of the interdisciplinary approach in the educational process; a lack of educational materials for efficient ESD; limited financial support provided by national funding resources for ESD events and initiatives; insufficient level of cooperation and coordination; a lack of free market in the field of teachers' training; frequent staff changes in education sector; insufficient competence of school management to develop their own policy; slow changes in the public attitude including the consumer patterns.

Nevertheless, several projects in the field of ESD are being implemented in our country with the support of international donors as well as Program to Support the Education for Sustainable Development in Bulgaria is being elaborated. Environment protection and the problems related to it

are included in the national curriculum of Bulgaria. The following opportunities exist in our country for implementing the Strategy for Education for Sustainable Development - the process of education management decentralization; support of ESD initiatives by Ministry of Environment and Water and Ministry of Education and Science; interest of ESD teachers in improving their qualification; good motivation of students for ESD activities; funding programs of international organizations related to ESD.

Education serves a fundamental purpose in changing values, lifestyles and behaviour as well as developing skills for building a democratic society. It is the main tool in changing the public attitude to the environment according to the international strategies and resolutions for achieving a Sustainable Development.

All that has been achieved up to now as a result of education policy in the Republic of Bulgaria and is an important prerequisite for the successful implementation of Education for Sustainable Development.

Education for Sustainable Development is a dynamic concept that encompasses a vision of education that should enable people for all of ages and ethnicities to take responsibility for sustainable future.

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### 1. Introduction

#### 1.1. Main characteristics of national education system

The main characteristics of national education systems described below are based on the input of Mrs. Diana Garašić, the Croatian stakeholder, and were obtained during an interview<sup>68</sup>, Supporting claims are based on Internet research on the topic. The institutions in charge of monitoring, evaluating and improving the educational system in Croatia are as follow:

**At the level of legislature, development strategy and funding:**

Croatian Parliament with National Council for Information Society, National Science Council, National Council for Higher Education, National Sports Council; Government of the Republic of Croatia and Ministry of Science, Education and Sports with Council for Pedagogical Standard, Croatian Innovation System Council, Government administration offices on the county level and in the City of Zagreb, together with the administrative departments with jurisdiction over education, local self-government offices with jurisdiction, National Council for Curriculum, National Council of Pupils, National Bologna Follow-Up Group, Teacher Council for the Implementation of the CNES.

**At the level of monitoring, evaluation and system development and program implementation:**

Agency for Vocational Education and Training and Adult Education, Agency for Science and Higher Education, Business Innovation Center of Croatia - BICRO Ltd., Central Bureau of Statistics, Croatian Academy of Sciences and Arts, Croatian Academic and Research Network – CARNet, Croatian Accreditation Agency, Croatian Institute of Technology Ltd. – HIT, Croatian Olympic Center Bjelolasica, Croatian Standards Institute, Education and Teacher Training Agency, Meteorological and Hydrological Service, "Miroslav Krleža" Lexicographical Institute, National Center for External Evaluation of Education, State Intellectual Property Office of the Republic of Croatia, State Office for Metrology, The National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia, The National Foundation for the Support of Pupil and Student's Standard, University Computing Center - SRCE, Zagreb University.

**At the level of institutions:** kindergartens, primary schools, secondary schools, higher education institutions, scientific institutes and technology and research development Centers.

**Other organizations** related to education system are: Association of Croatian Secondary School Principals, Croatian Association of Primary School Principals, Center for Educational Research and Development.

According to information provided by Mrs. Diana Garašić, during an interview held on July 15<sup>th</sup> 2014<sup>69</sup>, legislature and development strategy are made at the level of Croatian Parliament and Ministry of Science, Education and Sports. The Ministry of Science, Education and Sports is the institution responsible for the quality of education monitoring. Ministry's goal is to enable everyone, under equal terms and according to one's capabilities, to acquire knowledge and skills required for work or continuation of education.

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<sup>68</sup> Interview with Diana Garašić (ETTA)

<sup>69</sup> Interview with Diana Garašić (ETTA)

On the operative level, concerning monitoring, evaluation and system development, Education and Teacher Training Agency is responsible for monitoring and serves to ensure education quality, teachers' advancement and professional development of the teachers. Education and Teacher Training Agency conducts studies and sets priorities upon the results of the studies. The organization of quality monitoring, teachers' advancement and professional development is carried out according to priorities.

National Center for External Evaluation of Education monitors and evaluates state graduation exams in high schools and exams on national level. The state graduation exams are indicators of the results of education on a national level.

The institutions cooperate closely on various strategies, action plans and agendas concerning development and improvement of Croatia's educational system. Their cooperation depends upon the current needs and tasks which need to be carried out. They cooperate at the levels of management and tasks organization to set out priorities and decide which institutions and organizations will implement decisions and carry out actions.

According to results of International Student Assessment (PISA) in 2012, which is conducted in the member countries of OECD (and partner countries), Croatia falls in the middle range (OECD, 2014)<sup>70</sup> The assessment was conducted in 65 countries and tested mathematics, reading, science and problem solving in students 15 years old. In mathematics, Croatia scored below the average (and was placed on 40<sup>th</sup> place) (NCVVO, 2013)<sup>71</sup>In science and reading, Croatia scored below the average (placed in 34<sup>th</sup> place and 35<sup>th</sup> place respectively) (NCVVO, 2013).<sup>72</sup>

While the results of PISA 2012 show results below average of OECD countries, it should be noted that Croatian students achieve great results in International Mathematical Olympics and International Olympics in Informatics (Garašić, 2014)<sup>73</sup>. Mrs Garašić states that there are outstanding individual cases with extraordinary results, be it students, teachers or even schools (Garašić, 2014)<sup>74</sup>.

## 1.2. Existing strategic documents in the field of education

Based on our research (information available on the Internet and interviews with stakeholders), national and strategic documents in the field of education in Croatia are: Law on Education in Primary and Secondary Schools; Strategy for the Making and Development of the National Curriculum for Preschool, General Compulsory and Secondary School Education; National Curriculum Framework for Preschool Education, General Compulsory and Secondary School Education; Strategy for the Education, Science and Technology; Croatian Qualifications Framework Act; Croatian Qualifications Framework; National Program of Education for Human Rights and various statutes and decisions drafted and issued by Ministries and Agencies . Some of these documents are also listed in the analysis of the implementation of Croatian qualification framework (Grgec, 2013).

General aims acclaimed in these documents, namely in the Croatian Education Act, are: to ensure systematic education of students, to nurture and entice intellectual, physical, aesthetic, social, moral and spiritual development – according to their abilities and aptitude, to raise and educate students in line with general cultural and civilizational values, human rights and children rights and to enable them to live in a multicultural world. To ensure basic, general and expert competences and to

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<sup>70</sup> OECD. (2014). PISA 2012 Results in Focus: What 15-years-old know and what they can do with what they know.

<sup>71</sup> NCVVO. (2013). Priopćenje za javnost: Rezultati OECD-ova istraživanja PISA 2012 provedenog u Republici Hrvatskoj.

<sup>72</sup> NCVVO. (2013). Priopćenje za javnost: Rezultati OECD-ova istraživanja PISA 2012 provedenog u Republici Hrvatskoj.

<sup>73</sup> Interview with Diana Garašić (ETTA), June 15th 2014

<sup>74</sup> Interview with Diana Garašić (ETTA), June 15th 2014

capacitate students for life and work in an always changing socio-cultural context To ensure equal rights and conditions of learning and teaching and to improve the Croatian educational system according to European standards. To establish an effective network of educational institutions and programs, develop a system of quality insurance on all levels of education and to support inclusive education, lifelong learning and adult education (MZOS, 2014)<sup>75</sup>. Certain documents, such as National Curriculum Framework, stress the importance of openness to change and continuous innovation in lieu with changes and development of the society, therefore it is essential that national curriculum is continuously revised. Decentralization and democratization of these processes mean that the responsibility for the changes lies on teachers, experts, principals, but on the parents, students, local and regional community and social partners as well (MZOS, 2010)<sup>76</sup>.

### 1.3. E-learning and Education for Sustainable Development in context of existing strategic documents

National strategic documents stress the need to educate students on ICT, to use ICT to enhance teaching process in primary and secondary schools and to create schools that are technologically developed and prepared to implement e-projects (MZOS, 2010; MZOS, 2014)<sup>77</sup>. National Curriculum Framework also address the concept of Sustainable Development (MZOS, 2010)<sup>78</sup>.

According to National Curriculum, digital competences are one of the most important competences in the Croatian curriculum. The access to information and communication technology must be available to all students and the use of ICT should be a part of the curriculum as an interdisciplinary content or intersubject topic. The students should learn how to effectively use computers and programs and comprehend basic principles of the computer making. They should also be capable to apply ICT to problem solving in various areas (MZOS, 2010)<sup>79</sup>.

National curriculum stresses the importance of Sustainable Development: the basic values of National curriculum are derived from the dedication to a wholesome development of the students for a European co-existence and a society which will enable Sustainable Development. Sustainable Development is also a connection among various relations and problems of environment, nature, economy and culture. Through Sustainable Development education the students will learn to understand the complexity of social, economic and technological development and develop a positive value system with regards of environment quality preservation and rational usage of nature's resources. The values that are crucial are: care, moderation, frugality, solidarity and respect for oneself and other people, the nature and environment, biological and cultural diversity of the planet Earth (MZOS, 2010)<sup>80</sup>.

Action Plan for Education for Sustainable Development states that there is a variety of themes and content related to Sustainable Development covered by schools, but there is still a lot of work to be done if we are to implement the competences as defined by UNECE Strategy. The goals of the Action Plan are to achieve understanding and acceptance of Sustainable Development concept which requires a shift in the existing educational paradigm from transmission and learning of facts to education which requires critical reflection, thinking and drawing conclusion about issues related to work and life so that the students can understand the reality and interrelations of the environment, society and economic development. Education for Sustainable Development is a lifelong learning

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<sup>75</sup> Ministarstvo znanosti, obrazovanja i sporta. (2014). Zakon o odgoju i obrazovanju u osnovnoj i srednjoj školi. NN [87/08](#), [86/09](#), [92/10](#), [105/10](#), [90/11](#), [5/12](#), [16/12](#), [86/12](#), [126/12](#), [94/13](#), [152/14](#)

<sup>76</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum.

<sup>77</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum; Ministarstvo znanosti, obrazovanja i sporta. (2014). Strateški plan 2014 – 2016. .

<sup>78</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum

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process which includes different types of education: formal, non-formal and informal. Schools have the key role to prepare young people for inclusion into the society in which they will assume responsibility for a constructive development of the society. The content should be placed within a wider context of Sustainable Development, but the interconnectedness between themes is vital to education for Sustainable Development (MENP, 2011)<sup>81</sup>.

## 2. National capacities for e-learning

### 2.1. Overview of national data concerning technical capacities for e-learning

All elementary and secondary schools in the country are interconnected via the academic research network CARNet (<http://www.carnet.hr>) The schools are connected using various technologies (optic, ADSL) with varying connection speeds.

A separate project (e-Otoci) was conceived with the aim of improving and advancing the educational process on the islands, and in so doing, encourage the inhabitants of small, remote and poorly inhabited islands to continue to live there. It is conceived on the idea that specially organized classes for "distance education" be organized within the framework of existing schools in larger cities on nearby islands or within the county office. This system allows for the real time transfer of video, audio and other educational material. In this way, 23 schools on the islands have been connected via the video-conference system and the e-Islands project ([http://www.carnet.hr/e\\_otoci](http://www.carnet.hr/e_otoci)).

Any institution of primary, secondary and higher education can be a member of CARNet. Through the membership, they can be constantly connected to the Internet and have the right to use CARNet services (<http://public.mzos.hr/Default.aspx?art=11672&sec=3160>). Institutions use various technologies and speeds, depending on the available infrastructure of the provider, their needs, market changes etc. In order to become a member of CARNet, each institution must send an application to the Ministry of Science, Education and Sports ([http://www.carnet.hr/clanstvo\\_u\\_carnet\\_mrezi/kako\\_postati\\_clanica](http://www.carnet.hr/clanstvo_u_carnet_mrezi/kako_postati_clanica)).

Individual users (teachers, students, professors, scientists, etc.) with the electronic identity in the AAI@EduHr system have the access to Internet (CARNet).<sup>82</sup>

Through GÉANTnetwork all CARNet users can connect with colleagues from over 40 European countries in over 8 000 researches and education institutions ([http://hr.wikipedia.org/wiki/Hrvatska\\_akademska\\_i\\_istra%C5%BEiva%C4%8Dka\\_mre%C5%BEa](http://hr.wikipedia.org/wiki/Hrvatska_akademska_i_istra%C5%BEiva%C4%8Dka_mre%C5%BEa)).

"NET at School" is a project designed by the Ministry of Science, Education and Sports with the goal to enable Internet access in schools and has started in 2003. In the subject of the project, ISDN connection has been installed in all Croatian schools and 1750 computers have been donated. Schools are offered with 10 hours of free Internet access, free usage of disc space for the school website and each school has one e-mail address. The school needs to apply to enter the project and realize the benefits (<http://public.mzos.hr/Default.aspx?art=8894&sec=3140>).

According to Digital Agenda for Europe (available at <https://ec.europa.eu/digital-agenda/en/country-information-croatia>), the state of play of Broadband Development is:

Basic: 2 Mbps for 95% of the population and households since 2012

NGA: 30 Mbps for 19% of the households since 2012.

The long term aim for NGA Coverage is 30 Mbps for 50% of the population until 2020.

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<sup>81</sup> Ministry of Environmental and Nature Protection. (2011). Action plan for education for sustainable development.

<sup>82</sup> CARNet. Elektronički identitet u sustavu AAI@EduHr.

The technologies used are:

DSL	94,1%
VDSL	15,9%
FTTP	6,2%
WiMax	0,0%
Standard Cable	19,6%
Docsis 3 cable	0,0%
HSPA	93,1%
LTE	25,0%
Satellite	100,0%

Table 1. Share of Different Technologies 2012 (<https://ec.europa.eu/digital-agenda/en/country-information-croatia>)

Available frequencies are 800 MHz LTE - 900 MHz, 1800 MHz LTE, UMTS - 1900 MHz, 2100 MHz UMTS - 2500 MHz IMT and 3500 MHz WiMAX (<https://ec.europa.eu/digital-agenda/en/country-information-croatia>).

Students use web browsers and social networks on everyday base. They use interactive whiteboards much less frequently than the EU average, but their confidence in operational ICT skills is close or below EU mean and is at or above EU mean in social media skills.

The number of school computers is 1 computer classroom per school. The number of computers available is below the EU average at all grades (European Schoolnet&University of Liege, 2012). There are fewer internet-connected desktop computers than the EU average. According to data received from Ministry of Science, Education and Sports there are 44 570 students in high schools and 118 955 students in primary schools attending informatics classes, with 1 236 teachers of informatics (these information were received in an e-mail from Mrs. Katarina Grgec).

Although there are studies showing the frequency of use of ICT in lessons is average in comparison to EU standards, our professional experience (as a knowledge management company and professional experience of Croatia's project manager, Predrag Pale, Ph.D) shows that e-learning courses are used in pilot projects in schools and are mostly used by pioneer teachers. Croatia ranks below other countries in regards to virtual learning environments.

Outside the informatics (ICT) subject (which is optional subject in primary schools for 5<sup>th</sup> to 8<sup>th</sup> grade and a mandatory separate subject in secondary schools) and, according to the experience of Croatian project manager Predrag Pale, PH.D, ICT is used in pilot projects in schools and is mostly used by pioneer teachers. Broader implementation of ICT into teaching in schools is still missing. As the adjustment of the learning process to include ICT is under way, some schools have introduced e-directories (<http://www.carnet.hr/e-dnevnik>) for teachers or smart boards and have educated their teachers accordingly (according to Mrs. Grgec).

According to information received from the teachers and stakeholders, there is no technical staff dedicated to ICT in schools – the role of technical staff is executed by teachers and/or students themselves.

MS Windows is used in all schools, with the addition of various free software (such as Geogebra). According to Mrs. Grgec, the technical equipment is funded through the funds a school receives from the state or by sponsors (through donations), but the sponsor model is not widespread. The

equipment is on average 6 to 7 years old and the replacement is problematic due to economic crisis (correspondence with Mrs. Grgec). The Ministry of Science, Education and Sports has an agreement for software licensing for all schools with Microsoft Croatia (<http://public.mzos.hr/Default.aspx?art=11687&sec=3163>).

## 2.2. Analysis of documents about competencies and teacher and student outcomes regarding ICT use

All Croatian teachers received basic ICT training (basic ECDL program) as a part of their expert education. The Education and Teacher Training Agency in collaboration with CARNet is working on systematic training of all teachers in ICT, but there are currently no expectations for the use of ICT in examinations and assessment (correspondence with Mrs. Grgec). ICT is a part of higher education for future teachers in university, but the stakeholders expressed the opinion that teachers lack confidence in operational skills and social media skills.

It is stated that ICT competences are one of the crucial competences which should be in the focus of the new National Curriculum. The access to information and communication technology must be available to all students and the use of ICT should be a part of the curriculum as an interdisciplinary content or intersubject topic. The students should learn how to effectively use computers and programs and comprehend basic principles of the computer making. They should also be capable to apply ICT to problem solving in various areas and should use it in all subjects in order to research and communicate on local and broader level, to exchange ideas and share their work (MZOS, 2010)<sup>83</sup>.

ICT competences are included as interdisciplinary content or intercourse topic, but as key competence as well. Informatics is elective subject in primary school (from 5th to 8th grade) and a mandatory subject in all four years of high school (gymnasium or vocational secondary schools) (European Schoolnet&University of Liege, 2012)<sup>84</sup>. National Curriculum Framework integrates ICT in many subjects in addition to regular teaching ICT as a separate subject (MZOS, 2010)<sup>85</sup>.

According to a survey we conducted preparatory to conducting baseline study, teachers most commonly use PowerPoint presentations as a tool in teaching.

## 2.3. Identification of current state and rooms for improvement in e-learning

During interviews, our stakeholders state that no major improvements have been made in the last five years regarding ICT usage in education. Even though national and strategic documents stress the importance of ICT in education and the development of ICT competences in students, no work has been done on larger scale. Schools depend upon themselves in efforts to implement positive changes and rely heavily upon their staff and skilled students. Some schools have introduced e-directories and smart boards.

The methods of the usage of ICT in education are lacking. Teachers require training and examples of good practice and time and room to experiment personally with the possibilities of ICT application in their own subject(s). There is also a problem of procurement of hardware and continuous update of software used in schools (correspondence with Mrs. Grgec).

There are goals regarding ICT usage in education set out in National Curriculum: the students should learn how to effectively use computers and programs and comprehend basic principles of the computer making. They should also be capable of applying ICT to problem solving in various areas

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<sup>83</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum

<sup>84</sup> European Schoolnet & University of Liege. (2012). Survey of schools: ICT in education - country profile: Croatia.

<sup>85</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum

and should use it in all subjects in order to research and communicate on local and broader level, to exchange ideas and share their work. The goal is to create high-tech schools which are prepared to implement e-projects. In order to achieve this goal, schools must have high-speed Internet, enough of the equipment and they must computerize the processes of teaching, learning and management. This should be achieved through the cooperation with CARNet and structural funds (MZOS, 2010)<sup>86</sup>.

### **3. Sustainable Development (SD) in Education**

#### **3.1. Representations of SD themes in national curriculum**

The Sustainable Development themes are present in the Croatian National Curriculum. They are not included in one separate subject but are rather distributed among various subjects. The number of themes and their teaching differ by types of secondary schools and differ in gymnasiums and vocational schools.

Some of the themes present are: environment protection, nature conservation and management of natural resources, biological and landscape diversity, renewable energy sources and energy efficiency, waste management, corporate social responsibility, sustainable production and consumption, informing consumers and consumers' rights, certification, cleaner production, building peace, non-violence, democracy, justice, human rights, security, ethics, political literacy and political participation, global, national and local responsibility, democratic citizenship, local, regional, rural and urban development, social inclusion, quality of life, intersectoral partnership, information and education on disease prevention, healthy lifestyles, public health, protection of cultural and traditional heritage etc (MZOS, 2010)<sup>87</sup>.

According to Croatia's stakeholder, Mrs. Diana Garašić (one of the editors of "Education for Sustainable Development, a Primary and Secondary School Handbook"), it is difficult to assess in which subjects and to what extent are the Sustainable Development themes present in the national curriculum, given the fact that Croatian National Curriculum has not defined the quantity of themes in any given subject and has not defined the methods of teaching the Sustainable Development. There are no documents on national level that define which topics of Sustainable Development are to be covered by which subject, to what extent and in which way. National Curriculum has set out the guidelines for nature and science subjects, but the Croatian Qualifications Framework has the opportunity to define the criteria of Sustainable Development teaching and assessing. Many subjects in gymnasiums and vocational schools include some Sustainable Development themes.

Some subjects may cover similar or same themes, but from a different standpoint. For now interconnections through subjects are a question of individual engagement and are relying on particular schools and teachers which may agree to adapt their curricula to accommodate interconnectedness. The interconnectedness is still a desired model, but one that we have yet to achieve on a national level (interview with Mrs. Garašić).

#### **3.2. Identification of new arisen important themes of SD that should be included into national curriculum**

All the themes listed by the UNECE are important, but the problem arises from lack of a defined working framework. There is no regulation of the teaching process for Sustainable Development, no methods recommended, no criteria for the assessment and the interconnectedness of the subjects teaching Sustainable Development remains undefined.

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<sup>86</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum.

<sup>87</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum.

Some of the themes pointed out are: citizenship, democracy and government, human rights, elimination of poverty, biodiversity, environment protection, climate changes, environmental health, corporative and social responsibility (interview with Mrs. Garašić).

## 4. Teacher's view about e-learning and education for Sustainable Development

Education of teachers for Sustainable Development is not consistent. There are some optional courses on certain universities, but for the most part the themes of Sustainable Development are integrated into different courses, much like in the secondary education system. Informal education in Croatia still remains unrecognized and is rarely used as a method of education for Sustainable Development. The Education and Teacher Training Agency has developed a number of modules and projects for concrete application of civic education in schools and the local community (interview with Mrs. Garašić).

E-learning is still underrepresented in education of teachers and general competences for e-learning are under EU average. Much work needs to be done so that teachers learn and gain confidence in using e-learning. Again, it depends on individuals and their personal aptitude towards new methods and their implementation in everyday work.

Majority of teachers lack experience in using web classrooms and cooperation on international educational networks. Teachers with such experience, which they have typically attained through cooperation on an EU-funded project, have applied for the eSchool4S project because they recognized this project as a continuation of their education in the field of ICT in teaching. It seems there is still a large number of teachers not interested in expanding their ICT knowledge (outside the basics) or intimidated by the concepts of web-based classroom. In the interviews with stakeholders and teachers which applied for cooperation on eSchool4S project the major problem is not so much ICT knowledge and competences, but the knowledge of English language (as the official language of the project).

Teachers generally express positive attitude towards e-learning, but there is a lack of implementation of e-learning in the Croatian education system.

Teachers in general are aware of the importance of Sustainable Development in teaching. The concept of Sustainable Development is heavily stressed in Croatian National Curriculum and the Action Plan for Sustainable Development is ongoing (interview with Mrs. Garašić). But as the operational development of the implementation of Sustainable Development into classrooms is missing, the obligation to follow certain guidelines is lacking. Therefore it is up to every teacher to decide how much of importance he or she will give to themes of Sustainable Development in their teaching. It is also up to every school and its teachers to decide whether and to which extent will the themes of Sustainable Development be interconnected between subjects.

Teachers already include the Sustainable Development themes into their subject's curriculum. Teachers which applied to join the eSchool4S project in Croatia are prepared to do more: to include more themes or to include them in a new and different way.

Some teachers are already involved in European projects and want to continue their participation, some have personal interest in the topics of e-education and Sustainable Development with significant experience in e-teaching so they see this project as a continuation of previous learning and experience. They see the project as a way of personal and professional development and aim to enrich their range of skills, develop their competencies and implement new methods and strategies to teach more successfully. They also search for ways to more directly involve students into the learning process and to teach them real, practical issues and problem solving. They see Sustainable Development as crucial element of teaching for progress and a better world. They search for ways to

ignite the consciousness of the importance of Sustainable Development in their students. Many are interested in international cooperation and are excited about the possibilities of cooperation and exchange of ideas with colleagues on international level. They are interested in new ideas and concepts on how to improve life standard of impoverished population and to raise awareness in students on the importance of environment protection and its connection to quality of live enhancement. They are looking for way of implementing Sustainable Development into classroom and ways to make it more interesting to students. Some teachers have participated in and even coordinated projects and are willing to share their knowledge and experiences with other teachers. Others are looking for ways to include students in international projects. They want to improve their ICT competences and hear about the experiences of their colleagues in other countries.

## 5. National conclusions and recommendations

National strategic documents set out a number of goals for the Croatian education system and they must be achieved. More agility of the institutions in charge in the implementation of these strategies is badly needed – the resolutions need to be passed more quickly and the implementation needs to be more efficient and in a shorter period of time. Constant revisions of the National Curriculum are necessary to follow socio-economic development and the Curriculum needs to be more specific and to the point in order to become a reference point for all institutions involved, as well as the teachers. A need to include local communities, regions, parents and students needs to be addressed with practical guidelines and recommendations.

The processes that are already under way must continue: computerization of schools needs to be carried out on larger scale, systematically and consistently (e.g the e-directories should become a standard, not an exception), followed by appropriate technological solutions and teacher training. There is much room to improve the equipment in schools (both hardware and software), as well as the connection to the internet (namely, internet speed). The lack of hardware and software needs to be addressed (perhaps through new models of procurement) and software needs to be regularly updated.

Ministry of Science, Education and Sports has no data on the number of computers per student in schools, the level of ICT usage in teaching is below EU average and the usage of e-learning is still in its early stages, implemented only within certain projects and not as a widespread method of teaching (correspondence with Mrs. Grgec).

The concept of Sustainable Development is valued as very important in the Croatian education system, cited as a high priority, and is accompanied with an Action Plan (MZOS, 2010)<sup>88</sup>. Despite recommendations and plans, Sustainable Development topics are not yet an integral part of classes. It is an interdisciplinary, cross-curriculum concept, but there are no parameters to measure its incorporation into subjects. Therefore it is difficult to assess how much are topics of Sustainable Development present in the classroom which leads to various interpretations: some express the opinion it is very well represented, some oppose it.

It is certain there is a need to change the paradigm of teaching: the education system on the whole needs to make a shift from a transmission of facts to teaching which results in critical thinking, reflection and arriving at conclusions based on available facts. The shift is necessary so that the students can understand the complexity of Sustainable Development issues and how they relate to environment, society and economic development. The Sustainable Development topics and issues need to be placed in a wider context and their interconnectedness must be clear to students.

According to stakeholders, the new National Curriculum should be the driver of change, a chance to implement the above stated requirements. There are no indications this will ensue, as the document

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<sup>88</sup> Ministarstvo znanosti, obrazovanja i sporta. (2010). Nacionalni okvirni kurikulum

lacks deadlines or outcomes (MZOS, 2010)<sup>89</sup>. According to Mrs. Garašić, the new Croatian Qualifications Framework has set out outcomes of teaching, but they are not expressly linked to Sustainable Development.

One of the most prominent problems is lack of teaching methods which incorporate ICT into classroom. Teachers need training, examples of good practice and enough time and space to experiment with methods. There are no guidelines of the teaching process for Sustainable Development, no methods recommended, no criteria for the assessment and the interconnectedness of the subjects teaching Sustainable Development remains undefined.

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## **7. List of stakeholders**

1. Diana Garašić, Head of Department , Education and Teacher Training Agency
2. Katarina Stupalo, Philosophy, Logic and Ethics Associate, Education and Teacher Training Agency
3. Katarina Grgec, Head of Secondary Schools and Boarding Homes Department, Ministry of Science, Education and Sport
4. Tamara Hudolin, Senior Advisor for chemistry, graphic and audio-visual technology, Agency for Vocational Education and Training and Adult Education

# Germany Country Report

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## Preface

The frame of the national education system is set by the Kultusministerkonferenz (KMK) (Standing Conference of the Ministers of Education and Cultural Affairs) situated in Berlin, Germany. At the KMK e.g. universal contents of the national curricula as well as final exam requirements of each school type and level are decided.<sup>90</sup>

The detailed definition for these curricula and exam requirements is up to each German federal state. The federal curricula and exam requirements differ from each other due to the federal circumstances. Therefore the following study containing the German part is based on the data of the German federal state Baden-Wuerttemberg as the GIZ and the LAK are situated in this state.

In Baden-Wuerttemberg there are 5,423 public and 760 private schools. This includes about 2,424 primary and 862 elementary schools, 429 secondary schools, 426 special schools, 378 high schools, 762 vocational schools, with round about 100,000 teachers, and 1,694,000 students.<sup>91</sup>

## 1. Introduction

### 1.1 Main characteristics of the national education system

In Baden-Wuerttemberg there are four institutions that deal with monitoring, evaluating and improving the educational system.

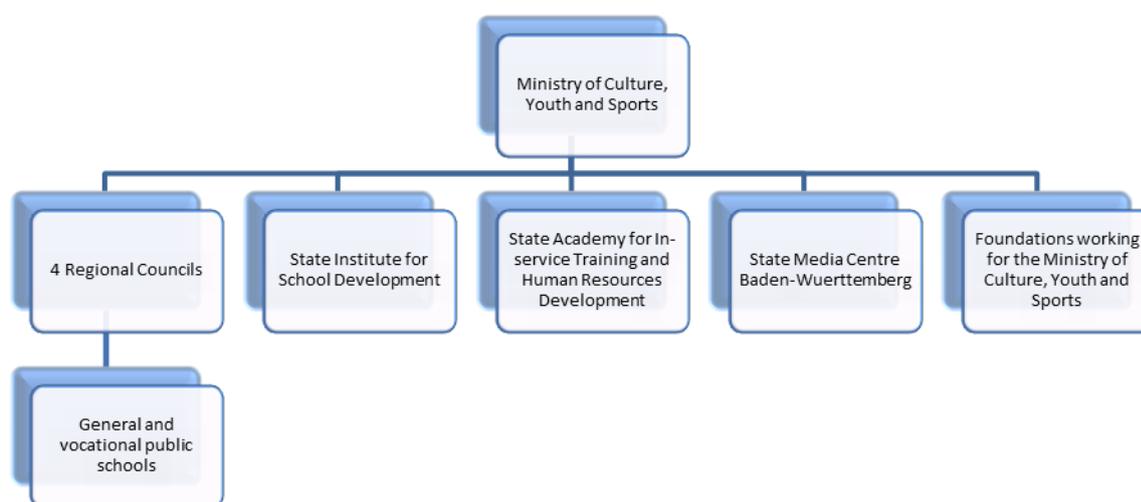


Figure 1: The Ministry of Culture, Youth and Sport Baden-Wuerttemberg

<sup>90</sup> [www.kmk.org](http://www.kmk.org)

<sup>91</sup> [www.statistik.baden-wuerttemberg.de](http://www.statistik.baden-wuerttemberg.de) (see References)

The leading institution (top education authority) in the area of education is the Kultusministerium fuer Kultus, Jugend und Sport (the Ministry of Culture, Youth and Sports). The Ministry of Culture, Youth and Sports defines the educational standards of a federal state in the form of curricula to promote the skills and talents of the students individually. The determination of the organisation of teaching, an equal and balanced provision with teachers, the determination of performance standards at school exams and centralized exams are parts of the Ministry's responsibilities. Furthermore, it organises teacher training and further education, the promotion of schoolhouse construction. The Ministry of Culture, Youth and Sports is also responsible for scholar youth education, cultural matters, further training of adults and in the field of competitive and mass sports.

The educational divisions of the Ministry of Culture, Youth and Sports are:

1. general schools;
2. professional schools;
3. elementary education;
4. private schools;
5. teacher training and further education and
6. education research.

### **The education monitoring**

The education reporting follows a merely descriptive method: It describes developments and circumstances and supports the politics and educational administration, also hinting to obstacles. The Ministry carries out this reporting every three to four years.<sup>92</sup>

### **The Regierungspräsidium (Regional Council)**

The second important educational institution in Baden-Wuerttemberg is the Regierungspräsidium (Regional Council). It unites different departments of social life of a region such as the department of school and education. The Regional Council is responsible for children, youngsters and young adults in our region to accompany and support them on their way to adult life at their best. The most important task to guarantee these responsibilities is a comprehensive personal management: the extraction, employment, further education of staff as well as selection of appropriate executives.

The Regional Council wants to support and advise schools by managing appropriate further education and self-evaluation. In this framework the Regional Council works together with the Landesinstitut für Schulentwicklung (LS, State Institute of School Development) and the Landesakademie für Fortbildung und Personalentwicklung (LAK, State Academy for In-Service Training and Human Resources Development).<sup>93</sup>

### **The Landesakademie fuer Fortbildung und Personalentwicklung (LAK, State Academy for In-service Training and Human Resources Development)**

There are three locations of the State Academy for In-service Training and Human Resources Development in Baden-Wuerttemberg which offer services in two main sectors.

The first sector is in-service training and human resources development at schools on behalf of the Ministry of Education, Youth and Sports Baden-Wuerttemberg and the Regional Council and is a legally responsible public-law institution.

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<sup>92</sup> [www.kultusportal-bw.de](http://www.kultusportal-bw.de)

<sup>93</sup> [www.rp-stuttgart.de](http://www.rp-stuttgart.de)

The State Academy in Esslingen presents the competence centre concerning in-service training for teachers at vocational schools: it qualifies managerial staff, multipliers and lecturers with special tasks, implements new curricula and types of colleges, develops lesson materials and organizes multimedia and networking systems (e.g. Cisco-Academy). Technical-oriented courses in the excellently equipped workshop, computer and network courses in modern computer labs and courses for pedagogic or methodical topics are the main fields of work concerning the in-service training.

The second sector is represented by international exchange programmes and trainings at the State Academy. Responsibilities in this sector are international school projects and language projects, international exchange and consulting, projects for further qualification of teachers and improvement of the mobility of apprentices.

An excellent example pictures the ABB (Academy for vocational Education - France) and the Danube-Region-Strategy. Tasks that belong to these programmes are:

- exchange of information, expertise and experience in the vocational field,
- improvement of mobility, in cooperation with partners in the industry.
- reinforcement of the professional skills of apprentices, teachers, trainers and managerial staff as well as
- implementation of joint training and projects.<sup>94</sup>

### **The Landesinstitut fuer Schulentwicklung (LS, State Institute for School Development)**

The State Institute for School Development (public-law institution) is a qualified partner which provides services for all non-academic educational institutions, for the State Ministry of Education, the Regional Council and the school administration in Baden-Wuerttemberg, in particular in the field of school quality development and curriculum development. Its employees are mainly teachers, social scientists and psychologists.

The State Institute for School Development is divided in four departments:

Department 1: Administration, Coordination, Educational Reporting

Department 2: Quality Development and Evaluation

Department 3: Educational Development and Empirical Educational Research

Department 4: Curriculum Development.

The State Institute for Educational Development focuses on quality development and evaluation, the development of curricula for all types of schools (from primary to vocational sections), the educational reporting, editing and maintaining web resources for schools, producing and publishing teaching materials, exploring new methods in teaching and learning and empirical educational research. It cooperates with other educational institutions and organisations as well as with partners in business and industry, welfare and general administration.<sup>95</sup>

### **Quality development and evaluation**

One of the strategic education political objectives of the Ministry of Culture, Youth and Sports is to give the schools in Baden-Wuerttemberg a higher level of independence and responsibility concerning their pedagogic work. In this framework the development and evaluation of educational quality plays an important role.

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<sup>94</sup> [www.lehrerfortbildung-bw.de](http://www.lehrerfortbildung-bw.de)

<sup>95</sup> [www.ls-bw.de](http://www.ls-bw.de)

Since December 2006 systematic internal and external evaluation of schools is a basic part of quality development in Baden-Wuerttemberg. This evaluation considers relevant areas of school quality such as school management, lessons' development, individual feedback etc. Thus not only results but also processes are reviewed and evaluated by the school itself (internal) and later on by a group of external evaluators (employed by the State Institute for School Development) authorized by the Ministry of Culture, Youth and Sports and the Regional Council respectively.

The results of the external evaluation are presented to the school and also submitted in form of an evaluation report. The report contains recommendations for the school's further quality development. This report and the measures planned by the school are forwarded to the Regional Council as kind of an agreement for the upcoming quality period. Thereby a permanent further development of school quality in Baden-Wuerttemberg is guaranteed.

Another approach to improve school quality especially at vocational schools represents the outcome of a study commission named "Fit for Life in Knowledge Society – Vocational Schools, Training and Further Education". In 2009/10 the above commission intended to reform the vocational schools in Baden-Wuerttemberg until 2030 by integrating low-achievers in the world of work better through targeted promotion measures and by attracting high-performing adolescents to vocational schools through specific offers.

The main fields of action are:

- Ensuring the equivalence of vocational and general education;
- Further development of tailor-made educational offers so that all children and adolescents with their various talents, skills and interests will be promoted optimally;
- Extraction of qualified employees to ensure the prosperity of our state.

The commission report contains about 50 recommendations and 160 individual proposals for the future of the vocational school system, the dual training and the general and vocational training and further education. The first steps to implement these recommendations were taken in the school year 2011/12.<sup>96</sup>

### **International surveys**

Many developments, structural changes and innovations had their influence on the plans of educational reforms in Baden-Wuerttemberg. These reforms also partly evolved from reactions to international studies such as TIMSS, IGLU and PISA. Results were e.g. the stronger emphasis on media and on scientific lessons. Also new subjects, new subject combinations, child care and all-day learning offers, as well as extracurricular projects are only some examples for the successful development of the Baden-Wuerttemberg educational system with reference to international best practice approaches.<sup>97</sup>

## **1.2 Existing strategic documents in the field of education**

### **The Kultusministerkonferenz (Standing Conference of the Ministers of Education and Cultural Affairs, Germany)**

The Standing Conference of the Ministers of Education and Cultural Affairs tries to ensure the highest level of mobility, the equivalence of living conditions and to promote the common interests for learners, students, teachers and scientists in the field of culture by consensus and cooperation in Germany.

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<sup>96</sup> [www.kultusportal-bw.de](http://www.kultusportal-bw.de)

<sup>97</sup> See above

The work on the development and introduction of nationwide valid educational standards is of specific interest to the Standing Conference of the Ministers of Education and Cultural Affairs. These educational standards focus on general educational aims and list core competences that are to be acquired by all pupils and students at a certain level of education.

The general aims of the Standing Conference of the Ministers of Education and Cultural Affairs are:

- to arrange the comparability of courses of education, appropriate leaving certificates and diploma, as well as of teacher training
- to ensure the quality standards in schools, vocational training and universities,
- to promote the cooperation between educational, scientific and cultural institutions,
- to give instructions concerning the contents of school subjects and areas of learning that are implemented in the curricula by each federal state,
- to especially support internal and external evaluation as well as school development responding to the results of international studies such as PISA to ensure internationally comparable quality.<sup>98</sup>

### **1.3 E-learning and Education for Sustainable Development in the context of existing strategic documents**

In the national educational standards the mentioned aims to be reached by the pupils and students are divided into (a) attitudes, (b) skills and (c) knowledge.

Under (b) skills one can find that the good command of a computer and the meaningful use of an internet access are essential competences that need to be taught in the computer age. The use of the computer and the internet is included in the curricula as an integrative element in subjects and subject combinations. Generally, computer lessons are offered as elective subject or specialisation by schools (two hours or more per week).

Further, main topics and tasks of the schools represent the implementation of the themes environmental education and sustainability appropriate to age mentioned in the national educational standards.

A formulated example for the integration of sustainability in a curriculum is: “The pupils acquire an understanding for simple ecological relationships at chosen eco systems. They recognise the cyclical characteristics of a system and the principle of sustainability in nature” (educational standard and curriculum, Realschule (secondary school), class 7, subject: scientific working).

## **2. National capacities for e-learning**

### **2.1 Overview of national data concerning technical capacities for e-learning**

In Baden-Wuerttemberg 81% of private households have an internet connection and 84% own a computer (Statistical State Institution, 2013).

Concerning schools in Baden-Wuerttemberg, every school of each type (except primary schools) must provide computer rooms so that they can fulfil the requirements of the current curricula. Generally the computers are equipped with an internet connection.

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<sup>98</sup> [www.kmk.org](http://www.kmk.org)

### *User habits of students*

63% of students at the age between 10 and 15 use their computer and the internet daily. They use the computers mainly to communicate with friends and relatives on the one hand and to search for information about products and services on the other (Statistical State Institution, 2013).

### *Number of school computers per child*

The contents of the curricula in Baden-Wuerttemberg prescribe the use of media such as the internet. Thus every school (except primary schools) is equipped with sufficient computers for a whole class and computer rooms so that the relevant curriculum can be implemented.<sup>99</sup>

### *Amount of ICT use in classroom and existing e-learning courses in primary and secondary schools*

In primary schools (classes 1 to 4) there are no standards or curricula prescribing the use of computers and/or the internet in lessons.

At elementary and secondary level (classes 5 to 10) the use of the computers and the internet is defined by the national educational standards (see above). However, the application of e-learning courses depends on the teacher.<sup>100</sup>

### *Number of technical staff for ICT in schools*

Every school (except primary schools) must provide technical staff for ICT in their school. Depending on the size and type of school the number of technical staff varies to a great amount.

### *Number and type of used educational software (especially related to SD), ways of financing technical equipment*

Schools in Baden-Wuerttemberg use different educational software, sometimes there is even no specific educational software installed depending on the type of school. The most applied educational software is MOODLE because schools use it also as platform for their internal communication and as school homepage. Besides MOODLE there is also software for different learning games (especially related to SD) on offers which is developed by teachers and distributed by the Regional Council. The use of educational software is optional so no exact numbers are available. Technical equipment including e.g. licenses is either free of costs or paid for by the relevant region.

## **2.2 Analysis of documents about competencies and teacher and student outcomes regarding ICT use**

The education curricula for teachers at general elementary, secondary and high schools don't contain specific ICT courses. Compulsory courses such as media pedagogics and also courses centering the studied subjects always include lessons where ICT is used to present modern approaches and methods to teach certain topics. At the so called pedagogical universities (responsible for the training of teachers at general primary, elementary and secondary schools) there are also offers for additional media courses especially e-learning courses.<sup>101</sup>

The education curricula for teacher at vocational schools determine the attendance of at least one computer course (e.g. business informatics) as requirement to pass the final exam. Further ICT courses are available.<sup>102</sup>

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<sup>99</sup> See curricula at [www.ls-bw.de/bildungsplaene/](http://www.ls-bw.de/bildungsplaene/)

<sup>100</sup> See above

<sup>101</sup> See above

<sup>102</sup> See curricula at [www.ls-bw.de/bildungsplaene/](http://www.ls-bw.de/bildungsplaene/)

Nevertheless there are many options for teachers to participate in further ICT trainings that focus on the special needs of teachers and teacher trainers. The State Academy as well as the Regional Councils offer ICT trainings about topics such as Moodle, e-learning, cloud computing, virtualization, green computing etc.<sup>103</sup>

Besides teachers can find online materials concerning the use of ICT at school on specific websites established by the State Academy (the Teacher Training Server: [lehrerfortbildung-bw.de](http://lehrerfortbildung-bw.de)), the State Institute (the State Training Server: [www.schule-bw.de](http://www.schule-bw.de)) and the State Media Centre: [www.lmz-bw.de](http://www.lmz-bw.de).

As data processing and computer sciences are compulsory subjects at vocational schools and further computer lessons either compulsory or elective subjects at general schools the computer rooms are usually fully employed. However, the capacity utilisation depends on the facilities and the budget a school has. Thus the demand for a computer room for lessons of e-learning can't always be satisfied.

## 2.3 Identification of current state and rooms for improvement in e-learning

Further training measures concerning the use of media in the classroom improved the knowledge and skills of teachers in Baden-Wuerttemberg in the last five years. Topics are Moodle, e-learning, design and media techniques, information management and business computer science, multimedia and net-supported learning arrangements, object-oriented programming, etc.<sup>104</sup>

The main problems that remain to be solved regarding ICT usage in education are the implementation of data security and copyright regulations in schools when working with Moodle classrooms, establishing websites or using the school network are the main problems in ICT at schools in Baden-Wuerttemberg.

There are three main goals set regarding ICT usage in education which are:

- Fast development of mobile devices such as tablets and smartphones to be used in education.
- Application of ICT to improve individual support.
- Planning of a comprehensive fast internet access countrywide.

## 3. Sustainable Development (SD) in Education

### 3.1 Representations of SD themes in national curriculum

The national educational standards for certain subjects and subject combinations contain knowledge and competencies in the field of sustainability. Thus every relevant curriculum also contains themes concerning sustainability.

Besides there are also guiding perspectives which were formulated in the framework of the national educational standards. These guiding perspectives are divided into two main sectors containing the following topics:

General guiding perspectives:

- Education for Sustainable Development,
- Prevention and health promotion,
- Education for tolerance and intercourse with diversity.

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<sup>103</sup> [www.lehrerfortbildung-bw.de](http://www.lehrerfortbildung-bw.de)

<sup>104</sup> See above

Topic specific guiding perspectives:

- Professional orientation,
- Media education,
- Consumer education.

The perspectives are not topics to be ascribed to a single school subject but to be approached across different subjects.<sup>105</sup>

The commissions responsible for the educational planning have the task to arrange the curricula in that way that the perspectives are incorporated in each subject. That includes also the formulation of educational competencies based on these perspectives suitable to age and subject.

As mentioned before, main topics and tasks of the schools represent the implementation of the themes environmental education and sustainability appropriate to age mentioned in the national educational standards. Especially environmental education connects to the topic sustainability.

Literally mentioned Sustainable Development is to be found at secondary and high schools (general and vocational schools) in the following subjects: biology, business administration, chemistry, economics, ethics, geography and scientific working.

Sustainability and Sustainable Development are mentioned in these curricula as subtitles referring to sustainable production, sustainable consumption, and environmental themes.

Besides that, topics like globalisation in politics or cultural knowledge in foreign languages also include Sustainable Development in a broader sense and do not name the theme explicitly.

Sustainable Development itself is represented by a small part in the curricula of Baden-Wuerttemberg. Nevertheless it depends on the teacher to what extent this topic is included in the lessons.

There are subject combinations at general secondary schools such as MNT (man-nature-technology), scientific working (biology, chemistry and physics) that deal with SD related themes.<sup>106</sup>

### **3.2 Identification of new arisen important themes of SD that should be included into national curriculum**

The UN Decade *“Education for Sustainable Development 2005 to 2014 in Baden-Wuerttemberg – designing the future – learning about sustainability”* underlines the importance of SD themes in our national curricula. The necessity to integrate Sustainable Development at all levels of the education system originated from the General Assembly of the UN in Rio in 2002. The aim of the UN Decade is to enable people for an active design of a permanent ecologically compatible, economically powerful and socially fair environment considering global aspects today and in the future.

Therefore the national committee of the UN Decade defined annual topics for the implementation of the UN Decade. The objective of the annual topics is to better focus on the activities of the decade stakeholders, to activate new partners and to accentuate the concerns of ESD. Activities beyond these annual topics are certainly possible and desirable:

- 2007: Cultural variety
- 2008: Water
- 2009: Energy
- 2010: Money
- 2011: Town

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<sup>105</sup> [www.kultusportal-bw.de](http://www.kultusportal-bw.de)

<sup>106</sup> See curricula at [www.ls-bw.de/bildungsplaene/](http://www.ls-bw.de/bildungsplaene/)

- 2012: Nutrition
- 2013: Mobility
- 2014: Conclusion, Review of the previous topics, Outlook.<sup>107</sup>

## 4. Teacher's view about e-learning and Education for Sustainable Development

If sustainability is part of the subject's curriculum the teacher has to acquire certain knowledge and the competence to teach this topic in the relevant subject appropriate to the age of his or her pupils and students. The State Seminar for didactics and teacher education (regional institution) sees to that as its responsibility is to train teachers in their relevant subjects.

E-Learning is also part of the teacher training but to which extent it is included in the training lessons depends on the State Seminar trainer and the applicability in the relevant subject. There are no explicit data in what way and to what extent e-learning must be trained.<sup>108</sup>

Most teachers know MOODLE as platform for school homepages and internal communication. Some of the teachers have had also experiences with MOODLE as an interactive learning platform to repeat tasks, practise for class tests or to develop a new or certain topic that is suitable to be worked on the internet.

The work in an international educational network is rather rare. The preferred way to work internationally are twinning with foreign schools as there is the chance to talk to foreign pupils and students in person in the native language and to visit them and get to know their culture in person.

On the one hand, there are teachers who take e-learning as a must because their colleagues agreed upon the use of e-learning for certain parts of their lessons. On the other hand, some interested teachers are aware of the chances and benefits e-learning brings to pupils and students. Both sides support the view that the use of e-learning in lessons depends on the subject, the age of the pupils/students and even on the type of school. The younger the pupils are the more interesting the subject is (e.g. biology, but not maths) and the higher the educational level, the sooner e-learning is accepted by teachers and pupils equally.

On the one hand, it's a must for those teachers who are supposed to teach sustainability in their lessons according to the specific curriculum. On the other hand, there are teachers who are convinced of the topic and active on integrating Sustainable Development in the education of their pupils and students.

Each teacher's decision depends on his or her subject, the lessons available for e-learning (availability of a computer room at the time of their lesson) and the willingness and interest of their pupils and students.

## 5. National conclusions and recommendations

As discussed at the General Assembly of the UN in Rio in 2002, the integration of Sustainable Development in national curricula is seen imminent and of greatest importance to the future for succeeding generations by the educational institutions in Baden-Wuerttemberg.<sup>109</sup> The incorporation of SD themes at all levels of the education system aims at an active design of a permanent ecologically compatible, economically powerful and socially fair environment considering global aspects today and in the future. Thus, a comprehensive visual and virtual network including

<sup>107</sup> <http://www.kultusportal-bw.de/,Lde/775373?QUERYSTRING=un+dekade>

<sup>108</sup> <http://www.seminare-bw.de/SEMINAR-STUTTGAERT-BS,Lde/Startseite>

<sup>109</sup> <http://www.kultusportal-bw.de/,Lde/775373?QUERYSTRING=un+dekade>

basics such as a fast internet access are main criteria for attracting young people's attention (as modern media are part of their daily life) and for ensuring not only a nationwide but worldwide exchange and cooperation focusing on (new) developments in sustainability. Contents of this network present e.g. training measures concerning the use of media in the classroom, integration of mobile devices in school lessons, international twinning and EU projects, etc.

An important criterion for the successful integration with the help of modern media such as the internet is the implementation and compliance of data security and copyright regulations in schools when working with e. g. Moodle classrooms, establishing websites or using the school network.

## 6. References

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Landesakademie für Fortbildung und Personalentwicklung an Schulen

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Landesbildungsserver

[www.schule-bw.de](http://www.schule-bw.de)

Landesinstitut für Schulentwicklung, Stuttgart

[www.ls-bw.de](http://www.ls-bw.de)

Ministerium für Kultus, Jugend und Sport

[www.kultusportal-bw.de](http://www.kultusportal-bw.de)

Regierungspräsidium Stuttgart

[www.rp-stuttgart.de](http://www.rp-stuttgart.de)

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[www.statistik.baden-wuerttemberg.de](http://www.statistik.baden-wuerttemberg.de) Topics:

Berufliche Schulen in Baden-Württemberg im Schuljahr 2012/13 nach Schularten und Trägerschaft – Stand: 17. Oktober 2012

Statistische Berichte Allgemeinbildende Schulen, Schuljahr 2012/13

Lehrkräfte an öffentlichen und privaten allgemeinbildenden Schulen in Baden-Württemberg 2013/14 nach Schularten, Geschlecht und Beschäftigungsverhältnis

## 7. List of stakeholders

1. Mr. Achim Beule, Ministry of Culture, Youth and Sports, Referat 52 (Sport und Sportentwicklung), Arbeitsgruppe Sport und Umwelt, Stuttgart, Germany
2. Mr. Ingo Noack, Ministry of Culture, Youth and Sports, Referat 44 (Individuelle Förderung), Stuttgart, Germany
3. Mr. Tobias Kazich, Ministry of Culture, Youth and Sports, Referat 43 (Berufsschulen, Internationale Schulpartnerschaften), Stuttgart, Germany
4. Dr. Thomas Hoffmann, ESD Expert ([www.esd-expert.net](http://www.esd-expert.net)), State Seminar for Didactics and Teacher Training, Karlsruhe, Germany
5. Mrs. Stefanie Rolli, Ministry of Culture, Youth and Sports, Referat 16 (Europa, überregionale und internationale Angelegenheiten, Bundesrat), Stuttgart, Germany
6. Mrs. Sabine Wiemann, project management, national and transnational projects, BUPNET GmbH, Germany

# Hungary Country Report

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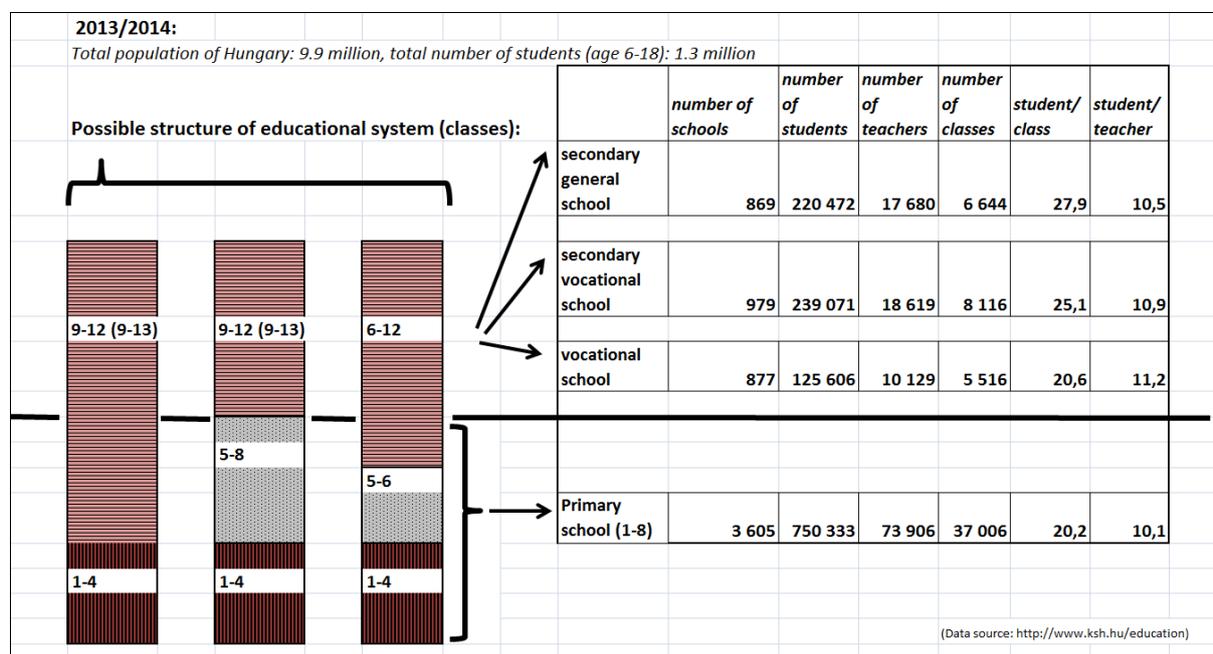
## 1. Introduction

### 1.1. Main characteristics of national education system

In Hungary the structure of educational system is very similar than Central European and ex-socialist countries.

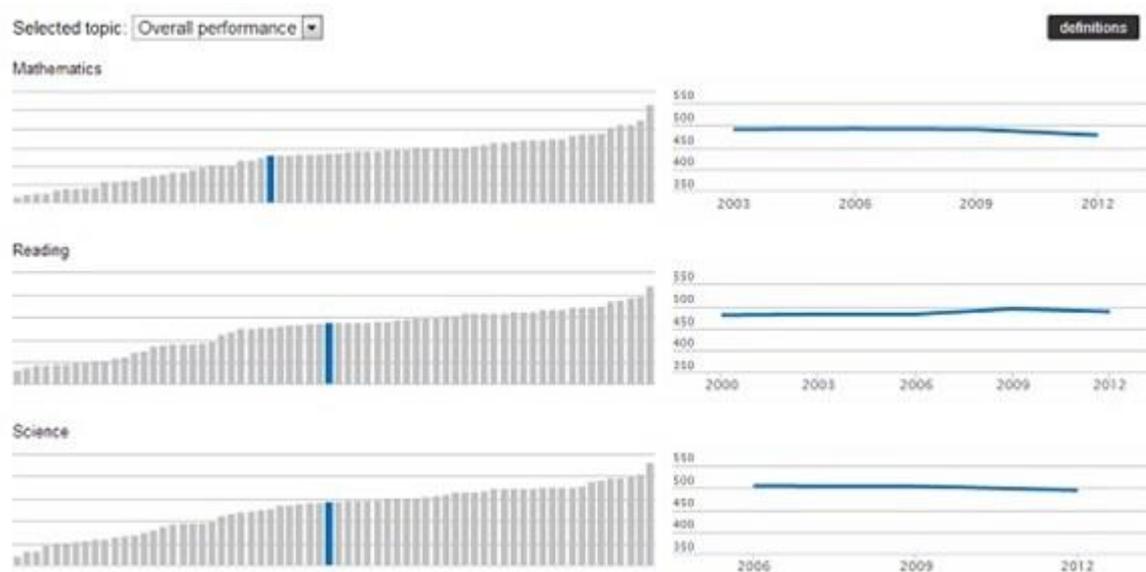
Children enter the gate of Hungarian public education, when they are 3 years old and they start kindergarten. Compulsory schooling begins after 6 years old role, depending on the individual competences of child. Then they start to go to the primary school in September. Compulsory education takes until the age of 18, reaching age of majority. Traditionally they spent 8+4 years in elementary and high school, but according to other options they have 6+6 and 4+8 years of training. From any allocation they spend 12 years together in primary and secondary education. Before completing their studies, they must take a final examination. Required graduation subjects are literature, grammar, mathematics, history and foreign language (usually English, German or French).

The following diagram was prepared and used data of Hungarian Central Statistical Office focusing on target groups of our project.



Source: (<https://www.ksh.hu/?lang=en>)

PISA examination<sup>110</sup> showed that students' reading ability, skills in maths and in other sciences are more reliable than the number of years spent in school.



Source: compareyourcountry.org

By the OECD Better Life index<sup>111</sup> the following data had been summarized after the last Programme for International Student Assessment (PISA) reviews.

In terms of students' reading and math number of points scored 487, which is closer to the OECD average. In Hungary has very high degree of difference between the students with the highest socio-economic background and the students with the lowest socio-economic background. The OECD average is 96 points until in our country it reaches the 121 points. This study suggests "the school system in Hungary does not provide equal access to high-quality education" (OECD, 2013)<sup>112</sup>

Each participant of the Hungarian educational system aims to increase the effectiveness of school education. Directives of curriculum development activities and program develop new pedagogical/professional methods, educational programs, textbooks, teaching aids and related instruments. Principles of the proceeding analyse social situation, educational opportunities of the young and focusing especially on the integration of Roma and special needs pupils. The following institute are active participates in the implementation of educational development programs supported by the European Structural Funds of the European Union (Source: <http://www.ofi.hu/2-quality-education-for/2-5-education-for>).

Our research group updated revised the report of Ágnes Magai and István Simonics (Magai & Simonics, 2008). Based on these the following Institutions inspect and improve the educational system in Hungary:

- Inter-Ministerial Committee on Information Society (Provides advices on various Information Society-related policies)
- Ministry of Human Capacities<sup>113</sup> (task: Responsible for vocational training, adult education,

<sup>110</sup> <http://www.oecdbetterlifeindex.org/countries/hungary/>

<sup>111</sup> <http://www.oecdbetterlifeindex.org/countries/hungary>

<sup>112</sup> [http://dx.doi.org/10.1787/how\\_life-2013-6-en](http://dx.doi.org/10.1787/how_life-2013-6-en)

<sup>113</sup> <http://www.kormany.hu/en/ministry-of-human-resources>

lifelong learning and training of disabled and unemployed people)

- Secretary of State for public education
- Secretary of State for higher education
- Local governments (task: Responsible for financing public education Institutions)

The other actors that are influencing eLearning developments as follows:

1. *Associations*-Co-ordinating and promoting the eLearning developments and Information Society:
  - Hungarian Distance Education Foundation (MATAL)<sup>114</sup>
  - Association of the Hungarian Content Industry (MATISZ)<sup>115</sup>
  - Hungarian Association of IT Companies<sup>116</sup>
  - Hungarian Telecottage Association (Magyar Teleház Szövetség)<sup>117</sup>
  - Digital Library Directorate of John von Neumann Digital Library and Multimedia Centre (Neumann House)<sup>118</sup>
  - Hungarian Virtual University Network<sup>119</sup>
2. *Research institutions*- Research activities, promoting and lobbying of Information Society and eLearning:
  - National Institute for Public Education<sup>120</sup>
  - Centre for Multimedia and Educational Technology<sup>121</sup>
  - Centre for Education Innovation and Adult Learning<sup>122</sup>
  - BME UNESCO Information Society Research Institute40 (ITTK)<sup>123</sup>
  - eLearning Department of the Computer and Automation Research Institute of the Hungarian Science Academy<sup>124</sup>.

## 1.2. Existing strategic documents in the field of education

Hungary laws very precisely regulate rules and opportunities for public education to all participants of education system. Naturally all of these are in accordance with the holistic international and European Union directives. In primary and secondary education a three-level structure constitutes the overall framework for curricular matters:

From the Act CXC of 2011 on National Public Education:

- “The National Core Curriculum is a set of competence standards providing guidelines for curriculum development. It is issued by a government decree. It specifies the common goals of teaching and learning and the core study areas for primary and secondary education. These are in accordance with the Key Competences agreed upon by the Council of the European Union.”

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<sup>114</sup> <http://matal.matisz.hu/>

<sup>115</sup> <http://matal.matisz.hu/>

<sup>116</sup> <http://www.ivsz.hu/>

<sup>117</sup> <http://www.telehaz.hu/>

<sup>118</sup> <http://www.neumann-haz.hu>

<sup>119</sup> <http://e-university.hu/>

<sup>120</sup> <http://www.ofi.hu>

<sup>121</sup> <http://edutech.elte.hu/>

<sup>122</sup> <http://www.bme-tk.bme.hu/index.php>

<sup>123</sup> <http://www.ittk.hu/>

<sup>124</sup> <http://www.sztaki.hu/?en>

- “Framework curricula, either developed or accredited by the Ministry, are based on the National Core Curriculum. They contain recommendations for teaching objectives, the system and time allocation of subjects, the content of the individual subjects, and the requirements in each subject in each grade.”
- “Schools develop their local curriculum in accordance with the National Core Curriculum by adopting one of the recommended framework curricula or by preparing it on their own.”  
(Source: [http://tka.hu/englishupload/docs/angol/Magyar\\_oktatasi\\_rendszer\\_en.pdf](http://tka.hu/englishupload/docs/angol/Magyar_oktatasi_rendszer_en.pdf))

The local curriculum has to be approved by the teaching staff and the school maintainer.

### 1.3. E-learning and Sustainable Development in context of existing strategic documents.

In Hungary the National Core Curriculum (NCC) recognises digital competence as a key competence. This competence helps to learn skills in personal, social life and work. The most important computer applications help share information, cooperative networking, learning and research. It draws attention of the ethical principles pertaining to the interactive use.

Students should understand how IST facilitates creativity and innovation, be aware of problems associated with the authenticity and reliability of information. By framing of NCC “Necessary skills comprise the ability to search for, collect and process information, use it in a critical way, and distinguish between real and virtual relationships.” E-learning provides opportunities for innovative and creative thinking. However critical and conscious attitude need to the interactive network of cultural and social communities (Source: [http://www.ibe.unesco.org/curricula/hungary/hu\\_al\\_fw\\_2007\\_eng.pdf](http://www.ibe.unesco.org/curricula/hungary/hu_al_fw_2007_eng.pdf)).

The basis of National Sustainability Concept is about National concept on the transition towards sustainability, which is a strategy for the period of 2012-2024 (Source: Appendix of Parliamentary Resolution 18/2013 (28th March)<sup>125</sup>.

We would like to summarize the following facts:

Common national interest is the understanding of sustainability not also collective, but in individual level too. Both the citizens and organizations of the nation should take decisions with taking account of SD in every day. The main purpose of environmental education is to help student’s self-improvement in their attitude to the environment and their way of life. Thereby the rising generation will be able to preserve the natural environment, in addition to the sustainable development of society. Sustainable development also means lifelong learning, in order to have an informed and active generation, who are able to find the right balance in their lives and lifestyles between nature, environment, social justice and the economy. This can be achieved by making better focus on developing students' thinking in the field of natural sciences. We have to get to sensitize the young generation environment admit for state. Be able to detect changes in the environment, could analyze them and make a decision on an environmentally responsible action. This should be based on individual responsibility. Environmental awareness then should be a moral principle. During environmental focused education, students should have knowledge of the current processes that cause our Planet shows critical symptoms. Through real samples, students have to realize how the social and economic development impacts the environment, and what consequences they can have. Students should be aware of the current situation and consumption of natural resources, and they need to learn the principles of sustainable consumption. Students should be involved in the conservation of their immediate environment values. “Respect for nature,

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<http://www.stakeholderforum.org/fileadmin/files/National%20Framework%20Strategy%20on%20Sustainable%20Development.pdf>

responsibility and the prevention of environmental adverse effects should be a dominant factor in their way of living.”

## 2. National capacities for e-learning

### 2.1. Overview of national data concerning technical capacities for e-learning

In Hungary, all education institutes have free and unlimited internet connection. We have national strategies covering training measures and research projects in the areas of e-learning. There are central documents for ICT learning objectives at both primary and secondary schools using a computer, knowledge of computer hardware and electronics, using office applications, using multimedia and developing programming skills. Hungary is lagging behind the EU average in almost every aspect of ICT considering significant part of the society.

(Source: [http://english.tpf.hu/upload/docs/angol/Magyar\\_oktatasi\\_rendszer\\_en.pdf](http://english.tpf.hu/upload/docs/angol/Magyar_oktatasi_rendszer_en.pdf))

The most important sources of public financing are the state budget. The state support depends on the number of students. ICT equipment of schools is financed from the central budget and it has opportunity from project funding. In recent years these projects goals were the development of ICT infrastructure, the improvement of digital skills and dissemination of ICT supported education, training One of The Social Renewal Operative Programme, what was financed by the European Social Fund. It is based on lifelong learning. The other one is The Social Infrastructure Operative Programme, what was financed by ERDF. Several ICT infrastructural development was realized in this period (Magai and Simonics, 2008).

Funding of e-Learning in many cases are supported by the private sector. For example Cisco Systems and Microsoft.

In this year numerous new enterprise development tenders will open within the New Széchenyi plan for the 2014-2020 development periods with the permission of the Ministry of National Development ([http://palyazat.gov.hu/new\\_szechenyi\\_plan](http://palyazat.gov.hu/new_szechenyi_plan)).

### 2.2. Analysis of documents about competencies and teacher and student outcomes regarding ICT use

In the informational society digital competencies are essential every level of society, especially for youth. Fortunately our educational system organizes to get possibilities from informatics and computer sciences. Consequently, every student of secondary and high school possess at least basic digital skills. Employment agencies and the Regional Training Centres provide ECDL courses for unemployment people. Very important that disadvantaged groups have options to participate on eLearning based courses or basic computer training. It is an appropriate chance for disabled people to improve their digital skills.

The initiative by the Ministry of Education and Culture eLearning curriculum is becoming more available and is under developed. Found of tenders and measures of Ministry have equipped schools in Hungary, but motivation of teachers and best practices are missing (Magai and Simonics, 2008).

In everyday practice more and more teachers use a Digital Database, Sulinet Digital Knowledge. It helps learning and teaching on high level quality in Informatics, Hungarian Literature, Mathematics, History, Biology, Physics, Chemistry, Geography, Arts, and Languages. It is co-ordinated by current Ministry and background institutions.

Some years earlier the endeavour of Hungarian education system started a practice-oriented paradigm change in the education. In spite of the theory-oriented practice teachers and leaders

hope improving trend in teaching and motivation.

Regional and social inequalities can be lessened by providing ICT and library services. Making information accessible to all makes it possible to strengthen democracy. Based on relevant pedagogical approaches, the new National Core Curriculum and new Frame Curriculum introduced in 2013 include tasks for ICT development at all levels of education. Teacher education, postgraduate education and teacher training courses include the use of ICT. A Master of Arts in ICT teacher training is also available. Teacher training on ICT is available through 30-and 60-hour courses for teachers at all education levels.

(Source:

[http://www.ofi.hu/sites/default/files/WEBRA/2014/04/NAT\\_2012\\_EN\\_final\\_2014marc14.pdf](http://www.ofi.hu/sites/default/files/WEBRA/2014/04/NAT_2012_EN_final_2014marc14.pdf))

NGOs act as professional stakeholders. Their main tasks are counselling, material development and making recommendation.

Hungary evaluates the use of ICT in the context of EU-funded projects (European Social Fund). Monitoring of ICT application in schools has been conducted since 2011. The monitoring involves quantitative measures – questionnaires – and will also include a qualitative survey.

All of educational and public institutions are obliged to provide data to the Public Education Information System (KIR: <http://www.kir.hu>).

Good practices are collected and disseminated by agencies under the Ministry of Human Capacities. The central level has exclusive responsibility for defining policy. Professional stakeholders are involved in preparing ICT measures in the National Core Curriculum and Frame Curricula. Schools can get technical support to implement the National and Frame Curricula in their local pedagogical programmes. Schools have a 10% margin of flexibility to take decisions about the content of local implementation (<http://www.kormany.hu/en/ministry-of-human-resources>).

Monitoring reveals outcomes about classroom practices. Surveys were conducted about ICT equipment in schools and ICT infrastructure. Self-evaluation by teachers regarding access to and application of ICT in the classroom and school environment is also available (See: [http://eacea.ec.europa.eu/education/eurydice/documents/key\\_data\\_series/129EN.pdf](http://eacea.ec.europa.eu/education/eurydice/documents/key_data_series/129EN.pdf))

### **2.3. Identification of current state and rooms for improvement in e-learning**

In 2006 a national survey was conducted among teachers on the use of ICT in schools, which included self-assessment of attitudes and skills in the use of technical devices. The abovementioned developments contribute to the proper use of ICT in education, but the ideal situation would be if teachers could use technologies more confidently and more effectively and strengthen co-operation with SEN methodology institutes. SEN methodology institutes also need to broaden their ICT knowledge, especially in terms of adult-adult relation. An on-going yearly survey on the use of ICT in schools is necessary. 70% of teachers have access to the school server – and thus access to educational materials – from home. In school, teachers and students can use notebooks, special software, screen-reading software and self-developed educational materials and devices.

(Source:

[http://ikasma.net/intranet/uploads/noticias/adjuntos/326\\_2\\_KeydataonlearningandinnovationthroughICTatschool.pdf](http://ikasma.net/intranet/uploads/noticias/adjuntos/326_2_KeydataonlearningandinnovationthroughICTatschool.pdf))

At the present time, the central issues include adopting the new Frame Curricula at local level – local pedagogical programmes – in order to renew pedagogical content and choosing a more complex, higher level programme in ICT usage. Another central issue is the failure to place appropriate emphasis on ICT for inclusion in teacher training: infrastructural developments in ICT tools, compiling of best practices in ICT usage by schools; dissemination of practices and models, national

survey on the use of ICT in secondary schools conducted by Microsoft (2,198 teachers from 264 schools responded to the questionnaire).

### 3. Sustainable Development (SD) in Education

#### 3.1. Representations of SD themes in national curriculum

SD themes are present in the national curriculum. Environmental education is regulated by educational legislation. According to 48.§ 3. paragraph of the 2003 Amendment (Act LXI) to the 1993 Act on Public Education (Act LXXIX) all Hungarian public educational institutions must expand the local pedagogical programme by a local strategy for school-based environmental and health education. The development priorities of Hungarian public education are spelled out in the Mid-term Strategy for Public Education, issued by the Ministry:

- Gender equality
- Health Promotion
- Environment
- Rural Development
- Cultural Diversity
- Peace and Human Security
- Sustainable Urbanization
- Sustainable Consumption

(Source: [http://www.ibe.unesco.org/curricula/hungary/hu\\_al\\_fw\\_2007\\_eng.pdf](http://www.ibe.unesco.org/curricula/hungary/hu_al_fw_2007_eng.pdf))

Sustainable Development can be achieved by special focus on the development of students' way of thinking, in the field of natural sciences.

Environmental education in combination with extracurricular activities brings closer the objects to the nature, learning about the environment (Havas, 1997).

The Hungarian Association for Environmental Education some years earlier started a "school-greening" programme, which is a very popular way to promote extra-curricular possibilities in schools. The idea motivated among professional schools and communities in public life. As a result it is very promising in terms of our country's education for sustainable development.

Another - maybe better - opinion is to introduce a compulsory subject in the secondary schools for age 11-14, which would have the role to integrate the knowledge from other thought subjects too in the holistic concept of Sustainable Development, with the proficient help of a proper teacher. Since 1993 dozens of students finished their studies in Hungarian higher education with the Environmental Science teacher diploma. There is a potential possibility in the country to build up the net of SD knowledge through the four most proper years for the emotional and intellectual development of the next generations.

#### 3.2. Identification of new arisen important themes of SD that should be included into national curriculum

Main issues raised by Hungarian government were the followings: fortification of basic values and quality of life, the importance of learning and systems thinking, issues of labour market and employment, endeavour of public administration reform, regional and rural development. Furthermore these topics were given prominent role as equality, family, population, intergenerational issues, sustainable communities, international cooperation, infrastructure, innovation and comparative advantages, public participation, sustainable consumption and

production. Not least, in particular health and liveable environment are same important development goals as referred to previously.

(Source: <http://www.un.org/esa/sustdev/natlinfo/nsds/egm/hungary.pdf>)

## 4. Teacher's view about e-learning and Education for Sustainable Development

Introduction of career model system into the Hungarian education is a basic step towards the approaching paradigm change. The practice-oriented education shows an increasing trend, than theoretical education.

According to our survey many teachers have difficulties defining the concepts of SD and ESD with their own words. Teachers' definitions and attitudes can be seen in their statements and expressed values.

"Findings from environmental psychology show that pro-environmental norms and behaviour are rooted in a pro-environmental value orientation" (Klas et al., 2013). It would be important motivate more green students and invoke even more teacher training program. But among teachers we have a basic question about Sustainable Development attitudes and behaviour. Do the students have practical-oriented pro-environmental knowledge? And if they haven't enough, whether there is sufficient opportunity to change it with influence of teacher attitude in the school.

Target of education for SD is to help students to develop the competences action. We need special competences in teaching and communication. Teaching should assist students in transferring their knowledge and give them time to exercise. Learning is always a sense of constructive process. Over the effectiveness of learning students are active participants. The learning process should be a context place where the individual knowledge building activities is realized not only on, but also interactions, negotiations and cooperation throughout. The powerful innovative learning environment features that strikes the right balance between the discovery of individual and pursue activities. It keeps the focus on individual differences, motivation, skills and development needs. The challenge in this is that the students must build their knowledge through active participation in appropriate spaces of the local community and also in the classroom activities. Teachers should become cooperative. We need to realize that learning is hard work: sustainability competences are not easily developed.

Agreeing with the followings "In teaching and learning for ESD, all five domains (knowledge, systems thinking, emotions, ethics and values and action) have to be applied to each of the professional dimensions and they also relate to all overall competences". (Sustainable Development Strategy of Hungary, 2005).

In a Comenius 2.1 project in 2008 - *Competencies for ESD teachers*, an international research group summarized the attitudes, abilities and competences of an adequate teacher personality see below:

- teaching students to distinguish between factual knowledge and opinions
- to know and to select relevant national and international policy documents and goals
- acquire sufficient knowledge to integrate SD into the whole school curriculum
- put focus to SD challenges and issues
- adopt cultural heritage
- all-level cooperation with organizations and partners in the Society
- ability to create a powerful learning environment for teaching SD issues.

## 5. National conclusions and recommendations

In accordance with *National Sustainable Development Strategy (2007)*<sup>126</sup>:

The strategy of domestic research and development includes those policies, which definitely plays an important role in sustainability. Research activities must be controlled and coordinated, such as continuous strengthen and support. The scientific evidences must be made available in plain language to all members of Society. Financial background of monitoring systems must also be solved.

The meaning, forms and values of sustainability must be focused in the education system, especially in schools. Sustainability must become one of the most important principles of education, so that the new knowledge and way of thinking get planted in the minds and as a consequence of it people could change their social and economic conditions. All of knowledge about SD is basic development requirement from preschool education through higher education to outside of schools.

The analyzing system of education (teaching in subjects) is not entirely suitable for holistic and practice-oriented way of thinking. "Practical knowledge of 'life', methods of conflict management and global knowledge should be more involved in the education and instruction" (National SD Strategy, 2007). Not only the presentation of problems, but also the possible solutions must be represented in education.

Directives of the strategy aim to create development of teaching with the following programme parts: human rights, education towards peace and prevention of conflicts, intercultural education and environmental education. The holistic education prepares citizens for more responsible life in the society including SD.

As member of higher education in Hungary, we have the overview, that since 1993 dozens of students finished their studies in Hungarian higher education with the Environmental Science teacher diploma. There is a potential possibility in the country to build up the net of SD knowledge through the four most proper years for the emotional and intellectual development of the next generations.

The importance of the informal study is significant at the work place as in the school. On the labour market both the employer and the employee profit of the activities of informal and formal SD knowledge. Last but not least, we must emphasize the role of the media. Anyway, it is an appropriation, that media should help SD. These efforts must be strengthened in the fields of economic, social and environmental awareness.

In order to rise up the general levels of culture / education and to improve the quality of cultural socialisation it is needed to have adequate access to basic cultural services. The developing community spaces help those activities in the education and in the whole society what provides opportunities of cooperation.

We should highlight the importance of self-education, because this responsible behaviour is a basis of democracy.

We would like to summarize the Hungarian recommendations with the following concretely formulated goals.

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<sup>126</sup> [http://www.ff3.hu/upload/NFFS\\_20070629\\_en1.doc](http://www.ff3.hu/upload/NFFS_20070629_en1.doc)

Analysis of the data in the Survey of Schools: ICT and education<sup>127</sup> suggests a ‘5C approach’ to addressing issues identified in the survey

- continuous investment in the professional development of teachers
- supporting measures to promote schools
- efficient and practice-oriented cooperation between different policy areas
- “Country-specific support, addressing large differences and degrees of ICT provision and implementation”
- Competence development: key competences in particular digital competence of the young generation

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### Links:

- <http://www.sdnetwork.eu/?k=country%20profiles&s=single%20country%20profile&country=Hungary>
- <http://www.ofi.hu/2-quality-education-for/2-5-education-for>
- <http://www.old.kfki.hu/fszemle/archivum/fsz0406/pigozzi0406.html>
- <http://unesdoc.unesco.org/images/0021/002117/211750e.pdf>
- <http://www.ofi.hu/tudastar/linktar/linktar-fenntarthatosag>
- [http://digital-agenda-ata.eu/datasets/digital\\_agenda\\_scoreboard\\_key\\_indicators/indicators](http://digital-agenda-ata.eu/datasets/digital_agenda_scoreboard_key_indicators/indicators)
- [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Internet\\_use\\_statistics\\_-\\_individuals](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Internet_use_statistics_-_individuals)
- <http://www.kormany.hu/hu/emberi-eroforrasok-miniszteriuma>
- [https://www.kir.hu/okmfit/files/OKM\\_2012\\_Orszagos\\_jelentes.pdf](https://www.kir.hu/okmfit/files/OKM_2012_Orszagos_jelentes.pdf)

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<sup>127</sup> [http://english.tpf.hu/upload/docs/angol/Magyar\\_oktatasi\\_rendszer\\_en.pdf](http://english.tpf.hu/upload/docs/angol/Magyar_oktatasi_rendszer_en.pdf)

- <http://www.nefmi.gov.hu/english>
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- [http://tka.hu/englishupload/docs/angol/Magyar\\_oktatasi\\_rendszer\\_en.pdf](http://tka.hu/englishupload/docs/angol/Magyar_oktatasi_rendszer_en.pdf)
- [http://www.ibe.unesco.org/curricula/hungary/hu\\_al\\_fw\\_2007\\_eng.pdf](http://www.ibe.unesco.org/curricula/hungary/hu_al_fw_2007_eng.pdf)
- <http://www.un.org/esa/sustdev/natlinfo/nsds/egm/hungary.pdf>
- [http://ikasmina.net/intranet/uploads/noticias/adjuntos/326\\_2\\_KeydataonlearningandinnovationthroughICTatschool.pdf](http://ikasmina.net/intranet/uploads/noticias/adjuntos/326_2_KeydataonlearningandinnovationthroughICTatschool.pdf)
- <http://e-university.hu/>
- [http://palyazat.gov.hu/new\\_szechenyi\\_plan](http://palyazat.gov.hu/new_szechenyi_plan)

## 7. List of stakeholders

1. Dr. Csilla STÉGER, chef manager of department, Department of Higher Education (Felsőoktatási Főosztály), Office of Education (Oktatási Hivatal)
2. Dr. Katalin RÁDLI, vocational chief concellor, Ministry of Human Resources (EMMI)
3. Dr. Gábor HALÁSZ, univ. professor, director of center, ELTE Pedagogikum

### 1. Introduction

#### 1.1. Main characteristics of the national education system

In Romania, access to free education is guaranteed by the Constitution of Romania (Article 32). Ministry of National Education is responsible for regulating and enforcing education. Under the age of 6, kindergarten is optional, while between the ages of 6 and 16 years old, education is compulsory. The 12<sup>th</sup> grade is the end of the school educational cycle. In 2010, there were approximately 4.700 gymnasium schools (students aged between 11 and 15) in Romania (Cotidianul, 2014). Students are dealing with ICT starting from the Primary school, when they usually have one class per week of introduction to computers (MECTS, 2011).

Regarding the school aged population, by level of education (excluding post-university education), almost a half (45%) of the school population is represented by the secondary level, followed by the primary level (grades I-IV) – 21.2%, pre-primary (17.6%), higher (14.1%) and post-secondary (2.1%) levels (Romanian Statistical Yearbook, 2012). According to the same document, in 2012 there were 7204 schools in Romania, fewer than in 2007 (8484 units) with an approximate total of 3.8 million persons enrolled. Among them, approximately 2.6 million were pupils (from primary, secondary and high schools), 0.53 million were students and 0.67 million were children in kindergartens. Regarding the teaching staff from the pre-university level, a strong decreasing was reported for the last 20 years. In 1992, there were around 280.000 professors, while in 2012, there were only 220.000 (Institutul Național de Statistică, 2014).

In Romania, County School Inspectorates and National Agency for Quality Assurance in Pre-university Education (A.R.A.C.I.P.) are in charge with the external monitoring of all quality aspects in schools. County School Inspectorates are in charge with external monitoring visits and validation of the self-evaluation report drafted by each school. A.R.A.C.I.P. is responsible to conduct regularly (ones at each 5 years) the institutional assessment and accreditation. A.R.A.C.I.P. was founded in 2005 and since then it became the key role institution that aims to improve the learning outcomes, by creating a culture of quality, being the national public institution under the Ministry of Education, with legal personality approved by Law no. 87/2006 (Ministry of Education, Research and Youth, 2007). Every year, A.R.A.C.I.P. is evaluating around 450-500 schools, both private and state-owned. County School Inspectorates are also subordinated to the Ministry of Education (A.R.A.C.I.P., 2013).

As it was mentioned before, A.R.A.C.I.P. is in charge with the external monitoring of all quality aspects in schools. Regarding its internal organization, there was a constant decreasing of staff. For the period November 2005 and October 2009, according to the Government Act No. 1258/2005, the organizational structure of A.R.A.C.I.P. consisted of 50 members (A.R.A.C.I.P., 2013). Starting from November 2009, according to the Law No. 329/2009, the organizational structure of A.R.A.C.I.P. was reduced with 10 members (A.R.A.C.I.P., 2013), among them 32 were external evaluators (Violeta, 2010). According to the Government Act No. 830/2010, the last staff reduction was done in September 2010, and in present A.R.A.C.I.P. has only 12 members. In the last three years (2011-2013), A.R.A.C.I.P. collaborated with other 759 external experts (A.R.A.C.I.P., 2013).

The Inspectorates are established in each county and they suffer by the reduced personnel, mainly in the last years, due to a law for reducing the number of jobs for the civil servants. Within every

inspectorate, there is also a department that deals with the evaluation of schools (Department of Educational Management and Institutional Evaluation) (A.R.A.C.I.P., 2013).

Regarding the cooperation between the institutions dealing with the external evaluation of the schools, the steps are the following: (1) Each school from Romania is obliged each year to prepare a self-assessment report, (starting with 1<sup>st</sup> September 2013 is performed using an on-line platform [https://calitate.aracip.eu/\\_layouts/AracipMc/Landing.aspx](https://calitate.aracip.eu/_layouts/AracipMc/Landing.aspx)), about the material basis, school staff, students, parents, etc. The completion of the report for a school year is done at the beginning of the next school year (e.g. for 2013-2014 school year is made by October 10, 2014); (2) This report is analysed and subject to validation after a visit from the Inspectorate, usually scheduled in October-November; (3) After the report was validated by the Inspectorate, it is submitted to A.R.A.C.I.P. by the inspector in charge with Quality Assurance, usually by the use of the platform or via email. Every year in the second semester of the school year (March-April), the Inspectorate are conducting monitoring visits in order to check the implementation of the activities described in the report. Regarding A.R.A.C.I.P. assessment, each school unit must pass every five year through this process, which involves many documents covering the standards set by A.R.A.C.I.P.

According to recent studies (Huza & Huza, 2012; PISA, 2012), Romania is ranked below other countries from the region in terms of secondary education performance. This is mainly due to overly centralized system and low funding. A comparative evaluation of secondary education quality in Central and Eastern Europe, based on TIMSS (Trends in International Mathematics and Science Study) results, noted some differences between two groups of countries: countries like Estonia, Czech Republic and Hungary, that had approached the Western educational features on one hand; on the other hand the remaining countries from Central and Eastern Europe, such as Romania, characterized by a poorer performance, weren't able to prove the capacity to educate its younger generations in order to become competitive in the European labour markets. Education in Romania it is not an education oriented on the labour market and in Romania there aren't policies aimed to integrate the young people on the field of activities in which they done their studies.

These results are consistent with several reports of PISA tests, conducted by OECD. According to them, the performances of Romania's secondary education are far below that of other countries from the region, that have managed to catch up with the Western states (Huza & Huza, 2012). Moreover, according to PISA test made in 2012 (65 participating countries), aimed to evaluate the performance achieved at Mathematics at national and regional levels, Romania had a score of 445 points, the upper rank being 43, and the lower rank being 47, respectively (PISA 2012). These differences could be explained by the successive education reforms from the last years that did not lead to anything good. Every new education minister is coming with a new reform without assessing the impact of the previous one. There is not a long term vision on the reform. A good example is the repeated changes of curricula between 2001 and 2009 (Tomescu, 2010).

Regarding the *educational policies*, in Romania, the Institute of Education Sciences within the Ministry of National Education is in charge with developing research aimed to formulate new proposals in order to improve the educational system. For the period 2009-2012, the research objectives of this institution were to: assure the quality of education, support the education decentralization, *elaboration of national policy documents*, continuing education and support local and regional development in the areas of education and training (Institutul de Științe ale Educației, 2012). For the next period (2013-2016), the research objectives of the Institute of Education Sciences are focused more on the educational policies. There are three objectives: educational policy making according to the research results (e.g. elaborating a periodical Policy Brief), supporting quality education and youth policy making according to the research results (Institutul de Științe ale Educației, 2012).

Moreover, in some cases, the schools have an internal evaluation strategy that is focused on the needs of pupils and development (Școala Gimnazială George Enescu, 2013).

## 1.2. Existing strategic documents in the field of education

There are various strategic documents for the so called strategic reform in education. Starting with 1990, Romania is in a continuous reformation of the educational system. The main problem of those reforms is the lack of post reform evaluation.

In 2008, the *Strategy Education and Research for the Knowledge Society* was adopted by the Presidential Commission for the Analysis and Policymaking in Education and Research. Its main purpose was to develop the education and research for the period 2009-2015. Among the proposed measures and actions, the following ones are dealing with ICT:

- Action 1.5.: equipping all pre-university schools with computers and software that enables the quality raise of the educational process, both teaching and learning; Deadline to achieve this: 2010.
- Action 2.1.: focusing the school curricula on 8 categories of key-competences. Among them, the third ones were digital competences (use of ICT); Deadline to achieve this: 2009-2010.
- Action 2.2.: introduction of ICT as an optional subject in the grades I-IV and as a compulsory subject in the grades V-XII; Deadline to achieve this: 2010.

Recently, a new version (July 2014) of the *National Strategy on Digital Agenda for Romania 2014-2020* was proposed. According to this version, three strategic lines (aims) of development were identified (Ministerul pentru Societatea Informațională, 2014):

- providing ICT infrastructure in schools;
- developing the digital competences of pupils, students and teachers;
- using ICT (RED and Web 2.0) in the learning process and in the Lifelong Learning Programme.

According to this document, the authorities responsible for fulfilling the above mentioned goals are: the Ministry of National Education and the Ministry for Information Society.

## 1.3. E-learning and Sustainable Development in context of existing strategic documents.

According to the *Strategy Education and Research for the Knowledge Society*, the issues of e-learning are mentioned in the following actions (Comisia Prezidențială pentru Analiza și Elaborarea Politicilor în Domeniile Educației și Cercetării, 2008):

- Action 2.4.: Digitization of curricula content and creating a Virtual School Library. The lessons of the best teachers will be digitalize and stored on e-learning platforms.
- Action 4.3.: Increasing the quality of initial and continuous training of teachers, under the e-learning and blended-learning.

This Strategy contains operational solutions for the period 2009-2015, so that education and research build the knowledge society in Romania, characterized by prosperity, sustainable Development and personal development of people.

According to the *Strategy for Sustainable Development of Romania 2013-2020-2030*, radical improvement and diversification of the entire educational system and is recognized as a priority of strategic importance and a necessity for the implementation of Sustainable Development principles (Ministerul Mediului și Dezvoltării Durabile, 2008).

Instead, the *National Strategy on Digital Agenda for Romania 2014-2020* doesn't mention specifically the issues of e-learning or Sustainable Development (Ministerul pentru Societatea Informațională, 2014).

As a general conclusion, it can be said that the shortcoming of these strategies is the fact that they are not correlated.

## 2. National capacities for e-learning

### 2.1. Overview of national data concerning technical capacities for e-learning

According to the report of European Schoolnet and University of Liège published in November 2012 (European Schoolnet & University of Liege, 2012), in Romanian schools there is a low number of computers (desktops and especially laptops) available for students compared with the EU average. For example, at 8<sup>th</sup> grade, Romania is at the bottom of the scale on this indicator, with one computer available for 13 students, compared with European average (which is 5). But the current situation is better than the one from the beginning of this century, when in accordance with the data provided by the Romanian National Ministry of Education, before implementing the Informational Educational System program (*ro. Sistem Educational Informatizat, abbrev. SEI*), there were, on average, 3.5 computers for 100 students (SEI, 2010). Due to the implementation of the SEI program, more than 13.100 schools received a total of around 190.200 computers in the last decade. Thanks to the same program (i.e. SEI), a total of 3.647 e-lessons were developed and 141.750 teachers were trained (SEI, 2010). According to the report of the Ministry of Education from 2010, there were more than 4 million beneficiaries of the SEI program across Romania (*Competențe cheie TIC în curriculumul școlar*, 2011). Even so, Romania is in the lower half of European countries regarding the virtual learning activities at all grades (European Schoolnet & University of Liege, 2012).

Regarding the frequency of ICT use by teachers in class, according to the data collected between 2011 and 2012, in Romania the teachers are using ICT in approximately one quarter of their lessons, which is very close to the EU average. Compared with the ICT use by teachers and students, the use of computers and mobile phones is generally above the EU mean, while the use of their own laptop is below the EU average (European Schoolnet & University of Liege, 2012).

According to the National Institute of Statistics, in 2013 there were 55.8% of all households that own a computer. Depending on the residence there were differences in terms of households with computer equipment. Thus, in urban area, 69.8% of the households are equipped with computer, while in rural areas the proportion is only 37.5%. In terms of Internet access, over half of households (52.9%) had the service, the majority (73.2%) of them being in urban areas (Wall-Street, 2013).

According to *The Global Information Technology Report 2012* released by the World Economic Forum's Centre for Global Competitiveness and Performance in September 2011, Romania ranked 90 of 142 countries with a score of 3.3 on a scale of 1-7 in regard to the quality of the education system (*Rezultatele analizei documentare. Sectorul Tehnologia Informației și Comunicațiilor*, 2013). On the other hand, according to the report *Digital competences in the digital agenda* published by European Commission, Romania ranks 2 at European level regarding the percentage of teachers from secondary education who are including ICT in the compulsory courses. The document shows that between 56% and 71% of Romanian students have teachers who attended ICT courses (European Commission (2010).

Starting from 2006 approximately 200.000 students from pre-university school received a voucher through the Euro 200 program, helping them to purchase a PC (Ministerul Educației, Cercetării și Tineretului, 2014).

## 2.2. Analysis of documents about competencies and teacher and student outcomes regarding ICT use

In Romania, both in the lower and upper secondary level, teachers responsible for teaching activities in the field of ICT are different from those from the primary level. On the other hand, the key person in helping students developing skills in the ICT classroom is the teacher. He/she is responsible for providing learning opportunities that help students to use ICT to learn and communicate. In this context, it is very important that all teachers are trained in order to be able to provide these opportunities to students. In Romania, ICT is included in the regulations relating to the initial teacher training. After initial training, it is essential that teachers continue to develop and to refresh their skills and know-how in ICT by continuing professional development (European Commission, Eurydice, 2011).

There is no centralized national data regarding the total number of teachers from the pre-university education who have competencies for ICT use, but some information is available for the last years. Thanks to the program *Informational Educational System* (ro. Sistem Educational Informatizat, *abbrev.* SEI) implemented by the Romanian Ministry of National Education between 2001 and 2009, more than 141.000 teachers were trained (SEI, 2010). In addition, according to the report of the Ministry of Education from 2010, there were more than 4 million beneficiaries (teachers and pupils) of the SEI program across Romania ([Competențe cheie TIC în curriculumul școlar, 2011](#)).

Starting from 2012, Ministry of National Education is implementing through the National Evaluation and Examination Centre, the project *ICT Key Skills for school curriculum*, which is co-financed by the European Social Fund Operational Programme Human Resources Development. The overall objective is to improve and restructure the curriculum to the needs of the contemporary society, which require the use and continuous improvement of ICT skills.

In 2013, more than 27.000 teachers from the pre-university education improved their ICT competences thanks to Intel Teach Elements courses (Elearning Romania, 2013).

In May 2014, the Ministry of National Education signed an agreement with Google according to which around 40.000 teachers across Romania will be trained regarding the use of Google Apps in the educational process (Hotnews.ro, 2014).

ICT competences of students are included in the Strategy *Education and Research for the Knowledge Society* at Action 2.1.: focusing the school curricula on 8 categories of key-competences. Among them, the third ones were digital competences (use of ICT) (Comisia Prezidențială pentru Analiza și Elaborarea Politicilor în Domeniile Educației și Cercetării, 2008).

ICT competences of students are included into the curriculum both as a separate subject (which is optional in the primary level and compulsory in the lower and upper secondary level) and as integrated parts of different subjects (Comisia Prezidențială pentru Analiza și Elaborarea Politicilor în Domeniile Educației și Cercetării, 2008)

Due to the low number of computers in schools, they are mainly used in special computer classrooms (that are in many cases the laboratories of Informatics). This lack of ICT equipment makes difficult or impossible the conducting of all classes in a digitalized world at the same time.

## 2.3. Identification of current state and rooms for improvement in e-learning

Almost in every school where the interviews were done (mainly in the urban area), computers connected at the Internet were purchased in the last 5-10 years. In addition, software packages like: Windows (version 7, 8), Microsoft Office, Acad, etc. were purchased or were distributed to schools by the County Inspectorate. In few cases, computers were obtained by donation.

In some of the schools, e-learning platforms, like *Moodle* or *AeL* – Advanced eLearning (<http://www.advancedelearning.com/index.php/articles/c3/en>), were purchased. In one case (*Elie Radu* Technical College from Ploiești), an own platform was identified. Also, in the last years, in almost all of the schools, many professors participated to different training courses dealing with ICT implementation in the educational process.

Even if many efforts were done, in almost all schools computers connected at the Internet are needed, mainly due to the following two reasons: the existing ones are out dated or there are not enough compared with the number of pupils. In addition, a better (and new; wireless) internet connection, smart interactive whiteboards and tablets are needed.

In addition, trainings for professors are still needed, because only a small percentage of them are using the e-learning platforms (*Moodle*, *AeL*) during their classes, even if they have the necessary equipment (computers, network, applications a.s.o.).

Another problem consists in changing mentality of teachers (especially of the oldest ones who are used with a traditional way of teaching) regarding computer use in the educational process.

Through Action 2 - ICT in Education, Health and Culture, *National Digital Agenda Strategy of Romania* aims to achieve the following development objectives of ICT in education (Ministerul pentru Societatea Informațională, 2014):

- Developing basic citizen competences, focusing on disadvantaged groups;
- Stimulating the development of content / digital educational resources;
- Integration of Web 2.0 and OER (Open Educational Resources) in the learning process.

According to the Priority 7 (Improving quality in education, health and social inclusion), Action of intervention 1 (Improving the quality of education, including vocational education and infrastructure development) of the *Development Strategy for the South East region for the period 2014-2020*, the following activities are included:

- Developing e-learning platform for continuous training;
- Developing of specific educational programs;
- Promoting the ICT techniques in education (Agenția pentru Dezvoltare Regională Sud-Est, 2014).

Starting from 2008, the *Ministerial Order No. 4316 from 2008* provided the legislative framework according to which the subject *Computer-assisted instruction* was introduced in order to provide the know-how regarding ICT usage in the educational activities.

In order to highlight the importance given to ICT, starting from 2010, the Ministry of National Education introduced the subject Digital Competences (ICT) to the baccalaureate.

## 3. Sustainable Development (SD) in Education

### 3.1. Representations of SD themes in national curriculum

Starting with 2007, the institution responsible for national curriculum in the pre-university level is the *National Centre for Curriculum and Evaluation* in the pre-university level, which is coordinated by the *Ministry of National Education* (H.G. 231, 2007).

Education for Sustainable Development is promoted by the Ministry of National Education policies on formal and non-formal in the pre-university education, as follows:

- Key themes of Sustainable Development are included/integrated in disciplines/modules from the common core curriculum or optional subjects at all levels of education, including vocational and technical education;
- Development and implementation of national projects and programs and/or co-financed (EU and World Bank), such as: After School, Environmental Education, Eco-Kindergarten, Second Chance, Education for Democratic Citizenship, Health Education, etc.;
- Organization of competitions and school contests: National Contest Democracy and Tolerance, Earth Sciences-interdisciplinary contest, FOOD4U, European School - national competition, U4Energy, European Studies Programme - Linking Schools across Europe, Spring Day, Made for Europe, Move4Europe.

Regarding non-formal education, in order to raise awareness about the education for Sustainable Development, the following competitions (at county, regional or national level) were organized: National Contest for Environmental Projects, National Contest Friends of the Danube Delta, National Contest Friends of Nature, Good thoughts from the heart of child for TERRA Millennium III, Best practices in environmental education, ECO FUN, SOS Nature, etc..

Apart of those many other programs were developed and implemented by the NGOs that are not accounted anywhere.

The following *SD themes* are present in the national curriculum: reducing poverty, citizenship, ethics, civic responsibility in local and global context, peace, democracy and governance, justice, security, human rights, gender equality, health, cultural diversity, rural and urban development, economy, production and consumption patterns, environmental protection, natural resource management and biological diversity of nature.

Sustainable Development themes are included in several subjects in different extent, according to their specific. Among the most common subjects that integrate the above mentioned themes, are: Biology, Geography, History, Economics, Ecology, but also: Advice and Guidance, Entrepreneurship Education, Civic Culture, Developing human resources, Sustainable tourism development and others. The SD themes aren't presented as a separate lessons. They are integrated within other lessons.

The general idea resulted from the questionnaires conducted with the stakeholders, but also from consulting the national curriculum (H.G. 231, 2007), was that there is a connection trough the subject, but not a strong one. This is mainly due to the fact that the school curriculum contains too much subjects that do not allow inter/intra/trans-disciplinarily. But thanks to the optional courses some connections can be done, especially between the subjects within the same curriculum domain, as *Human and society* or *Technologies*.

### **3.2. Identification of new arisen important themes of SD that should be included into national curriculum**

The main problem regarding the SD themes is not their inclusion into national curriculum, but the way of inter-disciplinarily approach and the level of understanding and awareness of pupils. The children are receiving information about these topics, but they are not able to make connection between them, to have a global overview and approach about what means Sustainable Development as a whole.

Also, it is important to approach Sustainable Development at a global scale and to understand equity issues and cultural differences.

## 4. Teacher's view about e-learning and Education for Sustainable Development

As a conclusion of our survey, teachers are receptive, open minded, willing to further implement ICT in educational activities and they have a positive attitude and interest in specific techniques regarding the ICT. Some of them are doing their lessons by using e-learning platform like Moodle or AeL. In the last years, a strong Moodle network was developed at the national level that includes schools from every county (<https://edu.moodle.ro/harta.php>). Also, they are stimulating student's interest towards this discipline (ICT) and motivating them to attempt to improve their knowledge for further integration in the labour market or to continue their studies.

Most teachers have followed ICT training courses, postgraduate courses or introduction courses provided mainly by *Teacher Training Centres* within The Ministry of National Education or offered by other organizations. Also, some teachers followed ICT courses organized within projects financed by *Sectorial Operational Programme Human Resources Development 2007-2013*. Among the teachers from the list of stakeholders in this project, approximately *50% of them use ICT in the educational process*.

Regarding the teachers' experience in international educational network, most of them participated in projects like *Leonardo da Vinci*, *Comenius* and in several strategic projects.

Given the fact the students are very interested in ICT, the teachers are trying by all means to align to the new demands of the information society.

## 5. National conclusions and recommendations

### Regarding educational policies

Nowadays, the Romania's policies regarding education, Sustainable Development and ICT are not so well correlated. Moreover, the educational system is very rigid and overly centralized. To remedy these deficiencies, we recommend to the educational authorities to adopt a more flexible approach regarding the educational policies, by favouring decentralization as well as private initiatives and investment in education at all levels, within a general framework of targets and standards for quality, relevance, impact and access for all.

### Regarding ICT infrastructure and human resources

Even if several efforts were made, there is still a big lack of ICT infrastructure in the Romanian pre-university educational system, mainly in rural area. Future actions should support further development of ICT infrastructure in the pre-university education. Also, preparing and promoting OER (Open Educational Resources) and Web 2.0 tools for Lifelong Learning Programme among adults should be one of the main concerns of the authorities.

Regarding the human resources, namely the teachers, who are responsible for developing student's digital competences, they are very enthusiastic and they are trying to do their best in order to implement the Sustainable Development themes in the curriculum by the aid of ICT.

### Regarding digital competences

The Ministry of National Education should continue to improve the digital competences in Romania by organizing training sessions in schools and beyond. Moreover, additional support and direct digital skills development in areas of high social exclusion (e.g. rural areas under the poverty line) should be provided.

### Regarding the founding opportunities

In future, it would be great if the Ministry of National Education will allocate more funds for the training of teachers in the field of ICT usage. Moreover, other European funds must be taken into consideration.

### As a general conclusion and recommendation

Romania has potential, but too many uncorrelated strategies. Education authorities should draw a main route to follow, which should take into account the principles of Sustainable Development in the new European context.

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## 7. List of stakeholder

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2. *Dinu Bratianu* Technological High School Ștefănești- Argeș
3. *Ștefan Bănulescu* Technical College Călărași
4. Technological High School from Giurgiu
5. *Elie Radu* Technical College Ploiești-Prahova
6. *Ion Ghica* Economical College Târgoviște-Dâmbovița
7. *Lazăr Edeleanu* Technical College Ploiești-Prahova
8. *Ovidius* Theoretical High School Constanța
9. *Matei Corvin* Technical College Hunedoara
10. Energy Technical College București
11. *Vasile Sav* Technological High School Roman-Neamț
12. *Dimitrie Leonida* Technical College Timișoara-Timiș
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## Serbia National Report

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### 1. Introduction

#### 1.1. Main characteristics of national education system

Serbian educational system is highly centralised education system and consists of 3473 primary schools (together with local, outpost classrooms) and of 497 secondary school. It is characterised by high coverage rate (95% children enrol primary school) and relatively low dropout rate (96.6 % children finish primary school). Coverage with higher education in population between 17 and 30 years is 18%. In the whole population above 15 years old there are 10.6% of those with higher education and increasing population with higher education is ascending trend (Census 2011, Statistical Office of the Republic of Serbia).

Ministry of Education<sup>128</sup> is responsible for external evaluation of the schools through the work of pedagogical advisors who are located at the Regional School Administration Office across the country for performing expert pedagogical supervision. They extend their support to institutions operations, development planning and quality assurance as well as implementing other activities. Ministry also has in its charge Inspection and Expert Pedagogical Supervision that is obliged to react in cases of violation of various rules. Under the control of Ministry, there are two Institutes: Institute for Improvement of Education and Institute for Quality Evaluation of Education<sup>129</sup>. They propose general and special achievement standards, competence standards for teachers and preschool teachers and their professional development, competence standards for principals, textbooks and teaching tools, materials quality standards, and other quality issues to Nation Education Council and to Council for Vocational Training and Education of Adults for adoption. Nation Education Council<sup>130</sup> is a body that consists of 43 members of vocational and other public representatives (from churches and religious communities, vocational societies, National Academy of Science and Arts, universities, etc.) that has mandate for creating and approving various education policy measures. Council for Vocational Training and Education of Adults gathers 21 members from the distinguished representatives of the chamber of commerce, craftsmen, employer' association, experts in the field of vocational education and training and education of adults, business community, employment etc. Council for Vocational Training and Education of Adults proposes the list of educational vocational profiles, quality standards, curricula, textbooks, etc.

New *Law of Foundations of Educational System* (from 2009 and changes from 2013) introduced many novelties into Serbian education such as introducing pedagogical assistants, antidiscrimination issues, new enrolment procedures, nine months long obligatory preschool preparatory program, individual education plans and, among others, per capita financing.

Serbia has below average students' achievements (449 on Mathematic - 43rd, 445 on Science - 46th and 446 on Reading literacy test - 45th) and high equity (Pavlović-Babić & Baucal, 2013).

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<sup>128</sup> For more information, see – <http://www.mpn.gov.rs>

<sup>129</sup> For more information, see – <http://www.zuov.gov.rs> and [www.ceo.edu.rs](http://www.ceo.edu.rs)

<sup>130</sup> For more information, see – [www.nps.gov.rs](http://www.nps.gov.rs)

## 1.2. Serbian strategic documents and its main aims

*Strategy for Development of education in Serbia until 2020* (SDES 2020, 2012) set goals for every educational level. On the preschool level, aim of the strategy is to double the coverage of the children from four to six years who attend preschool institution, especially children from sensitive groups. Other aim is to decentralise local municipality units and to extent the length of obligatory preschool preparatory program. On primary school level there is aim to achieve maximal coverage, to improve teacher competencies trough better selection and better initial teacher education, to develop transition mechanism in transition from class to subject teaching in the fifth grade, to lessen number of classes and to introduce one shift in class performance and to make better preparation for inclusive education. In secondary education, plan is to introduce standards of quality of education (achievements of students, school environment, and equipment of the schools), make educational trajectories more flexible (to permit enrolment into higher education from different secondary levels, etc.) and also to develop and monitor students' performance. From the previous year graduation test was introduced. In vocational schools, Strategy aimed to develop system of responsibilities and better coordination to the other parts of education.

Goals for each level of education are increasing efficiency of using educational resources and raising educational effectiveness regarding decreasing dropping out rate and finishing school on time. In addition, goal of Strategy is to set structure of educational system to developmental needs of individuals and other state systems (economic, research, administrative, cultural, public) through the efficient system of monitoring and evaluation and to raise financing education from existing 4,5% GDP to 6% GDP (SDES, 2012, p.8).

## 1.3. E-learning and Sustainable Development in existing strategic documents

SEDS 2020 posted ICT as an important tool for the raising quality of teaching and important teacher competence that must be developed in continous professional development of the teachers. National information system about education should be constructed and it should gather and monitor all relevant longitudinal data for improving education (SES, dropout, achievements, absenteeism, individualised teaching and other indicators aligned with EU indicators, Eurydice, OECD, UNESCO). Nation Education Council in 2013 developed "Guidelines for Improving ICT Use in Education" (further – *Guidelines*) as a document that should serve in improving educational practice in way of modernising and introducing ICT in schools. Document is based on existing data and conducted research. Based on research results, document points out guidelines with different priority levels, highest, medium and low, as well as with different level of generality - from teaching practice, educational institution trough global educational national strategy.

Guidelines with high priority and high level of generality point out measures in national strategy. Guidelines with high priority for national level are (*Guidelines*, 2013, p.8):

- Developing English-Serbian dictionary of educational technology,
- Including media literacy into educational goals,
- Comparative analysis of ICT implementation in other countries,
- Make obligatory by law for school to have developed program for integration of ICT into school which should include raising level of ICT literacy and availability of software and hardware,
- Creating advisory board or body for strategy implementation,
- Monitoring and technical support of using ICT in educational system,
- Implementing Information system in entire education system in order to gather all relevant data for monitoring and
- Improving education and to foresee ICT use by curriculum itself.

Guidelines of high priority for educational institution are (*Guidelines*, 2013, p.11):

- Introducing obligatory methodical preparation for teachers, who plan to perform online courses,

- Provide technical support to online courses and
- Promoting mix model of teaching of traditional and novel online approach to various subjects.

Guidelines of high priority for improving teaching practice are (*Guidelines*, 2013, p.12):

- Introducing e-textbooks and other material as a legally recognised lecture materials,
- Promote temporary working methods with use of ICT in part of curriculum for realisation of program and
- Hiring experts for educational technology at regional level.

Government of Republic of Serbia brought *National Sustainable Development Strategy* in 2007 (further – *Strategy* or NSDS). Strategy defines Sustainable Development as a targets-oriented, long-term (continuous), comprehensive and synergetic process with impacts on all aspects of life (economic, social, environmental and institutional) at all levels. Sustainable Development points out developing models, which provide quality response to social-economic needs and interests of citizens, and at the same time eliminating or significantly reducing impacts, which are a threat or damage to the environment and natural resources (NSDS, 2007, p. 5).

The objective of the National Sustainable Development Strategy of the Republic of Serbia is to establish a balance between the three key factors, or three pillars, of Sustainable Development. Those three factors are: sustainable economic growth and economic and technological progress, sustainable social development, based on social balance, and environmental protection accompanied with reasonable use of natural resources, embracing them in one whole supported by an adequate institutional framework (NSDS, 2007, p. 6).

Regarding economy, *Strategy* proposes that Sustainable Development in Serbia must take into account insufficient integration of national economy in the economic-financial movements of the European and world economy. The necessary GDP share of imports and exports at the present level of the economy should be at least 50% on both the export and the import side (NSDS, 2007, p.21). Some of the risks for Sustainable Development of Serbian economy are following: the share of Greenfield investments is practically negligible compared to privatization of existing enterprises, public expenditures and the budget balance of Serbia are instable, proceeds of privatization are near to depletion, capital markets are insufficiently developed and insufficient investments are present. The situation in Serbia with respect to sustainable production and consumption is very unfavourable. The goods and services on the Serbian market produce excessive hazardous waste (unregulated landfills and big suburban waste disposal sites). Energy efficiency is very low, although the country as a whole has an energy deficit, so we can say that energy in Serbia is wasted, due partly to economic and technological factors (NSDS, 2007, p.33).

In terms of Education for Sustainable Development, according to the *Strategy*, Serbia needs to achieve the following objectives. Serbia has to strengthen basic and applied knowledge as a prerequisite of flexibility in the labour market and to ensure that quality education is accessible to all. Serbia has to improve early education and develop a system of permanent, adult education, and through changes in the system of education to provide complementarity of theoretical and practical knowledge. The biggest problem of the current (unsustainable) system of education in Serbia is the lack of efficient and effective education, a low educational level of the population, and the rigidity of the existing system of education (NSDS, 2007, pp.34-36).

Regarding sustainable social development, based on social balance, sustainability means that the life style of each individual in a society should be (1) environmentally aware, (2) healthy, (3) safe, (4) solidary, (5) participatory and (6) diversified (NSDS, 2007, p.42). The level of environmental awareness in Serbia is very low. According to the *Strategy*, average citizen of Serbia does not have a developed positive awareness of the need to reduce pollution, establish rational use of energy and non-renewable resources. Frequently present health-risky life styles (smoking, consuming alcohol and psychotropic substances) are often accompanied by a tolerant attitude of those around due to traditional behaviour patterns (NSDS, 2007, p.42). Social exclusion is high because of low employment rates and social security is low and not enough for satisfying elementary human needs.

Regarding environment and natural resources, with about 138 kg of generated industrial waste per GDP of USD 1,000, Serbia is among countries with high intensity in waste generation. Promotion of renewable sources of energy requires incentive measures, which would encourage private investments in the energy sector and strengthen competition in the energy and economy sector generally. Serbia has access to sufficient quantities of water to meet its needs, but only provided if their use is in a rational manner. Less than 70% of the population have access to the public water supply system, which is insufficient, while local water supply systems cover additional share of 14% of the population in Serbia. Average annual values of lead in ambient air in Belgrade and Niš are two to nine times higher than the allowed average annual emissions for settlements ( $1,0 \mu\text{g}/\text{m}^3$ ). In Bor and Belgrade over the past ten years, the annual limit of ambient air concentrations of  $\text{SO}_2$  was permanently above the allowed limit. Strategic goals are to harmonize national legislation related to air quality and air emissions with that of the EU and to adopt and implement international agreements relevant to protection of air quality. The goal is to reduce air pollution from the energy and industry sectors, to improve fuel quality and gradually phase out leaded petrol and diesel with high sulphur content. The goal is also to modernize the air quality monitoring system in urban areas and enhance the capacity of laboratories to test air quality; to improve public access to information regarding air quality and raise general public awareness (NSDS, 2007, p.74).

## 2. National Capacities for E-learning

### 2.1. Overview of national data concerning technical capacities for e-learning

According to the recent data from census from 2011 in Serbia, gathered by Statistical Office of the Republic of Serbia<sup>131</sup>, more than half of population are internet users (62.8%). There is not a plenty of studies, especially not on a larger samples, regarding using ICT in schools in Serbia.

Association of Teachers of Republic of Serbia (SURS) conducted a survey in 2011 with sample of 741 teachers of first cycle of primary school and asked them about their ICT competencies. Nearly 6% of teachers do not have any ICT competencies, 40% of them possess basic competencies (web, movies, text files, digital photo camera), medium level of competencies possess also 40% (work in text documents on a higher level, advanced search of web) and about 10% of the teachers have high level of competencies (solving problems, personal blog, etc.). Significant majority of the teachers (89%) reported that they have used computer in teaching process. 35% of the teachers report that they do not have any conditions for using ICT in teaching (SURS, 2011).

Association of teachers of informatics in Serbia conducted a research in 2009 in 135 primary schools. The research was about ICT use and school capacities for ICT implementation in classrooms and teaching. Local school authorities and pedagogical advisors supported research. In average, one school from the sample has 28 computers, which means that one computer is, in average, used by 19 students. Teachers use computers most in teaching of informatics as a subject (54%). Rest of computers they use in teaching other subjects (46%). In average, in one cabinet of informatics there are 10 computers. Some schools in Serbia have separated classrooms due to the regional, demographic and geographic varieties. Only 8% of the computers are in those separated classrooms (separated in separate buildings from main school) even there are 23% of schools who have separated classrooms. Only 17% of schools have online directories and possibility for parents and students to check and see their marks online. Teacher use computers in teaching informatics; 31% of schools have computers only in informatics cabinets. Pentiums IV and older Pentiums are computers teachers use mostly in schools. Most of the schools have ADSL internet connection; wireless connection has 31% and dial-up connection has 30% of schools; cable internet has 8, 5% of the schools. Many schools have two or more different internet connections. Teachers use about 53% of

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<sup>131</sup> For more, see <http://webrzs.stat.gov.rs/WebSite/Public/PageView.aspx?pKey=2>

all computers in teaching and learning. Data that may worry is that there are 10% of schools without informatics as a subject (SURS, 2009).

Other research from the same organisation included gymnasiums and vocational schools besides primary schools. Vocational schools have more computers in average (57 computers per school), than gymnasiums (49) and primary schools (23 computers per school). About 78% of all computers are used in teaching. From all computers used for teaching and learning, 74% of them are used in teaching informatics and 26% in teaching other subjects. In average, schools have only one classroom with computers, which counts from 10 to 15 computers. Only 17% of schools have more than two computer classrooms. Only 35% of schools have computer network in schools with all computers. This is a good indicator of internal division of school ICT resources. In secondary schools, only 20% of schools have online directory (SURS, 2010).

There are lot of room for improvement of implementation ICT technologies on every educational level. There is room for improving equipping the schools with contemporary ICT technologies, as well as improving the education policies of integrating ICT into teaching and learning practice.

## 2.2. Analysis of documents about competencies and teacher and student outcomes regarding ICT use

National Education Council brought in 2011 Standards of teacher competencies and their professional development (further – *Standards*) that comprehend competencies about teaching area, competencies of teaching itself, competencies of support to the personal development of the student and competencies for communication and cooperation. According to the *Standards*, teacher should be "updated to the latest educational tehnologies and to apply them in teaching process".<sup>132</sup>

The overview of the curricula and syllabi realized at the faculties which educate teachers points to the fact that, concerning initial teacher training, ICT is not a part of it (with some exceptions when ICT is introduced through some elective courses at faculties). However, a lot of additional training are organised as a part of teacher professional development (in EU Project "Razvionica", Open Discovery Space, as well as in part of Catalogue of Teacher Trainings of Institute for Improving Quality of Education<sup>133</sup>).

In SEDS 2020, ICT teaching and learning is posed as one of priorities and one of the most important tools of raising quality of teaching. Teacher training for ICT is one of two priorities in continous teacher education and one of five measures for improving teacher capacities (SEDS, 2020, p. 78).

ICT competences of students are included into the curriculum both as a separate subject (which is optional in the primary level and compulsory in the lower and upper secondary level) and as integrated parts of different subjects, but this on free initiative of the teachers regarding school capacities related to ICT.

Due to the low number of computers in schools, there are usually special computer classrooms (cabinets of Informatics). This lack of ICT equipment is the cause for the conducting all classes in a digitalized world at the different time.

## 2.3. Identification of current state and rooms for improvement in e-learning

As previously stated, main improvements are equipping schools with computers and other devices, introducing teacher trainings in ICT in a catalogue of in-service programmes, developing the "Guidelines for Improving ICT Use in Education" and many project activities related to improving ICT usage in schools (Razvionica, Digital School, and Open Discovery Space).

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<sup>132</sup> For more, see <http://www.zuov.gov.rs/dokumenta/CPRZO/akta/kompetencije-nastavnika-pravilnik.pdf>

<sup>133</sup> For more, see <http://katalog2015.zuov.rs/>

The goal is to fulfill goals of high and medium priority set in the "Guidelines for Improving ICT Use in Education" in next five years.

The conclusion is that there is a strong need for spreading teacher training for all teachers – courses dealing with ICT should be introduced both into pre-service and in-service teacher education programmes. Internal seminars, organized at schools and lead by those who are experts in ICT use (e.g. teachers of Informatics) could be organized. Online teaching materials in Serbian should be developed and made accessible to all teachers in Serbia. Better equipping schools from municipalities with lower GDP is also necessary. Hierarchical organisation of ICT trainings and prerequisites for some more advanced training will create better adjustments regarding teacher existing competencies.

### 3. Sustainable Development (SD) in Education

#### 3.1. Representations of SD themes in national curriculum

For the purpose of this Report curricula for respective subjects in secondary schools were analyzed, more specifically – main goals, tasks, thematic blocks and lessons units, set by the Ministry of education, science and technological development<sup>134</sup>.

Curriculum explicitly mentions SD in the goals of learning Biology in secondary schools. Tasks related to SD are accepting that nature protection, respect and preservation of national and world cultural heritage. Tasks are also responsible usage and protection of natural resources constitute some of their most important task; development of awareness of importance of health and healthy lifestyles; development of tolerant, humane behaviour regardless of national, religious, gender and other differences between people and strengthening capacities for lifelong learning.

According to the Curriculum for Chemistry, one of the main goals of learning Chemistry is to develop responsible relationship toward oneself, others and environment. Tasks in chemistry teaching related to SD is to understand importance of chemical production for contemporary society; understanding of connection between chemistry, technology, social sciences and humanities; understanding of importance of chemistry and chemical production for SD; development of responsible attitude toward substance use in everyday and professional life. There is the relationship between chemistry and technological development and ecology. However, explicit mention of SD at the level of lessons is missing.

Concepts related to SD that are used are: hazardous waste, air/ water/soil pollution, petroleum and natural gas, water resources and treatment, roles and importance of vitamins/hormones/antibiotics, cancer genic substances, etc.

Two of the goals of learning Physics in secondary schools, related to SD are obtaining knowledge on natural resources, their limitations and sustainable use, and developing adequate relationship toward natural environment protection, environmental restoration and improvement. There is a demand to point to the protection of environment endangered and polluted due to certain physical processes and changes, after every single chapter/ thematic block. When coming to physical grounds of energetic, it is necessary to point to importance of all energy resources saving.

Main goals of learning Geography are, among others, obtaining knowledge necessary for understanding contemporary world reality and development of moral values, tolerance, respect and belongingness to multi-ethnic, multilingual and multicultural world. Some of the tasks, related to SD are developing cooperation and solidarity between representatives of different social, ethnic and cultural groups; developing awareness of importance of SD, protection and preservation of natural

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<sup>134</sup> For more information, see –

[http://www.zuov.gov.rs/novisajt2012/naslovna\\_nastavni\\_planovi\\_programi.html](http://www.zuov.gov.rs/novisajt2012/naslovna_nastavni_planovi_programi.html)

and social environment; developing capability of lifelong learning and joining international and professional relationships.

Besides concepts directly related to SD (such as climate changes and protection or social inequalities and inclusion), concepts that are mentioned in the geography lessons in any way, which indirectly point to SD are: cultural and life standard of world population, world market/economy/politics, future trends (economic, demographic, agricultural), overpopulation, regional economic groups and EU, relict species protection, etc.

Main goal of the subject Civic education is to, through obtaining knowledge, skills, shaping attitudes and value system, contribute to students' strengthening for competent, responsible and engaged life in humane and democratic society grounded in key human values, respect of human and civil rights, in which diversity is respected, and solidarity and care achieved. Some of the tasks related to SD in teaching Civic education are adopting values that make a ground for human rights and democratic society to develop readiness to act in line with democratic values. The task is also to understand complexity of life in a multicultural community as well as to understand need for mutual respect and diversity appreciation.

One of the main goals of Sociology is to teach students to have their own critical opinion about society and current social issues. In relation to SD, students learn how to understand social and environmental issues and problems as well as problems of globalization. The focus is on attaining attitudes necessary for living in a multicultural and democratic society. However, nowhere curriculum does not mention SD explicitly concepts closely related to SD such is mobility, social power and inequalities and ecological problems.

Main goal of learning a foreign language is to enable students to talk and express themselves and to allow them to communicate on a global level. Other goals related to SD are to help them get a better starting position in labour market; appreciate other cultures and develop responsible relationship toward national cultural heritage. The concept of SD is nowhere explicitly mentioned and there is little room allocated for the issues closely related SD (only natural wealth and economic development, and environment protection).

Generally, curricula rarely comprehensively present SD. Although there are mentioning of SD in the goals and tasks in most of analysed curricula, it is not visible in the thematic blocks and lessons. It remains present only at the abstract level (especially in the case of Physics). In some cases (Biology, Geography and Sociology), there are many topics implicitly related to SD. *Therefore, it is recommendable to introduce SD in a more detail and explicitly into all levels – from the level of goals and tasks, to the level of concrete lessons and subtopics, and to provide guidelines/ recommendations for teachers how to achieve these goals through concrete actions/ teaching methods and materials use.*

*Curriculum should foster interdisciplinary approach and interconnect different subjects.* For example, similar topics related to SD are there in Chemistry in the second grade and in Biology in the third grade. Similarly, students learn in the first year about greenhouse effect, acid rains, ozone layers depletion within Geography, while plan is to attain knowledge on chemical grounds of these phenomena is for the second and third year of high school. Generally, although there is a recommendation of correlations between different subjects in curricula, concrete guidelines how to achieve this are missing.

### **3.2. Identification of new arisen important themes of SD that should be included into national curriculum**

One of the goals of primary school education is to raise awareness about Sustainable Development and protection of environment (*Law on Primary Education, 2013, Article 21, and Paragraph 9*) but there is no such statement in Law on Secondary school. Instead of this, secondary school has to

develop programme for protection of environment in cooperation with local government (*Law on Secondary Education, 2013, Article 16*). Better cooperation of schools and local communities (e.g. through organized visits to factories, volunteering actions) could contribute to broader and more effective elaboration of relevant SD topics and development of respective values and habits.

The analysis of the curricula led us to conclusion that most of the relevant SD themes are included in curricula, but their interconnections could be better and more stressed. In general, there are too many topics and there is little time for application, practicing, connecting to other disciplines and real life, and experimenting. There should be fewer topics in the curricula, but at higher competency levels (application, analysis, evaluation and creation).

Second pillar of Sustainable Development should be more emphasized in curricula of different subjects (particularly Geography, History, Sociology, Constitution and civil rights, and Languages) – awareness should be raised especially on employment rates, socio-economic inequalities, regional disparities and importance of social balance.

Innovative teaching approaches, i.e. outdoor learning, projects, community services, research, etc. might help create rich and transformative learning experiences relating to sustainability. More attention could be paid on large-scale research data and statistics which could make important issues more concrete, understandable and credible.

Finally, one should not oversee that economic crisis and poverty are obstacles to think of SD as a necessary and important subject for our future.

#### **4. Teacher's view about e-learning and Education for Sustainable Development**

For the purpose of this Report, focus groups with secondary school teachers were conducted. In general, teachers perceive ICT technology as a tool that contributes to increasing achievement in other subjects, not as something that has a purpose itself, except in teaching Informatics as a separate subject. Teachers who use ICT in teaching usually use it in project or multidisciplinary teaching, research and cooperation learning.

During their initial education, no one of the teachers who participated in focus groups had any course dealing with ICT use. There are many trainings in the scope of continuous professional development programs on ICT use in learning and teaching, but they are either too expensive for teachers or they are of low quality, theoretically oriented. Teachers can choose courses from catalogue of continuous professional development programs (teacher has an obligation to attend 120 hours of professional development in a period of five years according to *Rulebook on continuous professional development and obtaining the title of a teacher, 2012*).

Implementation of ICT in teaching is mainly the result of individual teachers' endeavours and engagement and not of systemic support and actions. More motivated group of the teachers agree that sole use of ICT cannot improve the teacher – a good teacher is a good whether using ICT technology or not. They pointed out that most of teachers are rigid, not flexible towards new technologies and new approaches in teaching/learning. Some teachers stressed that it would be good to have some network of teachers who use ICT technology in teaching, to exchange experiences and examples of good practices. Teachers' perceptions of developed "Guidelines for Improving ICT Use in Education" is positive, they think that the strategy has a vision (one of the teachers participated in writing Guidelines), but no action plan is created to implement a strategy, and teachers are not sure how long they will wait for action plan.

Both groups of teachers (motivated and unmotivated) are members of different professional groups at the Facebook and they regularly use teaching materials, ideas for lecture plans, etc. from

specialized websites (e.g. Edutop, Educlio, Education for the 21 century, Shared history, [www.rajak.rs](http://www.rajak.rs), [www.matematiranje.com](http://www.matematiranje.com), [www.srpsijezickiatelje.com](http://www.srpsijezickiatelje.com), [www.rastko.rs](http://www.rastko.rs), Rečporečučionica, etc.) or YouTube. In the group of more motivated teachers, the use of special software is more common (GeoGebra, Desmos, Tesla, Moodle, Wikimedia, PowerPoint, Prezi, etc.). Teachers mostly use these websites and software for lessons planning, but sometimes they download teaching material (usually videos) and suggest students to use these websites while learning and doing their homework. They also see ICT as a way to “extend” the lesson – to motivate students to learn at home and to prepare themselves for upcoming lessons. Computer science teacher noticed that pupils like when they get immediate feedback, so she believes that ICT can enable teachers and pupils to, for example, do quick tests or quizzes, which can result in effective assessment and self-evaluation.

In teachers’ opinion, pupils mostly like when they use ICT in classroom (currently they use PowerPoint presentations, listening to some dialogues and shows at the language lessons, watching videos, etc.). However, teachers are not sure to what extent they support pupils’ learning in the way their achievement increase.

Concerning technical equipment, their working conditions are poor although teachers work at schools from the socio-economically developed municipalities in Belgrade. Old and damaged furniture, old roofs and lack of computers and printers are their reality. In one of these schools, they have 31 computers, out of which only 15 are functioning well. They have only one projector in whole school. In another school, informatics is non-obligatory subject due to lack of computers. In another school, old electrical installations prevent them from using new computers they bought. In private schools, conditions for ICT use are much better (one teacher works in both private and public school) – students have modern equipment, smart boards (with interactive software), they use *Desmos graphic calculator* for android and iPhone platforms in mathematics for functions. Most secondary schools do not have access to Wi-Fi in classrooms. But teachers mentioned example of some elementary schools that made partnership with Ministry of Telecommunications and founded Digital classroom.

Teachers believe they have a role of moderator in classroom and therefore it is necessary for them to know ICT, to be able to show pupils how to use it correctly and critically. Many participants noticed that pupils do not know how to use Google and that their knowledge of English language is very scarce. Participants defined two factors that prevent teachers from adopting the role of moderator successfully: their lack of competences and lack of motivation due to the poor treatment by the public and government (teachers obtain the same salary, regardless of that whether they use technology or not, there is no recognition of extra effort and achievement). Lot of trainings and improvements are happening due to some teachers who are willing to educate other teachers and spread the ideas how to improve teaching and learning with ICT use. For example, teachers from one school spoke about a seminar that one of their colleagues organized at school after she participated at a course on internet teaching (e.g. [www.ted.com](http://www.ted.com)). They agreed that this practice of having “internal” seminars, where they can share ideas and knowledge is very fruitful.

Teachers report that there are rough guidelines in curriculum concerning SD, but they are more brief notes about desirable outcomes of SD than systematic approach to the subject. There is no emphasised content in any specific subject concerning SD, except in Biology for fourth year of secondary schools when students learn about ecology. In private school there is a subject called Global Perspectives where students learn about recycling, but also sociology and religion.

All teachers are willing to participate in web-based classrooms. They think that SD very important, but they do not feel very competent about ICT and SD. Teachers think that the concept “Sustainable Development” is “for developed countries” and that there is not enough awareness in our culture for the care for people, for their health and that there is no enough care for the nature and resources. During their initial education, only Biology teacher and younger Chemistry teachers

recognise the concept of Sustainable Development, but some field actions were not organized. Chemistry teachers agreed that one of the obstacles when dealing with up to date issues is that there is no modern technology in Serbia and there is no opportunities to show pupils examples of good practices in the field of food processing, waste disposal, energy saving, etc.

Teachers recognize decrease in quality of professors at the university – their teaching is not up to date, their requirements from students are too low and they publish old-fashioned handbooks. Professors should be able to induce interest of their students for the Sustainable Development of their society, to be models of appropriate behaviour, and to include students in practical activities dealing with this issue. Without that necessary conditions future teachers will not be equipped with necessary knowledge on this topic when they come to school. Participants also complained about the situation at primary schools – they believe teachers should work more at primary schools on issues such as Sustainable Development. They believe in primary education there are more possibilities to influence pupils' values and habits and to teach them to appreciate the nature, their own health, and to contribute positively to their own society.

Participants believe that curriculum presents well Sustainable Development (but still not sufficiently) in the curricula of primary school, but that teachers do not promote this topic enough. The greatest potential they see in Biology teaching in the 8<sup>th</sup> grade, when pupils learn about ecology. Computer science teacher stressed that at the lower grades of primary school there is only one subject which promote issues such as Sustainable Development – Nature guardians, which is elective and which class teachers avoid because they don't feel competent enough for that subject. Overall conclusion is that discussions and field actions should bolster Sustainable Development at primary schools. Besides that, teacher knowledge on these issues should improve, in order to raise their motivation and readiness to deal with them with pupils. Although teachers perceive this issue as highly relevant, they believe that they and their colleagues do not feel at ease when it comes to this issue because they do not have adequate knowledge.

In the high school, ecology is a peripheral topic. Biology teachers believe that only field actions dealing with environmental and societal issues would bring about desired change. For the moment, they can organize these actions only within additional lessons and out-of-school activities, but they lack time and financial resources for that. Computer science teacher explained that all of them should support values such as tolerance, respect, readiness for teamwork and lifelong learning in their regular classes, regardless of the subject and proposed lesson topic. They also agreed that all teachers should connect content of their subject with the issues learned at other subjects and that interdisciplinary approach to Sustainable Development would makes things easier, but one of the obstacles for this kind of cooperation is lack of coordination between curricula of different subjects for the same grade.

Opinions regarding pupils' interest in the topic of Sustainable Development differ. Some believe that pupils are motivated to learn about Sustainable Development and to take part in some initiatives because they are, as "more realistic as we are and concerned for their future." On the other hand, Chemistry teachers believe they are not interested enough because they did not know this topic before.

## 5. National conclusions and recommendations

Overall conclusion is that there are too little resources invested into schools concerning SD and ICT. Not only high school teachers, but also primary and especially University teachers should be more specialized in up to date issues, such as Sustainable Development, as well as modern teaching methods, which include the use of ICT. Curricula should be changed, made more flexible, in order to include several lessons per year in the scope of all relevant subjects that would allocate for field actions relevant for environmental and civic issues. Curricula of different subjects for the same grade

should be in tune, in order to make interdisciplinary approach possible. There is need for a fostering interdisciplinary approach and interconnections through the subject, as well as supporting higher competency levels (application, analysis, evaluation and creation) among student regarding SD. Better cooperation with local communities (e.g. for practices, community service actions, etc.) will be beneficial.

During their initial education teachers should develop digital competencies, which should be later on improved through in-service training. Regarding ICT teacher competencies in the context of continuous professional teacher development, there must be specification of requirements for specific seminar. Seminars/trainings must be hierarchically organised by difficulty. For now, there is bunch of seminars and teacher chooses what seminar she/he will attend. Teachers chose what seminars they will attend on not so desirable criteria (e.g. Cost of seminar/training, who are authors of seminar/training). Cooperation and peer-learning within school is also recommendable. Creation of the internet platform or a blog where representatives of different educational institutions (e.g. teachers, HE staff, etc.) could share examples of good practices from national and international level would be beneficial. Providing e-learning materials accessible for all teachers and better equipment of schools, mostly in rural areas would also improve teaching practice. Private initiatives and investments (e.g. from companies such as Microsoft or Cisco) are needed, especially for the sake of equipping schools (with computers, internet, software, etc.) and teachers training.

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## 7. List of stakeholders

1. Snežana Marković, State secretary in Ministry of Education, Science and Technological Development
2. Jelena Stanisavljević, PhD, Professor, Faculty of Biology, University of Belgrade
3. Slavoljub Jovanović, PhD, Professor, Faculty of Geography, University of Belgrade
4. Jasminka Čekić Marković, Centre for Education Policy, Belgrade, School policy, curriculum and VET expert

## Slovakia Country Report

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AINova, Svätý Jur

### 1. Introduction

#### 1.1. Main characteristics of national education system

The quality and content of teaching is overseen by several organisations under the *Ministry of Education, Science, Research and Sport of the Slovak Republic*: National Institute for Education, National Institute of Vocational Training, National School Inspection, National Institute for Certified Educational Measurements, Methodology and Pedagogy Centre, Slovak Centre of Scientific and Technical Information.

*National Institute for Education* is responsible for state educational programme (curriculum) at pre-primary, primary, and general secondary schools ([www.statpedu.sk](http://www.statpedu.sk)).

*National Institute of Vocational Training* is responsible for state educational programme (curriculum) at secondary vocational schools ([www.siov.sk](http://www.siov.sk)).

*National School Inspection* has a control function over the level of pedagogic management, education, technical equipment at schools including the conditions for practical training ([www.ssiba.sk](http://www.ssiba.sk)).

*National Institute for Certified Educational Measurements* is responsible for designing parts of school leaving examinations at secondary schools, testing of pupils at primary schools and preparation of international measurements to compare the results of educational systems of participating countries, such as PISA by OECD. The results of measurements can be used in formulation of education policies ([www.nucem.sk](http://www.nucem.sk)).

*Methodology and Pedagogy Centre* delivers the following services: provides continuing education for pedagogues and other staff; offers expert methodological support in the area of continuing education; carries out research and publishes various materials. There are several regional offices all over Slovakia ([www.mpc-edu.sk](http://www.mpc-edu.sk)).

The findings and recommendations of the *National School Inspection* are addressed to the institutions mentioned above, as well as to the individual schools.

*Slovak Centre of Scientific and Technical Information* is the national information centre, it runs a specialised scientific library focused on technical sciences and statistical data for prognoses and management of education for public ([www.cvtisr.sk](http://www.cvtisr.sk)).

Slovak pupils have worse results in international tests than the EU average. The PISA tests of 15 year olds show that the Slovak pupils do worse in all three categories - reading, mathematics and science (NICEM, 2014).

The *National Reform Programme 2014* states that in the area of education, the most important challenge is to increase funding and quality. Regarding the primary and secondary schools, the government intends to work on inclusion of children from marginalised communities, open the market with school textbooks and reduce administration in the work of teachers. It will support digitalisation of schools, evaluation of quality and promotion of best practices and improve financing (SG, 2014).

A lot of attention is paid to harmonization of the vocational school programmes with the needs of the labour market.

A number of nation-wide projects currently running are concerned with modernising the school programmes and contents of teaching subject by using ICT and digital technologies.

## 1.2. Existing strategic documents in the field of education

*Legislative framework:* The Slovak educational system in primary and secondary schools is framed by School Act Nr 245/2008 Coll. This act launched the reform of education. It harmonised the education levels with the international classification ISCED. (Coll. 2008) The state institutes formulated the state education programmes (curricula) and the schools adopted the school education programmes. In 2009 an Act on Vocational Training was adopted. It defined the ways of employers' participation in education process and introduced support mechanism for increasing the quality of vocational training. (Coll. 2009)

*Strategic framework:* The EU-wide strategy Europe 2020 is in Slovakia mirrored in *National Reform Programme* setting structural measures to achieve sustainable economic growth, employment growth and growth of quality of life. Education is included in the *National Reform Programme*. (SG, 2014) *National Strategy for Global Education 2012-2016* is a strategy promoting the principle of global thinking in learning. (NIE, 2012) *Strategy of Informatisation in Education Sector by 2020* defines the technological needs of Slovak schools and research centres in coming years. It introduces digitalisation as one of the most effective tools for Slovak teachers and scientists in achieving better results in education and research. (MESRS, 2013)

*Government Programme 2012-2016* in its chapter *Knowledge Society, Education and Culture* refers to Europe 2020. Apart from informatisation and digitalisation, it stresses the need to increase funding, improve the status of a teacher and overall quality of teaching and teaching programmes and draw attention to mathematics and natural sciences. (GP 2012-2016, 2012)

The following general aims are formulated in the strategic documents:

- Increase the funding for schools (Slovakia has a very low level of investment into the education within the EU);
- Increase the number of children in pre-primary education
- Strengthen the status of the teacher at all levels
- Increase the quality of education;
- Promote closer links between vocational schools and labour market;
- Make the education accessible for all;
- Promote the principle of global education and help pupils and students to build a healthy life style. (GP 2012-2016, 2012)

The *Partnership Agreement 2014-2020* adopted in the framework of the European Structural and Investment Funds administration refers to Europe 2020 aims and states these targets for Slovakia:

- Increase the quality of primary education (improve the PISA results of 472 in 2012 to 505 points in 2018),
- 40% of people aged 30-34 will have university degree (in 2011 it was 23,4%),
- Keep the level of early school drop-out below 6% by 2020 (in 2013 it was 6,3%),
- Increase employment of people aged 20 – 64 to 72% by 2020 (in 2011 it was 65%),

- Decrease the number of people at risk of poverty and social exclusion to 17,2% by 2020 (it was 20,5% in 2012). (SG, 2014b)

### 1.3. E-learning and Sustainable development in context of existing strategic documents.

E-learning as such is mentioned only in the *Strategy of Informatisation in Education Sector* and is mentioned in the context of using digital technology at universities. What is frequently mentioned is the use of ICT in teaching as well as in home assignments and self-study. (MESRS, 2013) Sustainable development as such is not mentioned and is included in the concept of environmental education (SPIRAL, 2014).

With regard to ICT, the state curricula for general and vocational secondary schools include subject Informatics to cover the following areas: Information around us, Communication on the basis of ICT, Algorithmic thinking/Problem solving, Principles of ICT functioning, Information society. (SSI, 2009)

With regard to environment, the state curriculum for general secondary schools introduces a cross-cutting topic Environmental education with the aim to introduce the environment in its complexity of relations among various organisms and between the man and the nature and make students to understand that only their harmony leads to sustainable development. (NIE, 2008)

The state curriculum for vocational schools contains the features of environmental education in all subjects with the same aim as in general schools. (SSI, 2009)

## 2. National capacities for e-learning

### 2.1. Overview of national data concerning technical capacities for e-learning

According to Eurostat data, in 2013 the level of internet access of Slovak households was 78% (the EU average being 79%). The computer use and internet use, at 79% and 78 %, is slightly above the EU average. Nevertheless, results obtained from a newly developed Digital Skills Indicator (based on four competence areas - information, communication, content creation and problem solving) show that, in 2012, 43% of Slovaks had low or no digital skills, compared to 47% for the EU average. (Eurostat, 2013)

Regarding the schools, 91% of school (primary and secondary) computers have internet connection. However, it is slower than desired as in 2012 only 20% of schools had connection with a higher speed than 12Mbit/s. The first wave of informatisation in schools came in 2000-2005 with project Infovek (Info-Age) when most schools received a computer/computer classroom, internet connection and a large number of teachers completed basic ICT courses.

Regarding students' self-confidence in their ICT skills, the mean score of students in Slovakia is slightly above the EU mean at all grades for operational and social media skills. (Eurostat, 2013)

The Commission's Study on ICT in Education examined also the students' responses, on how frequently they used various items of ICT equipment (school computer, and their own laptop or mobile phone) in their lessons for learning purposes. In Slovakia the student use of computers in class is higher than the EU mean. Use of their own laptop is close to EU means at all grades. Mobile phone usage is below the EU mean at all grades. (EC, 2013)

The rate computer/student was 3.8 in 2013. The number of computers directly used in teaching was 75%. The study from 2012 showed that in Slovakia there are fewer computers for all grade students than the EU average. Computers are much more frequently to be found in computer labs than classrooms in Slovakia. Almost all teachers claim to use the computers in teaching. However, only

43% of them use the computers regularly in teaching. In Slovakia the use of ICT by teachers is higher than the EU average at all grades with considerably more teachers using ICT in more than 25% of lessons. (EC, 2012)

Students report using interactive whiteboards at around the same frequency as other countries at all grades. Concerning students' ICT-based activities during lessons, an important indicator, Slovakia is among the leading countries as measured by frequency of use at all grades. However, for example the interactive boards are often used only as screens. (SSI, 2013)

Based on our desk research and interviews, there is no easily accessible list of existing e-learning courses at secondary schools. We assume that there are no centrally produced and provided e-learning courses and each school keeps its courses for their students only. E-learning courses are usually a product of an enthusiastic teacher.

It also seems that the notion of e-learning comprises mainly a set of various e-learning features that are used to support the learning process, such as digital texts, online tests, examples, project work, videos, tests made available via Moodle. It is not a complex or complete course.

The new experience and skills are acquired also through cooperation in international projects. According to the information from the Slovak Academic Association for International Cooperation a number of secondary schools participated in the LLP projects (Comenius, Leonardo da Vinci) over the period of 2007-2013 aimed at e-learning (5), SD (9) and environment (18) including the development of ICT skills.

Typically, there are no special technical (ICT) staffs employed by the schools. The ICT teachers are often asked to take care also of the basic hardware/software issues.

If the schools are involved in any of projects providing ICT equipment, they benefit from technical support within the project and during the project. A weak point in the use ICT is the maintenance and technical support after the project finishes as well as financing of upgrades and new ICT tools.

There is a department within the Centre of Scientific and Technical Information (Development of informatisation of primary and secondary schools) whose aim is to ensure the technical support, internet connection, anti-virus software, administration of equipment provided to schools through various projects, organisation of training in use of ICT tools and services. This activity is a successor to the Infovek project. (<http://www.rirs.iedu.sk/default.aspx>)

As we have learned during the interviews, there is no generally used or recommended educational software. Most schools do not use any special education software, not alone in SD. They might use Moodle for partial educational tasks.

Technical equipment is financed mainly through EU Structural funds projects. Other sources include the state budget, sponsoring – either as gifts of equipment or funds to buy it. The amount of money spent on ICT has declined over the past years. However, in 2013 the biggest amount of ICT was financed from the state budget, on the second place are the EU projects. (Figures for purchase of ICT in 2013: from budget - 10 873 items, other than budget sources - 2 017, non paid transfer - 1 968, gift - 3572, from EU projects - 6091, from other projects - 1502). (IIP, 2013)

The problem is in aging of the equipment and still the insufficient number of digital education tools, such as interactive board, beamer, etc.

## **2.2. Analysis of documents about competencies and teacher and student outcomes regarding ICT use**

There is annual national statistics by the Ministry of Education on use of ICT at schools. The data we can access are raw data, without interpretation or links to total numbers. There are data on numbers of computers and other digital didactic tools, number of internet connections, amounts of ICT

acquired last year, numbers of teachers and students who use ICT and in which subjects. The national statistics says that only 42% of ICT teachers are qualified. (IIP, 2013) Still, in Slovakia students at all grades are in schools that all employ more full time ICT coordinators than the EU mean (at grade 4 and 8 around 20% more). (EC, 2012)

Almost 90% of teachers completed training in use of ICT, out of them 20% at an advanced level. The study on use of ICT confirms that in Slovakia all students at all grades are taught by teachers who have invested more than 6 days in professional development activities during the past two years, above the EU average. (EC, 2012) It also seems that many teachers go through ICT training provided internally, by school staff.

In the past years, there have been a number of projects aimed at increasing teachers' capacities in use of ICT and the ways it can be applied in various subjects. One of the recently completed national project, *Modernisation of Education at Secondary Schools 2008-2013*, offered 3 modules – Digital skills for teachers, Use of modern didactic technology, Use of ICT in teaching of a concrete subject. (IEIP, 2013)

It is important not only to have specialised teachers of ICT skills but to make sure that the teachers of other subjects are able to use ICT in their teaching activities. The analysis of curricula at pedagogical faculties all over Europe show that in half of states the ICT is included in initial teacher training, including Slovakia. (EC, 2013)

Based on interviews, the graduates of the Faculty of natural science of the Comenius University in Bratislava are supposed to be able to use various measuring instruments connected to PC in order to make practical exercises such as monitoring of health state.

The document *Strategy of Informatisation in Education Sector* shall be followed by Action plans on:

1. Development and optimisation of digital infrastructure in education system,
2. Development of digital competencies in the education system,
3. Digitalisation of educational content,
4. Simplification of access to electronic services within the education system,
5. Development of partnerships with the private sector.

The fulfilment of action plans shall be regularly monitored. (MESRS, 2013)

The national curricula of most of subjects comprise the development of digital competencies as one of priorities. (NIE, 2009)

The national curriculum for secondary general schools defines the ICT competencies in the following way:

- the student uses ICT in his/her education, creative activities, project learning, presentations of his thoughts and ideas and solving practical problems
- the student has acquired the skills to find and process the information from internet in text and graphic forms
- the student has algorithmical thinking and can apply it in real life
- the students distinguishes between the real and virtual life
- the student understands the risks connected to the use of internet and ICT. (NIE, 2009)

In conclusion we can say that the computers are used as complementary teaching/learning tools. Special computer classrooms are used for teaching Informatics while the use of computers in regular classes depends a lot on teacher's attitude to ICT. Computers/internet are used mainly to search for

information, for testing of students, to show some simulations, to make exercises and home assignments.

### 2.3. Identification of current state and rooms for improvement in e-learning

The national project *Electronisation of Education System of Regional Schools Sector 2013-2015* which follows upon the strategic document *Strategy of Informatisation in Education Sector* aims at further developing the electronic services within the sector (for communication of parents and teachers, and administration as well as support of teaching process through provision of digital teaching materials). (MPC, 2013-2015)

Teachers can make use of various important ICT tools developed either with the support of the Ministry of education or without, for support of teaching process or administration. They can be found on internet, such as:

- Digital Planet, a complex portal of teaching materials for teachers and study materials for students
- Edupage
- eAktovka.sk (eSchoolbag) with digitalised text books.

The number of computers at primary and secondary schools is growing, as well as the number of internet connections, and fast internet connections. (IIP, 2013)

The level of equipment of schools with maps, CD recordings, laboratory tools and other teaching aids was rather good (85%) as well as with functioning didactic technology (90%). However, the use of didactic technology and ICT is rather low and the reason is the low level of ICT skills of teachers. (SSI, 2013)

Another problem is the aging of ICT and insufficient funding of new purchases. The interviewed teachers also stress the missing technical support for hardware and software at schools. (SSI, 2014)

The teachers interviewed state that there is no systemic support for use of e-learning, for example. Some teachers became enthusiastic about it and apply some features in their teaching process – reading assignments for students, tests, communication with students. It all depends on the teacher and the support or expectations from the school director.

The main aim of the *Strategy of Informatisation of Education Sector* is to ensure by 2016:

- Digital teaching and learning aids such as interactive boards and projectors to every second classroom in schools
- Broadband internet connection to all schools and facilities
- Accessible digital content as a complementary tool
- Adequate end facility for digital education of each teacher
- Optimisation of processes and build-up of centralised electronic services. (MESRS, 2013)

Newly launched national project *Modern Education – Digital Education for General Knowledge Subjects (2013-2015)* has the aim to introduce new education content to schools, using innovative teaching forms and methods. It stresses the use of digital contents and increase of students' motivation to study natural sciences and technology. (SCSTI, 2013-2015)

The national project *Electronisation of Education System in Regional Schools Sector (2013-2015)* will equip a number of schools with digital end facilities, such as tablets, interactive boards with notebooks and printers. 100 digital classrooms shall be set up providing a complex solution to digital teaching/learning. They will support the preparation for teaching, teaching itself, and also

homework. The project will also set up an information system ensuring the electronic support and services for designing the school curricula, use of digital content by teachers, students and parents. (MPC, 2013-2015)

### 3. Sustainable Development (SD) in Education

#### 3.1. Representations of SD themes in national curriculum

The national curriculum is presented as a state educational programme. SD is present in several subjects, but mainly in a cross-cutting topic Environmental education. Its aim is to form the pupil's personality so as he/she understands the relationship between the man and the environment, distinguish between local and global problems and see his/her own responsibility as a consumer and producer, receive and analyse the information about the environment and formulate own opinions and present them. (NIE, 2009)

The *National Strategy for Global Education 2012-2016* uses the term global education to cover the development education (about developing countries, poverty, etc.), environmental education, multicultural education, peace education and human rights education. Among others, it refers to the *Decade of Education for Sustainable Development* proclaimed by UNESCO for 2005-2014. (NIE, 2012)

There is also an older document, a comprehensive *National Strategy of Sustainable Development (2001)*, which defines 16 principles, one of them being educational principle. This strategy has not been updated since, though. (SG, 2001)

The topic of Environmental education covers the following: basic concepts from ecology and environment, biochemistry and geochemistry of the environment, processing and protection of (drinking) water, alternative sources of energy, collection and processing of waste. (NIE, 2009)

*The National Strategy for Global Education* covers the topics such as climatic changes, waste, environmental migration, air, water, soil, use of natural sources, alternative sources of energy. (NIE, 2012)

*The Report on the State of Education* outlines that the environmental education at general secondary schools was included into the topics on developing one's moral standpoints and values. (SSI, 2014) In the interviews the students stated that the most information about the environment came through the subjects such as biology, geography and chemistry. Less frequently they mentioned civic education and languages. Secondary vocational schools included the environmental issues into general subjects as well as professional subjects.

The topics which were covered most frequently were protection of the nature and the land, human activity and the environment, relationship of the man and the environment (local and global problems). (SSI, 2013)

The interviewed teachers confirmed that they coordinate their teaching within thematic areas (e.g. within the area Man and the Nature covering the subjects of biology, chemistry, physics, geography and horizontal topic of Environment education).

According to the interviewed teachers participation of schools in various projects provides also the opportunity to make interconnections between subjects in the topic of SD, such as "A Chance for the Blue Danube" (an international competition of young artists on ecological topics), Green School, a holistic methodology of environmental protection at schools, possibility to apply for a development project on environmental education to the Ministry of Education within the scheme "Enviroprojekt". The Slovak Academic Association for International Cooperation confirmed that several schools also participated in the EU LLP programme (Comenius, Leonardo) aimed at SD or environment.

### 3.2. Identification of new arisen important themes of SD that should be included into national curriculum

A comprehensive *Strategy of Environmental Education in Slovakia till 2030* is being developed now under the project supported from the EEA grant. It is formulated in the partnership of educational institutions, NGOs, as well as pedagogues from schools devoted to environmental education. It aims at producing environmentally more aware and better educated Slovak citizens. The Strategy refers to the priorities of the *Decade of Education for Sustainable Development* proclaimed by UNESCO for 2005-2014. The Strategy shall redefine the aims of the environmental education on the basis of the present level of knowledge about the natural, social aspects of environmental education, in close link to the SD. (SPIRAL, 2014)

A part of the Strategy is formulating the new content of the cross-cutting topic Environmental education at ISCED 1-3 levels; reflect it to the training of future teachers, as well as present teachers. It is all very much value oriented - educating towards responsibility, civic activism, wise consumer behaviour, participation, ecological thinking. The new environmental teaching programme will be based on critical thinking, interactive teaching methods, simulations, original teaching aids. It promotes the ideas of SD. Regarding the themes, the Environmental education shall cover the following: development of relationship between the man and the environment, links between the global and local environmental problems, 16 principles of SD, economic and social aspects of environmental problems, impact of consumerism on the environment, ecological footprint, adaptation on climatic change, self-reliance of individual and communities, environmental legislation, green economy. The Strategy stresses the need to strengthen the Environmental education in social science subjects, especially civic education, ethical education and history, bring back the subject of technical skills/gardening workshops to the national curriculum and preserve the school gardens and other green areas and use them during teaching. (SPIRAL, 2014)

## 4. Teacher's view about E-learning and Education for Sustainable Development

Based on the research done among the secondary education teachers, the teachers are not aware of the Strategy of SD from 2001. They teach topics they see important such as greenhouse effect, invasive plants, and illegal landfills. The teachers feel that more attention should be paid to SD practical aspects in people's lives; therefore their classes take part in various environmental projects.

Regarding e-learning, the teachers asked had very little experience and were not ready to provide opinions. The interviewed schools/teachers don't have experience with online teaching. E-learning is not widely used at secondary schools in general. Some teachers use some e-learning features in their teaching. However, teachers use various ICT tools.

According to the teachers, the topic of SD is important as it relates to all spheres of life. It relates to all natural science topics but also civic education, foreign languages and physical education.

Older generations of teachers did not study topics dealing with SD, and they participate in continuing education courses provided by Methodology and Pedagogy Centres. According to the information from the Methodology and Pedagogy Centre, within last 5 years there were 3 programmes offered, completed by 9 groups of 15-20 participants. The interest in participation has declined over the years.

Younger generations of teachers, for example graduates from Natural Sciences Faculty have been offered subject of ecology and SD since 2004.

The teachers believe that SD should be dealt with more, preferably continuously, not divided into several subjects. The problem is that the amount of information to be covered in one subject is growing but the amount of time devoted to an individual subject is decreasing. The teachers would appreciate a more interdisciplinary attitude towards this topic. For example before 2008, there was a specific subject of Ecology at 4<sup>th</sup> grade of secondary general schools and so a concentrated attention could be devoted to it. Teachers try to coordinate the coverage of SD/environmental education within the thematic areas.

The general discourse on SD is less intensive than it was in 2000-2004 (around the time of Slovakia's entry into EU), and even if there is anything in the media, the students don't follow as they do not follow the regular media in general.

The teachers are ready to include SD/environment into their teaching but it is their decision how much time they spend on these topics.

Teachers/schools often organise also environment-friendly activities such as cleaning of streams, collection of old batteries, looking for illegal landfills, excursion to Kittsee Wind Park, separation of waste, examination of water quality.

Older teachers were not much interested in the project. However, younger teachers are much more active. Participating in the project means that the school has sufficient ICT equipment, teachers able to use it, and the level of command of English.

## 5. National conclusions and recommendations

The importance of SD is declared in several national strategic documents. Nevertheless, we feel a discrepancy between the social importance of the topic, its presentation and presence in the media and in the teaching programmes of secondary schools and quality of teachers' training in this area.

From the documents as well as from the discussions with teachers, it is recommended:

- Complete and adopt a new nation-wide *Strategy of Environmental Education in Slovakia till 2030*
- To educate parents on SD through media, teachers through continuing education and pupils through subject or topic of Environmental education
- Develop awareness raising and education activities of students aimed at showing the interconnectedness of events, development and problems at local, regional and global levels,
- Develop the value oriented attitude of students to SD vs consumer way of life
- Increase the awareness of students of topical environmental problems, involving them into environmental projects, especially in cooperation with various environmental organisations
- Participate in international environmental projects
- Increase the awareness of children of global environmental topics; develop their critical thinking on social, environment, economic and political processes in the world.

Regarding ICT, all available sources report rather good situation in technical equipment of schools; however, the use of more sophisticated methods based on ICT is not at such a high level among the teachers. Based on the statistics and the interviews, we are rather sceptical about the quality of statistically reported frequent use of ICT in classroom.

The recommendations are as follows:

- Ensure the continual upgrading of ICT in schools and provision of technical support
- Provide high speed internet connections
- Pay attention to internet use security

- Create favourable conditions at schools for use of innovative pedagogical methods based on ICT, increase motivation of school management and teachers to use digital technology
- Develop information and digital competencies of teachers to be able to make full use of available tools
- Disseminate the information on running projects and expected results so that the teachers are well aware of possibilities and available digital content
- Spread the use of digital teaching sources approved by the National Institute for Education as complementary forms of teaching as well as those which are being currently developed
- Participate in international cooperation projects, partnerships of schools such as e- Twinning which supports the cooperation of European schools through the use of ICT and a foreign language.

The document *Strategy of Informatisation in Education Sector* stresses mainly the need of technical equipment of schools, optimisation of processes and building of centralised electronic services, creation of legislative conditions for digitalisation and ensuring of sustainability and quality of results brought by investments into education. (MESRS, 2013)

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## 7. List of stakeholders

1. Centrum vedecko-technických informácií, Bratislava (*Slovak Centre of Scientific and Technical Information, Bratislava*)
2. Gymnázium Ul. Ladislava Sáru 1, Bratislava (*Secondary General School*)
3. Gymnázium Metodova 2, Bratislava (*Secondary General School*)
4. Gymnázium Jána Papánka, Vazovova 6, Bratislava (*Secondary General School*)
5. Národný ústav certifikovaných meraní, Bratislava (*National Institute for Certified Educational Measurements*)
6. Odbor prierezových aktivít, Úrad vlády SR, Bratislava (*Department for Horizontal Activities, Office of Government of the SR*)
7. Prírodovedecká fakulta UK, Bratislava (*Faculty of Natural Sciences, Comenius University*)
8. Odbor školstva, mládeže a športu, Úrad Bratislavského samosprávneho kraja (*Department of Education, Youth and Sport, Office of the Bratislava Self-governing Region*)
9. Slovenská akademická asociácia pre medzinárodnú spoluprácu, Bratislava (*Slovak Academic Association for International Cooperation*)
10. Splnomocnenec vlády SR pre vedomostnú ekonomiku, MŠVVŠ SR (*Plenipotentiary of the Government for Knowledge Economy, Ministry of Education, SR*)
11. Stredná odborná škola, Ivánka pri Dunaji (*Secondary Vocational School*)
12. Špirála – celoštátna sieť organizácií venujúcej sa environmentálnej výchove (*Spirala – national network of institutions devoted to environmental education*).
13. Štátna školská inšpekcia, Bratislava (*National School Inspection*)
14. Štátny inštitút odborného vzdelávania, Bratislava (*National Institute of Vocational Training*)
15. Štátny pedagogický ústav, Bratislava (*National Institute for Education*)
16. Metodicko-pedagogické centrum, Bratislava (*Methodology and Pedagogy Centre*)

## Appendix 5: Country Reports Update for 2015

### Austria Country Report Update for 2015

Prepared by Christine Lechner and Reinhard Wieser

Pädagogische Hochschule, Tirol

#### 1. New national data concerning technical capacities for e-learning

National statistical data about internet connection in households (Statistik Austria, 2015).

In 2015 82% of the Austrian households were equipped with an Internet connection, 81% of these households have broadband connections. First

84% of the 16- to 74-year-olds used the Internet during the three months preceding this survey, mostly for sending or receiving e-mails (90%). 74% claimed to have gathered information about goods or services on the Internet, 67% use the web for reading online news, newspapers or magazines, and 61% of the interviewed Austrians do Internet banking.

65% of the Internet users who are active in social networks use their platforms every day or almost every day - especially the 16- to 24-year olds. Regardless of age, 27% of the interviewed stated that they use their access to social networks at least once a week.

76% of the interviewed users access the web on mobile devices such as their smart phones, laptops, or tablets, and most of them are younger than 35.

#### 2. New national data about teachers' and students' ICT use

OECD data about the number of school computers per child and the amount of ICT use in classroom<sup>135</sup>

In general Austrian students use their computers more often than in other OECD countries (OECD,2015). This means that Austrian students spend more time online in school than their counterparts in the OECD, outside of school they are less online. In 2012 2,9 students had access to one school PC, and 81,4% of Austrian students used computers at school which is about the same average as in Serbia (82%) and the Slovak Republic (80,2%). On average, Austrian 15- to 16-year-olds are 29 minutes online daily at school - which is 4 minutes longer than the OECD average. At the weekend the time that kids spend online is

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<sup>135</sup> OECD (2015) Students, Computers and Learning. Making the Connection. PISA. OECD Publishing. September 2015. Link: [www.keepeek.com/Digital-Asset-Management/oecd/education/students-computers-and-learning\\_9789264239555-en](http://www.keepeek.com/Digital-Asset-Management/oecd/education/students-computers-and-learning_9789264239555-en)

significantly higher: on average an Austrian student spends 119 minutes on the internet daily. The OECD average, on the other hand, is at 138 minutes per day.

### 3. New national data about representations of SD themes in national curriculum

There have been no amendments to Austrian curricula concerning ESD since 2014. A new curriculum for Upper Secondary will be published during the coming year<sup>136</sup>.

The organization of ESD agendas has been somewhat restructured in that, on the basis of a contract with the Austrian Ministry, the Ecology School Network will be co-ordinated by the IUS (Institut für Unterricht und Schule), University of Klagenfurt. The overall responsibility for ESD will remain within the Ministry for Education<sup>137</sup>.

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<sup>136</sup> <https://www.bmbf.gv.at/schulen/unterricht/index.html>

<sup>137</sup> <https://www.bmbf.gv.at/schulen/unterricht/index.html>

## Bulgaria Country Report Update for 2015

Prepared by Mimi Videnova, Antoaneta Fitneva and Sonya Vuchkova

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### 1. New national data concerning technical capacities for e-learning

In the last year is no official information published about Internet connectivity, number of school computers per child, the amount of use of ICT in the classroom and existing courses, etc.

Nevertheless continues execution and implementation of the "Strategy for the effective application of information and communication technologies in education and science of the Republic of Bulgaria 2014-2020"<sup>138</sup>.

In the national program "ICT in School"<sup>139</sup> for the considered period were foreseen the following activities: Providing high-speed network between the regional inspectorates of education to allow all schools join the network and having access to educational and administrative services, e-content, etc.; Renovation of school infrastructure through the deployment of terminal solutions, renewal of hardware in computer labs, control WiFi zones and implementation of distance learning in schools abroad and others. The expected results were: Renewed computer equipment in schools; Durable optical connectivity between all regional inspectorates; Access to "cloud" ICT educational resources; Involvement of innovation centers and educational exchanges to the network and initiate joint projects, etc.

Unfortunately, despite the efforts, some of these expectations were not met. But work in this direction continues and we expect the report of the Ministry of Education with the official data.

### 2. New national data about teachers' and students' ICT use

In the previous report we have made own study about teachers' and students' competencies for ICT use and way in which are computers used in regular classes and in extra-curricular activities. Since there is no formal study, we cannot give new exact statistics. But we can say that during the last year, situation has not changed significantly.

In addition, we can cite the survey "Implementation of ICT-based teaching in Bulgarian Schools"<sup>140</sup>, made by Valentina Terzieva, Elena Paunova, Petya Kademova-Katzarova, Yanina Stoimenova from Institute of Information and Communication Technologies of the Bulgarian Academy of Sciences which was provided to us by the authors. Their study is more extensive but as a result confirms the conclusions of our survey.

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<sup>138</sup> "Strategy for the effective application of information and communication technologies in education and science of the Republic of Bulgaria 2014-2020", <http://www.strategy.bg/StrategicDocuments/View.aspx?lang=bg-BG&Id=904>

<sup>139</sup> National program "ICT in School", Application No.10, [http://internet.mon.bg/ikt/NP10\\_IKT\\_2015%20\(1\).pdf?m=1](http://internet.mon.bg/ikt/NP10_IKT_2015%20(1).pdf?m=1)

<sup>140</sup> "Implementation of ICT-based teaching in Bulgarian Schools"<sup>140</sup>, made by Valentina Terzieva, Elena Paunova, Petya Kademova-Katzarova, Yanina Stoimenova, Institute of Information and Communication Technologies from Bulgarian Academy of Sciences, [http://iict.bas.bg/acomin/docs/sci-forums/7-9-July-2014/paper\\_2.pdf](http://iict.bas.bg/acomin/docs/sci-forums/7-9-July-2014/paper_2.pdf)

### 3. New national data about representations of SD themes in national curriculum

In the area of curriculum situation currently also not changed. Taking into account the recommendations made by Directorate-General of Education and Culture (DG EAC), with contributions from the Directorate-General of Employment, Social Affairs and Inclusion (DG EMPL) and the Eurydice Network in the **Education and Training Monitor 2015**<sup>141</sup> Bulgaria has adopted the new school education act and provide opportunities for comprehensive reforms in the school system, including modernizing curricula and improving teacher training. Underway is the development of new curricula tailored to the requirements of the new "Act on pre-school and school education"<sup>142</sup> adopted in 2015. Since there is no official information on this subject, we can only hope that the themes of Sustainable Development will be widely covered in national curricula.

### 4. Additional national data related to e-learning and ESD

The political conjuncture of recent days will affect all education in the country. The content of the drafts of curriculum led to scandal and removal of current Minister of Education and Science. People's dissatisfaction, referring plans to introduce controversial changes to the elementary and high school curriculum will lead to drastic changes.

This moment is very suitable with the results of our project to influence positively and offer a wider overlap the topics of SD in curricula.

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<sup>141</sup>Education and Training Monitor 2015, [http://ec.europa.eu/education/tools/docs/2015/monitor2015-bulgaria\\_en.pdf](http://ec.europa.eu/education/tools/docs/2015/monitor2015-bulgaria_en.pdf)

<sup>142</sup> "Act on pre-school and school education", <http://dv.parliament.bg/DVWeb/showMaterialDV.jsp?idMat=97877>

## Croatia Country Report Update for 2015

Prepared by Valerija Radičević and Vesna Živković

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### 1. New national data concerning technical capacities for e-learning

National Education, Science and Technology Strategy stated that some e-learning content has been created but Croatia still has a long way to go in order to “catch up” with EU countries, some of which have been investing into e-learning for more than a decade. The materials created in the fields of mathematics and physics can be found at the National distance learning portal Nikola Tesla. This portal has been launched by the initiative of Ministry for Science, Education and Sport and the materials available cover only a part of curriculum in elementary and high school education. Unfortunately, the materials available are not adapted for special needs students. More materials need to be developed (measure 2.6.2), as well as tools and methods for implementation of ICT into education and teaching. Furthermore, certain standards for the digital education content need to be established (measure 2.6.1). It is also necessary to invest into development of the content at all educational levels and the goal is to have 50% of all educational content available as digital content by 2020. To that goal, a national repository of digital teaching content shall be established which would serve as a central place of storage, creation, sharing and evaluation. It is also important that this national repository should be connected to other national repositories in Europe and the world (Education, Science and Technology Strategy – Early preschool, elementary and high school education, 2014).

According to CARNet<sup>143</sup> the third generation of GÉANT projects, i.e. the GÉANT 3 project, is currently in progress. At the start of May 2015, a new generation of GÉANT projects was initiated - GÉANT4. The GÉANT project today contains 500 Gbps physical network and a portfolio of advanced, user-oriented services. The GÉANT network uses its own optical infrastructure.

### 2. New national data about teachers' and students' ICT use

It is necessary to invest into education for teachers in the field of ICT usage in teaching – it is important to develop their digital competences and to invest into equipment at schools, so that ICT may be implemented into classroom (Education, Science and Technology Strategy, 2014).

### 3. New national data about representations of SD themes in national curriculum

No changes.

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<sup>143</sup> <http://www.carnet.hr/geant>

## 4. Additional national data related to e-learning and ESD

Croatian Parliament passed the national Education, Science and Technology Strategy<sup>144</sup> on October 17<sup>th</sup> 2014. According to the measure 7.2.2 the Strategy aims is to “(..) prepare clear guidelines for functional and rational building and equipping of the kindergartens and schools. To ensure resources for effective implementation of pedagogical standards in all educational institutions.”

The national Education, Science and Technology Strategy also references sustainable development: “By suggested modifications, a system is being built, one which should enable: development of skill necessary for the active participation in social and cultural events and competence for acceptance and participation in building a system of values appropriate to the principals of contemporary democracy; competence to communicate in a multicultural and multilingual community; competence to act in a modern, technically developed society which nurtures active sustainable development movement, which assumes gaining important knowledge and skills, especially in the fields of mathematics, nature sciences, technics and informatics, as well as social and humanistic disciplines...” (Education, Science and Technology Strategy – Early preschool, elementary and high school education, 2014).

## 5. New national conclusions and recommendations

National Education, Science and Technology Strategy has aim to develop digital educational content, tools and methods in order to use ICT in education (measure 2.6.)(Education, Science and Technology Strategy – Early preschool, elementary and high school education, 2014).

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<sup>144</sup> Full text can be found at <http://novebojeznjanja.hr/strategija/rani-i-predskolski-osnovnoskolski-i-srednjoskolski-odgoj-i-obrazovanje/11>

## Germany Country Report Update for 2015

Prepared by Christiane Spies

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### 1. New national data concerning technical capacities for e-learning

From 39,409 households in Germany around 85 % have internet access. There are around 51,000 computer users in these households from which 49,000 use the internet. (DESTAT, 2015)

### 2. New national data about teachers' and students' ICT use

In the framework of a school pilot project lasting 5 years the continuous use of tablets in school lessons will be piloted at 40 vocational schools with up to 5,400 students in total. The pilot schools equip their classes with tablets to develop and test pedagogical concepts - especially under the aspect of individual advancement of students. Three different operating systems (iOS, Android, Windows) are in use.

The Ministry of Education, Youth and Sports Baden-Wuerttemberg will support the pilot project financially with 2.5 million euro for the acquisition of devices, (scientific) support, further education, etc.

Teachers will be accordingly qualified at the Landesakademie Esslingen. A training concept for the support of the teachers at the pilot schools will also be developed by the Landesakademie in cooperation with the Landesinstitut für Schulentwicklung (State Institute for School Development). This concept will ensure the multiplication of important competences for the use of mobile devices in school lessons.

The school pilot project is also scientifically accompanied. The question on how tablets contribute to the development of learning processes - also under the aspect of individual advancement - is paramount.

The first 14 schools started with the use of tablets at the beginning of this school year 2015/16. A first interim report of the scientific accompaniment will be published in July 2016. (tabletBS, 2015)

The tablet project is also supported by an expert group of the Ministry of Education, Youth and Sports Baden-Wuerttemberg that will attend to the technical part of the project. Network specialists, IT professionals and data protection officers involved in the expert group connect the devices with the school network, ensure the compliance of data protection guidelines and save the actions of students and teachers.

The aims of the school pilot project are

- to gain experience about the linking of modern technology and modern pedagogical concepts,
- to test the positive effects of tablets on learning processes,
- to find new ways for individual and cooperative learning,

- a maximum benefit for young people at schools in Baden-Wuerttemberg,
- to prepare students for a digitalised world of work especially at vocational schools,
- to make students also aware of the risks of internet use,
- to take up everyday reality of the students.

The main focus of the tablet lessons is put on the subjects mathematics, foreign languages and on the profile subjects at vocational secondary schools. (Excite, 2015)

The internet platform [www.tablet-in-der-schule.de](http://www.tablet-in-der-schule.de), developed and hosted by the Landesinstitut für Schulentwicklung, offers teachers the chance for professional exchange, examples for school lessons and hints for the use of appropriate applications (apps). (Tabgym, 2014)

In Germany there are around 142 schools using tablets regularly in their lessons which make up only a small percentage of the 34,000 schools in Germany. (tabletBS, 2015)

There are also risks in expanding modern media in school lessons such as:

- low school budgets for hardware and software,
- no availability of wifi, electronic boards as well as insufficient sockets,
- only few sufficiently tested methods for the successful use of tablets,
- very high standards on data protection. (Handel, 2015)

### **3. New national data about representations of SD themes in national curriculum**

No changes.

### **4. Additional national data related to e-learning and ESD**

In the framework of the action programme „To Design Future - Education for Sustainable Development“ different projects are implemented to raise the awareness of pupils from elementary level on to think and act sustainably.

For this reason thematic brochures published by the Ministry of Education, Youth and Sports Baden-Wuerttemberg offer sufficient options to discuss the topic of sustainability. Not only pupils but teachers, too, obtain suggestions for the design of their lessons. The brochures contain background information, pictures, articles and questions about sustainability.

There are the following thematic priorities:

- Fuel cell
- Energy
- Money and Sustainability
- Climate

- Noise
- Sustainable Mobility
- Sustainability on the plate
- Consumption of resources
- City
- Textile and fashion
- Water

Despite of the outstanding importance of the topic of sustainability and the just expired UN Decade, the model for ESD in school lessons hasn't properly arrived yet. The eight following learning modules will show teachers different sustainable fields of activity for their school lessons. By these modules teachers are able to acquire competences to link ESD with the subject-specific requirements in their lessons.

Module 1 - Fields of activity to secure the future globally

(Topics: raw materials and energy, climate change, nutrition and agriculture)

Module 2 - Sustainable Development as model

Module 3 - Sustainability between the poles of vision and reality

Module 4 - Dealing with complexity: systemic learning

Module 5 - Education for sustainable development - definitions, features, tasks

Module 6 - Planning ESD-work processes competence-oriented

Module 7 - Sustainable development and the institution school

Module 8 - Options for cooperation with non-school partners

(BNEBW, 2015)

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# Hungary Country Report Update for 2015

Prepared by Regina Filetóth and Ferenc Mónus

College of Nyíregyháza, Nyíregyháza

## 1. New national data concerning technical capacities for e-learning

In Hungary 73% of households have internet connection. 72,4 % of them have broadband internet connection. (Source: [www.ksh.hu](http://www.ksh.hu))

According to PISA study, in 2012 the number of students per one school computer were 2,2 in Hungary. 74,4 % of students are using computers in school. Students' exposure to computers at school varies widely between countries. It is extremely interesting that Hungarian students perform at the sixth worst position among the European Union countries in terms of basic mathematical skills. So we cannot say that we benefit from using computers in education, although there was a strong effort in this regard in recent years. According to the same research, the Hungarian students spend 112 minutes on weekdays, and 156 minutes on weekend on average for using the Internet. (Source: Students, Computers and Learning: Making the Connection; OECD; 15th of September, 2015.)

The state budget helps financing ICT technical staff's salaries in the schools depending on the number of students. In case of schools with less than 250 students one part-time technical staff, between 251-750 students one full-time, in case of higher number of students two full-time technical staffs are financed. (Source: [eduline.hu](http://eduline.hu))

## 2. New national data about teachers' and students' ICT use

According to PISA study, in the field of ICT applications our performance is very depressing. Comparing European countries digital students' reading ability is among the last. In our country the proportion of people rated to 'not performing well' is very high, 32.5%. The number of excellent achievers is very low, only 4%. Our performance significantly deteriorated also in mathematics and in digital literacy. Following the analyses of PISA surveys at the Digital Teacher Conference Judit Lannert highlighted that Hungarian children use ICT tools particularly in friendships and fun dimension.

In 2015 Márta Hunya published data from her stand-alone development - a complex online measurement tool, which is named eLEMÉR. She worked with the data available for the Educational Research and Development Institute. This tool allows schools to measure the role of ICT tools in education by self-evaluation, and makes possible to form an overview about the national situation. In 2015, the technical toolbox fell below the level of 2011, since the majority of schools cannot provide money for the maintenance.

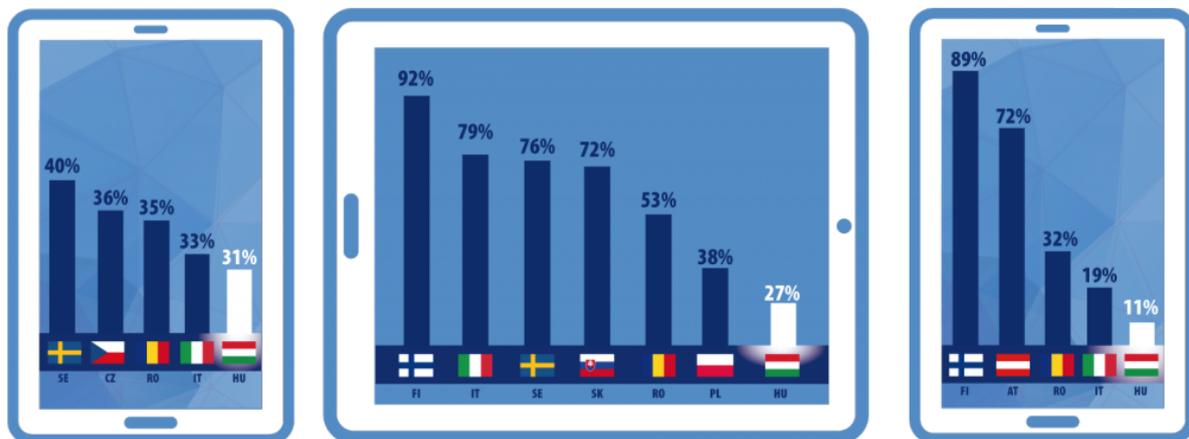
The procurement of computers, interactive whiteboards and other equipments are resolved by tender of the public schools or are covered by their own resources. Many companies offer assistance

to public educational institutions. Among others, the Hyper-School Education Programme of Telenor Hungary Zrt. The study reports that 363 students from fifteen classes of 5 schools had Hipernet-equipped tablet with internet access and Microsoft educational software package and Education Development Institute's learning materials. (Source: [www.hipersuli.hu](http://www.hipersuli.hu))

Opportunities like the Samsung's Smart School, may help both students and teachers to learn more and more about new investigations and methods.

(<http://www.samsung.com/hu/business/solutions-services/industry-solution/education/smart-school>)

## Problems in the use of digital devices



**Digital tools in the classroom    System administrators in schools    Digital learning environment**  
(Source: [www.ivsz.hu](http://www.ivsz.hu))

"Public education is responsible for life education and preparation for employment." In 2015 this educational manifesto was spelled out in the IT Telecommunications and Electronics Enterprises Association (IVSZ). The Association declared that our tools are outdated; there are not enough system administrators, the internet bandwidth is frequently low in the schools, there is a lack of digital contents and teachers do not conform to the digital education. (Source: [www.ivsz.hu](http://www.ivsz.hu))

In the digital educational content services there was a major change since the National Education Portal has been started, which is supporting a complex learning-teaching system. The portal was developed by the Education Development Institute. Interactive exercises, knowledge tests, digital curricula and textbooks will be available on the site. The students, parents and teachers can use it for free of charge for classroom learning, teaching and learning at home purposes. The surface provides an opportunity for the exchange of experiences (Source: [www.portal.nkp.hu](http://www.portal.nkp.hu)) similarly as the Digital Method Collection of the National Agency. (Source: <http://tka.hu/english>)

### 3. New national data about representations of SD themes in national curriculum

To our knowledge there are no changes in Sustainable Development themes present in the national curriculum in 2015.

### 4. Additional national data related to e-learning and ESD

As an initiative of the EMMI (Ministry of Human Resources) the theme of the Week between April 18 and April 22 in 2016 will be carried out about Sustainability. (Source: <http://www.dth2016.hu/>)

### 5. New national conclusions and recommendations

The Education Research and Development Institute summed up the results of the public educational development. Teachers and schools are directly supported on a helpdesk operation with more than 700 expicients, which are dedicated to help the introduction of different subjects with new content elements or the appearance of a major change.

(Source:[https://educatio.hu/projektjeink/tamop311\\_2szakasz/eredmenyek/m\\_learning](https://educatio.hu/projektjeink/tamop311_2szakasz/eredmenyek/m_learning))

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## Romania Country Report Update for 2015

Prepared by Mihai Enescu

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### 1. New national data concerning technical capacities for e-learning

In 2014, more than half (54.4%) of households in Romania had access to the Internet network at home; the majority (70.9%) of these were concentrated in urban areas. The regions with the highest percentages were București-Ilfov (76.7%), West (61.3%) and North-West (58.3%), while the regions with the lowest percentages were South-Muntenia (46.1%), South-West Oltenia (47.1%) and North-East (48.3%), respectively (INS, 2014a).

In 2015, according to National Institute of Statistics, more than 61% of households from Romania had access to the Internet (Capital, 2015). Regarding the internet broadband connections from fixed points, in June 2015 there were 4.1 million connections, with 0.5 million more compared with the situation from 2 years ago, June 2013, namely 3.6 million connections (ANCOM, 2015).

In 2014, according to statistics provided by National Institute of Statistics, there were 727.072 students enrolled in high school (15-19 years old) and there were 115.894 PCs (105.026 in urban area and 10.868 in rural area, respectively) (INS, 2014b). This means that there is 1 school computer available to 6.27 students.

According to OECD Teaching and Learning International Survey (TALIS), in Romania around 26% of teachers used, in 2013, ICT for students' projects or class work (European Commission, 2015b).

However, there are differences regarding the usage of ICT in rural versus urban areas. For example, according to a study done for 108 schools from rural area, the percentage of using ICT in class work is below 25% (Novak et al., 2015).

Regarding ICT infrastructure, Romania is considered to have 'Digitally developing schools', with relatively low levels of equipment, low classroom Wi-Fi provision and services hosted in school. Regarding IT Advisor, almost all of them have a qualification in ICT (Blamire & Colin, 2015).

The main way of financing technical equipment is budget allocation from the Ministry of Education and Scientific Research.

### 2. New national data about teachers' and students' ICT use

There are several introductory and/or advanced ICT courses dedicated to teachers, organized by Teacher Training Centre (e.g. Teacher Training Centre Prahova (CCDPH, 2015)) or by different universities (e.g. platform e-mentorat.ro (E-mentorat, 2015)), most of them being developed on Moodle platform.

In Romania, ICT is part of the initial education of all teachers, "Computer-Assisted Instruction" being a mandatory subject in Initial Teacher Training courses (Valtin et al., 2015). In some cases, like in Bucharest, the Teacher Training Centre is organising courses about education for sustainable

development, which are accredited by the Ministry of Education and Scientific Research (CCDB, 2015). Another example, is Teacher Training Centre from Bacău which started to implement to course “Integrating ICT in educational process”. The course was developed in the European educational system framework, according to Europe 2020 Strategy (Tribuna Învățământului, 2015).

According to school curriculum for 11<sup>th</sup> grade for the subject ICT, the focus is given to general competences, such as using general documentation techniques, using ICT in documentation and cooperation, and applying the knowledge acquired for a project (MESR, 2015a).

Moreover, at the end of high school, students' ICT skills are assessed in the bacalaureate exam.

In secondary and high schools, except ICT lessons, generally the teachers are not using the computers due to the fact that they are located in an IT room and they usually don't have access in that room. This finding is based on information we received from teachers that we have worked with on various projects.

### **3. New national data about representations of SD themes in national curriculum**

In 2015, the Ministry of Education introduced an optional subject for secondary schools, called “Education for development”. This course proposes an inter- and trans-disciplinary approach of issues such as globalization, development / sustainable development and global citizenship (MESR, 2015b).

The key themes of SD are integrated in disciplines such as Environmental Knowledge, Nature Sciences, Civic Education, History, Biology, Geography, Technologic Education, Sociology, Philosophy, Economy, Applied Economy, Entrepreneurial Education, Civic and Entrepreneurial Culture. In the optional national curriculum we can also find Financial Education, Make – up your environment, Project management, Ecology and Environmental Protection, Intercultural education, European Education (SESD National Implementation Report 2014).

In Romania, around 59% of students go to a school where there is a specific strategy to support teachers' collaboration as well as time allocated to it (European Commission, 2015a). Usually, the SD themes are interconnected in related subjects, such as Biology and Geography or Counseling and Civic Education.

### **4. Additional national data related to e-learning and ESD**

Starting from 2015, as it was abovementioned, there is a new optional subject related with SD.

Also, in the new adopted National Strategy on Climate Change and Economic Growth based on Low Carbon Emissions (MMAP, 2015a) and National Action Plan on Climate Change (2016-2020) (MMAP, 2015b) there are references to Education for Sustainable Development.

## 5. New national conclusions and recommendations

By introducing the optional subject “Education for development” and by promoting several courses dedicated to ICT and SD by the training centers within different structures of the Ministry, we believe that significant steps were done in this direction.

The problem remains in rural areas, where the ICT infrastructure is not so well developed.

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## Serbia National Report Update for 2015

Prepared by Danka Purić and Nataša Simić

University of Belgrade, Faculty of Philosophy, Institute of Psychology, Belgrade

### 1. New national data concerning technical capacities for e-learning

According to the Statistical Office of the Republic of Serbia from 2015, 63.8% of the population are internet users.

### 2. New national data about teachers' and students' ICT use

The document *Subject Curriculum Framework – mandatory subjects in general secondary education* (2015) recognizes the use of ICT as an important learning outcome for a number of high school subjects (computer science, psychology, philosophy, history, music culture, physical education...). The *National Curriculum Framework – Foundations of Learning and Teaching* (2015) defines ICT as a type of literacy and recommends its development through diverse subject teaching.

*National Curriculum Framework – Foundations of Learning and Teaching: Guidelines for application* (2015) lists several examples of good practice in the domain of ICT use, but no statistical data as to the percentage of students / teachers actively using ICT in regular daily activities.

The Catalogue of Teacher Trainings of the Institute for Improving Quality of Education for school years 2014/15 and 2015/16 defines ICT as both a teaching competence teachers should possess and as one of priority fields in teacher professional development (for a period for three years), as defined by the Minister of Education and Science of the Republic of Serbia.

In February 2015, a Conference and Fair on Information and Communication Technologies in Education was organized for the second year in a row. This event has the goal to improve the quality of the education in Serbia and is organized by the British Council, supported by a number of other partners. Over 2500 individuals and over 40 educational institutions visited the event and 52% of participants showed interest in e-learning topics.

### 3. New national data about representations of SD themes in national curriculum

In June 2015 a proposal of the *National Curriculum Framework – Foundations of Learning and Teaching* was created and within this document attuned visions of education, economic development and educational policies are put together in the context of the national curriculum (*National Curriculum Framework – Foundations of Learning and Teaching*, 2015, p.7). This document highlights the need of educational system to support development of competencies related to the care for world cultural heritage and environment and to promote values related to the concept of sustainable development (p.15). On the basis of international and national policy documents a list of inter-subject competencies for the end of secondary education was created and several

competencies are related with SD – responsible participation in the democratic society, responsible relationship to one’s own health and responsible relationship to the environment.

In the document *Subject Curriculum Framework – mandatory subjects in general secondary education* (2015) a list of goals and outcomes of all mandatory subjects in secondary schools is provided. For the purpose of this review, we analyzed this document, i.e. searched for the concepts and values that reflect ESD in relevant subjects taught in secondary schools.

For the foreign languages the topic of SD is not foreseen by the document – among the goals only the need for openness toward other cultures is mentioned and among outcomes – sensitivity to the context of communication is noted. The goals of the subjects Constitution and civil rights and Sociology (both taught for only one year in schools) reflect the values of ESD (mostly social and political component), among others – obtaining knowledge on democratic governing and making capable of active participation in the democratic and multicultural society. In the list of outcomes, SD is explicitly mentioned and almost all outcomes are related to ESD – e.g. [students are able to] assess the role of international organizations for the development of democratic relations and world peace preservation, critically estimate different aspects of globalization, express opinion on global ecological problems, propose ways of improving social equality, etc. In line with the curriculum for Geography, set by the Ministry of education, science and technological development, in the *Subject Curriculum Framework*, goals and outcomes closely related to SD are presented, among others – [students are able to] understand the impact of social factors on the level of economic development of different regions in the world, recognize factors that influence migration and structures of the population in the world and uneven demographic development, understand the importance of sustainable use of natural resources, etc. Similarly, the subject Biology explicitly addresses the concept of SD and many outcomes for all grades reflect ESD aspects – e.g. [students are able to] estimate human influences on ecosystems, interpret the influence of unhealthy life styles on health and development of physical illnesses, participate in protection of environment, etc. In the following subjects SD is only mentioned in one or two of the outcomes – in Physics it is foreseen that students are able to realize advantages and disadvantages of the use of different energy resources and understand the problems related to the use of nuclear energy in the context of sustainable development; in Chemistry – [students are able to] analyze the relationship between chemical scientific principles and technological processes and describe how chemical production influences individuals, society and environment, or critically realize the influence of organic compounds to life standard and environment.

There is a trend that SD is mostly present in the last (fourth grade) of secondary education and predominantly in social sciences, Biology and Geography and only sporadically in other subjects that should also address this issue (e.g. Chemistry, Physics, Computer science). In comparison to the Curricula set by the Ministry of education, science and technological development several years ago, the new Framework foresees even less time for the elaboration of the topic SD within individual subjects. However, it promotes realization of integrative, interdisciplinary classes when it comes to the topics such as SD. In the *Guidelines for application* (2015) of this Framework attention is predominantly paid to the strengthening of teachers’ capacities to provide positive climate for learning in general (to use cooperative and problem oriented methods, organize both remedial classes and classes for gifted students, encourage self-regulation among students, use portfolios for student’ assessment, promote inclusive values and lifelong learning etc.). The values of ESD are

embedded in the section on the ways of promotion inclusive education and lifelong learning. The positive change, compared to previous documents, represents the provision of specific guidelines regarding teaching methods and classroom activities and the concrete examples of the elaboration of different aspects of SD in schools – brief scenarios of the lessons such as Life at home according to the principles of SD, Many small savings = Big saving, and Customs of families of different nationalities. Through these examples of the lesson scenarios, which also promote interdisciplinary approach, teachers can get ideas how to organize their classes in order to promote ESD values.

#### 4. New national conclusions and recommendations

We can conclude that curricula for individual subjects do not promote the issue of SD as more relevant than few years before, but that the policy makers recognize the integrative and interdisciplinary nature of ESD. There are some improvements in the practice, i.e. recognition of the importance of ESD among teachers, though those teachers who are the most skilled, motivated and willing to cooperate with their colleagues who teach other subjects. Since ESD requires additional work and interdisciplinary approach, the concern that only small proportion of teachers will discuss the issue of SD remains. Therefore we believe it is recommendable to make SD more visible within individual subjects, on one hand, and to reward those teachers who engage in additional teamwork trying to teach students ESD values, on the other.

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## Slovakia Country Report Update for 2015

Prepared by Zuzana Štefániková and Marta Jendeková

AINova, Svätý Jur

### 1. New national data concerning technical capacities for e-learning

The number of PCs and other ICT equipment in schools has increased. The number of internet connections in schools has grown, as well as the number of faster connections. (*Annual Survey of ICT in Schools in 2014, IIP 2014, p.1*). The same is true about the households and internet connection (from 78% in 2013 to 79% in 2015) (Eurostat 2015). The number of teachers who use ICT in teaching process regularly has grown. The number of e-learning courses is not statistically collected. Technical staff for ICT in schools are teachers who, above their regular tasks, take care also of the equipment. The number of informatics teachers, and the number of qualified teachers of informatics has also grown.

Comparing the data in 2013 and 2014, the number of informatics teachers, and the number of qualified teachers of informatics has also grown (IIP 2013, IIP 2014).

The school budget lines for ICT are mostly spent on running costs and not purchasing new equipment. The rate of acquiring new ICT is 3 %. New ICT equipment is purchased mainly through various EU funded projects. (IIP 2014, p. 2)

### 2. New national data about teachers' and students' ICT use

The teachers' ICT competencies have increased, more teachers report that their level has changed from basic to intermediate level. The number of participation in various international cooperation projects has increased considerably, from 604 in 2013 to 957 in 2014. (*IIP 2014*). It is difficult to get data on changes in pre-service teacher education. Based on policy documents, for example the *Strategy for Informatisation and Digitalisation of the Education Sector by 2020*, there is certainly an ambition to do so. In-service teacher education is based on the demand from teachers. The Methodology and Pedagogy Centres offer accredited courses for teachers on use of ICT in teaching in general, and specifically for using ICT in some subjects.<sup>145</sup> The application of ICT in teaching of social science subjects has increased. (IIP 2014, p. 2)

According to the school inspection, the teachers do not use fully the potential of ICT in teaching and do not develop digital competencies of pupils, leaving them often as just passive observers. The situation was better in teaching English, Russian, biology, physics, geography, mathematics and physics where also the digital content was used. (SSI 2015, pp. 25-28)

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<sup>145</sup> The courses are listed at <http://www.mpc-edu.sk/vzdelavacia-cinnost/akreditovane-vzdelavacie-programy>

### 3. New national data about representations of SD themes in national curriculum

Apart from the national curriculum documents, each school year there is published a document with pedagogical-organisation instructions for a given year. *The Pedagogical-organisation instructions for schools in academic year 2015/16* in harmony with principles of the *National Strategy for Global Education 2012-2016* contain chapter on Environmental and Global Education and this chapter says that the schools shall: **(i)** apply global relationships and global dimension in the education content; **(ii)** raise awareness of pupils and students and educate them with the emphasis on understanding of global interlinkages of events, development and problems on local, regional, national, and international levels; **(iii)** increase the knowledge of students about global themes and lead them to critical thinking about social, environmental, economic and political processes in the world; **(iv)** use the materials published at [www.globalnevdzdelavanie.sk](http://www.globalnevdzdelavanie.sk) as inspiration for including global education into various subjects; **(v)** use the methodological guidebooks for Global Education prepared for secondary schools in teaching of mathematics, geography, civic education, arts and music classes.

Further on, environmental education should become a part of personal development of students; schools are recommended to cooperate with environmental centres and non-government organisations active in this field and to participate in international environmental projects. Schools are also recommended to create a position of coordinator for environmental education to implement the environmental programme of the school. (POIS 2015/2016, 2015, pp. 11-12)

There is the cross-cutting topic „environmental education" included in the national curriculum. The content of „environmental education“ was elaborated in 2009, however it takes into account also **education for sustainable development and cultivation of values and attitudes of students towards global environment.**

It seems that also the *National Strategy for Global Education for 2012-2020* provides an umbrella for topics related to broader understanding of sustainable development (globalisation and mutual interconnectedness, global problems and development cooperation, multiculturalism, environment, human rights) (NSGE, 2012, p. 10). Its implementation is in hands of the Ministry of Education, Ministry of Foreign Affairs as well as NGOs. NGOs have thus brought several new topics to schools, e.g. poverty, fair business, change of climate, sustainable development, children's rights. NGOs are focused on training of teachers, preparation of guidebooks<sup>146</sup>, didactic materials, videos, interactive exhibitions, workshops with students, etc.

The National Strategy for Global Education is further developed in documents related to development cooperation policy - the *Mid-term strategy for development cooperation of SR for years 2014-2020* and its annual programmes. There is always an action plan for global education included. According to these documents, the topics of global education shall be included into teaching at all levels of education, also in teacher pre-service and in-service training. There is also a

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<sup>146</sup> Globálne vzdelávanie vo vyučovaní predmetu anglický jazyk/dejepis/ geografia/občianska náuka/umenie a kultúra na stredných školách, OZ Človek v ohrození, 2015. Global Education in teaching of English/History/ Geography/Civic Education/Arts and Culture at secondary schools. Civic Association People in Peril, 2015

number of awareness raising activities for public planned and completed. (Focus of bilateral development cooperation of Slovakia for 2016, p. 17-19.)

It is stated already in the National Strategy for Global Education that teachers have applied the topics of global education in the subjects such as **civic education, theory of society, ethics, geography, as well as art classes**. At some schools students were involved in project based education or extracurricular activities. Some schools have created a specific subject focused on **global education**. (NSGE 2012, p. 5) In the framework of Global Education already mentioned new guidebooks for teachers of secondary education were published by NGOs in 2015 helping teachers to apply this topic in various subjects.

Environmental education is reflected in subjects such as: biology, chemistry, physics, history, geography, civic education, languages, etc.<sup>147</sup>

Concerning preparation of teachers for ESD, in 2015 the Methodology and Pedagogy Centres (Institution for In-service Teachers' Education and Training) in Slovakia offered to teachers continuing education related to environmental and global education, such as Human rights, Environmental education, Multiculturalism, Global development education, Environmental ethics, Inclusive education, Geography, Global education and its application in practice, Citizenship. We can assume that these topics have been incorporated by the trained teachers into the educational process.<sup>148</sup>

As a learning outcome concerning SD, the understanding of environmental issues in global context is expected. Making interconnections between the subjects is recommended, and it depends on the individual school.

### 3. Additional national data related to e-learning and ESD

There was no new legislation related to ESD adopted in 2015, however ESD has got important position in 3 documents that were issued and that support ESD. The *National strategy related to youth in the Slovak Republic for years 2014-2020*. Its strategic goal (1) Motivation for global themes focuses on measurement of quality and impact of global education in formal and informal education. Principles of global education should be incorporated into the education and training of volunteers working with youth as well as future pedagogical workers. The task is to develop key competences of youth by support of activities within GE. (NSRY 2014-2020, p. 7) Further, ESD was discussed in *Pedagogical-organisation instructions for schools in academic year 2015/16* (POIS 2015/16/, 2015, pp. 11-12); and in the *Midterm strategy for development cooperation of SR for years 2014-2018*, (MSDC, 2013, p. 2).

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<sup>147</sup> <http://www.statpedu.sk/clanky/statny-vzdelavaci-program-svp-pre-druhy-stupen-zs-prierezove-temy/environmentalna-vychova>

<sup>148</sup> These courses for teachers are listed at the web page of MPC, <http://www.mpc-edu.sk/vzdelavacia-cinnost/akreditovane-vzdelavacie-programy>

## 4. New national conclusions and recommendations

We can see the shift in considering ESD as an important part of educational process by the relevant stakeholders (Ministry of Education, Methodology and Pedagogy Centres, schools). Environmental education is present in the national curriculum and inclusion of global education topics is recommended.

From the implementation of Environmental and Global education into the educational process of pupils and students in Slovakia it is clear that the relationship between the content of these two subjects is not sufficiently defined. It seems that Global education is more understood as a topic related to societal problems of sustainable development, and Environmental education is rather related to sustainable development in natural science subjects.

There is still the need to foster the use of modern information, communication and digital technologies and develop the necessary skills, to make the existing digital content available through the fast and safe internet connections. The use of digital content is perceived as insufficient.

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## **Appendix 6: Country Reports Update for 2016**

### **Austria Country Report Update for 2016**

**Prepared by Christine Lechner  
Pädagogische Hochschule, Tirol**

#### **1. New national data concerning technical capacities for e-learning**

No recent amendments\*.

#### **2. New national data about teachers' and students' ICT use**

No recent amendments\*.

#### **3. New national data about representations of SD themes in national curriculum**

In vocational schools for apprentice training "environmental education" is not anchored in the curricula at all. In these schools there is an emphasis on ecological projects in some areas - but this is purely voluntary. Overall, the only development is a commentary on history and citizenship education, which is brand-new coming into force with the beginning of this school year. Environmental history is mentioned here.

#### **4. References**

Note: \* I have checked through curricula for the general school types in Austria, i.e. Primary & general Secondary. There have been no recent amendments. The latest amendment at Primary level was 2012, all other general education curricula have been in force since 2004. As we have so many different types of schools and dozens of curricula, I spoke to different people such as inspectors and also those responsible for ÖKOLOG. There is nothing new.

## Bulgaria Country Report Update for 2016

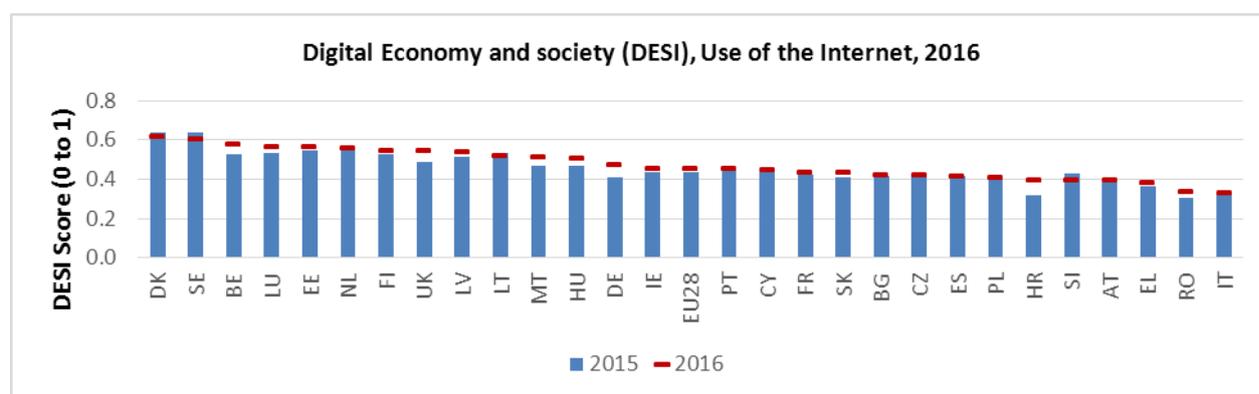
Prepared by Mimi Videnova, Antoaneta Fitneva and Sonya Vuchkova

73 SOU “Vladislav Gramatik”, Sofia

### 1. New national data concerning technical capacities for e-learning

Use of Internet Services by European Citizens is captured by DESI. The Digital Economy and Society Index (DESI)<sup>149</sup> is a composite index that summarises relevant indicators on digital performance of EU Members.

According to the dimensions of DESI, Bulgaria, Cyprus, the Czech Republic, France, Greece, Hungary, Poland and Slovakia falling behind the EU average and their development over the last year was slower than that of the EU as a whole. By showing such a slow growth they are distancing themselves further from the rest of the EU. Bulgaria needs to address its severe digital skills gap. Based on main indicators Internet usage is the dimension where Bulgaria performs the best. Bulgaria ranks 19<sup>th</sup> among EU countries.



The Common Assessment for Bulgaria is an increase compared to 2015, which it occupies the 27<sup>th</sup> place in the ranking by DESI. High-speed broadband is available for almost 72% of households in Bulgaria, but in rural areas there is no high-speed coverage. Only 55% of Bulgarian households subscribed to a fixed broadband connection, and half of them use broadband (10<sup>th</sup> place in the EU). Bulgaria needs to improve the acquisition of skills for working with digital technologies. Bulgarian Internet users are among the leaders in the use of services for video calls (first place) and social networks (sixth place), but it seems refrain from banking and shopping online. Despite some

<sup>149</sup> Digital Economy and Society Index (DESI) - [http://europa.eu/rapid/press-release MEMO-16-385\\_en.htm](http://europa.eu/rapid/press-release_MEMO-16-385_en.htm)

progress in the use of digital technologies in Bulgarian public services has great potential for its improvement.<sup>150</sup>

## **2. New national data about teachers' and students' ICT use**

According to the Plan for implementation of the Strategy for the effective implementation of ICT in Education 2015-2017<sup>151</sup> by the Ministry of Education and Science are structured several key major projects that outline the general plan of action:

- Training of teachers and students by means of ICT;
- Creation of electronic content;
- Implementation of systems for management, monitoring and control;
- Building a unified IT backbone network and cloud infrastructure.

Work Plan continues as it has a two-year extension. Part of the short-term objectives have been met and we expect the official report of the Ministry of Education for their realization.

## **3. New national data about representations of SD themes in national curriculum**

With the adoption of the new Law on pre-school and school education were developed new curricula. The presentation of these programs/curricula to the general audience is imminent. But the Republic of Bulgaria, as a member of the EU should contribute to smart, sustainable and inclusive growth by creating conditions and prospects for achieving the objectives of the strategy Europe 2020. Therefore, the priorities in education are aimed at implementing the key strategic objectives. It suggests that the principles of sustainable development will be set in most of the new curricula.

## **4. New national conclusions and recommendations**

Although Bulgaria's efforts in recent years have been aimed at reforms in education, some activities do not meet the targets which they are oriented. We can make some recommendations, based on our researches and observations.

For many years in Bulgaria were introduced subjects Informatics and Information Technology. These subjects acquaint students with basic concepts of ICT and create prerequisites and interest of students towards digital technology in general. It is known that Bulgarian IT specialists are well accepted in high-tech companies around the world and not only. Meanwhile Informatics classes are removed from the curricula of comprehensive schools and classes of Information technology are considerably reduced. These measures have been taken in order to integrate IT into other subjects,

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<sup>150</sup> European Commission > Digital Scoreboard > Bulgaria, “.Index DESI penetration of digital technologies in the economy and society for 2016 profile by country: Bulgaria”- [https://ec.europa.eu/digital-single-market/en/scoreboard/bulgaria#\\_ftnref2](https://ec.europa.eu/digital-single-market/en/scoreboard/bulgaria#_ftnref2)

<sup>151</sup> Plan for implementation of the Strategy for the effective implementation of ICT in Education 2015-2017 - [www.mon.bg/?h=downloadFile&fileId=7215](http://www.mon.bg/?h=downloadFile&fileId=7215)

following European trends. But results from recent years show quite different conclusions. Our recommendation is to preserve the status quo of these subjects in general education.

Also, despite the active involvement of Bulgaria in a variety of European programs and implementation of activities provided by them, the emphasis on Sustainable development is not at the desired level.

Presenting our project among decision makers and stakeholders, we hope to influence these factors positively.

As whole, although the data included in the official sites of the European Commission not placed Bulgaria in the top positions on the use of Internet and mobile communications, or distribution of communication devices among the population, practical observation show that innovative practices gaining ground fast in the Bulgarian schools. And if they facilitate and improve the work of teachers and students continue to be used.

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**Note:** The main researches about National capacities for e-learning we made using official information published on the European commission website for Commission priority on the Digital Single Market. "The Digital Economy and Society Index (DESI) is a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU member states in digital competitiveness." The DESI 2016 summarises data collected of EU members. Some of information is based on EU Education and Training Monitor - an annual publication that captures the evolution of education and training in the EU. At the national level, information gathered primarily from the website of the Ministry of Education and Science.

## Croatia Country Report Update for 2016

Prepared by Željko Marčan  
Aquilonis, Zagreb

### 1. New national data concerning technical capacities for e-learning

No changes or new data

### 2. New national data about teachers' and students' ICT use

No changes or new data

### 3. New national data about representations of SD themes in national curriculum

No changes or new data

### 4. Additional national data related to e-learning and ESD

No changes or new data

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## Germany Country Report Update for 2016

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### 1. New national data concerning technical capacities for e-learning

The curricula at vocational schools haven't changed concerning their focus on e-learning. As mentioned in the last report update in 2015, there is the "tablets" project still going on. Even more schools joined the project to establish tablet classes in their schools; even general education schools are following this trend.

The tablets project development and testing of digital lesson scenarios. Over 5,000 students will learn with digital support in the near future. In several pilot projects the usage of tablets in school lessons is being tested at the vocational schools in Baden-Wuerttemberg. After the project start in 2015/16 at the Vocational Gymnasiums another perennial pilot project was put up in the dual education in cooperation with the training companies. With the tablet project at Vocational Gymnasiums, Baden-Wuerttemberg is the only state in Germany with a project of this kind and size nationwide (tabletBS, 2016).

Consequently there is also a rapidly growing demand for further training in the field of tablet usage in school lessons. Especially the main subjects such as German, Foreign Languages, Mathematics and professional specific subjects (Technology, Economics, etc.) are of great interest for the mentioned schools.

### 2. New national data about teachers' and students' ICT use

No changes.\*

### 3. New national data about representations of SD themes in national curriculum

No changes.\*

### 4. Additional national data related to e-learning and ESD?

One part of the ICT concept of the educational system in Baden-Wuerttemberg is based on the strategy "Education in the Digital World" of the KMK (Kultusministerkonferenz - Standing Conference of the Education Ministries).

This strategy implies the expansion of existing and new teaching and learning trainings and their embedding in the curricula. The initial and further training of teachers should focus on implementing digital media in learning scenarios sustainably - in all phases of education.

For the success of this digital strategy the access to a supportive IT structure for learners and teachers is a necessary condition (KMK, 2016).

Another even more important role in the ICT concept of Baden-Wuerttemberg plays the new coalition agreement of the new state government of Baden-Wuerttemberg, led by the coalition of the two parties BÜNDNIS 90/DIE GRÜNEN (Green party) and CDU (Christian Democratic Union). The strategy introduced “DIGITAL@BW” prepares for the challenges of digitalization.

The preparation of students at vocational schools for the manifold challenges of a digitalized world of work “Industry 4.0” according to the technical development. This approach requires the enforcement of IT lessons from class 7 on and consequently an adequate initial and further training of teachers in this field of profession.

The projects *tabletbs* and *learning factory 4.0* are part of this strategy and shall be consolidated (p. 30).

As industry location and high-tech-state junior employees are fundamental especially in technical professions. Broadband connections at schools, digital lesson media and the work in the educational cloud with learning contents and programming environments are to be a standard at the schools in Baden-Wuerttemberg (gruene, 2016, p. 19).

“Media competency is a central prerequisite for a successful life plan in a digital era.” Important topics of media competency include the use of classical and new media services, the assessment of chances and risks, action knowledge concerning consumer and data security and also the active media production. “Digital education will be part of a modern general education.” Thus the state government plans to establish a safe digital educational platform that functions on the one hand as a saving space for teaching and learning materials and on the other hand as a digital teaching and learning space that is available for all teachers and learners in the state. Individual support will be made easier in this way as the e-learning programmes will be tailored to the individual needs. The state government plans to support the schools in Baden-Wuerttemberg by equipping them with digital technologies (gruene, 2016, p. 32).

Concerning ESD the coalition agreement foresees also a separate strategy.

The state government plans to develop a common strategy “Education for Sustainable Development” that activates and qualifies young people and adults for topics of sustainability. A sustainability network platform will be built to link and consolidate the voluntary sustainable engagement in Baden-Wuerttemberg (gruene, 2016, p. 32).

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Note -\*:

- There are only a few official and thus reliable sources for data concerning the requested topics.
- The main data for national and regional data involving any field of public life are surveyed by the German Federal Statistical Office and the 16 State Offices.
- The second main source for regional data is the Ministry of Education Baden-Wuerttemberg that regularly surveys relevant data in the field of education and youth.
- These sources are customarily surveying data once a year (in retrospect of the last year) depending also on the demand and the developments in the surveyed field of interest.

## 1. New national data concerning technical capacities for e-learning

In Hungary 73% of households have internet connection. 72.4 % of them have broadband internet connection (source: [www.ksh.hu](http://www.ksh.hu)).

The national reform programme of Hungary declare that our broadband internet coverage should have been realized in the whole country by the end of 2018. 1 million households will have super-fast internet (National Reform Programme 2015 of Hungary).

As part of the European Commission's eLearning program, the Central Support Service, eTwinning continues the collaboration with 30 European ministries within the framework of the European Schoolnet Hungary (<https://www.etwinning.net/en/pub/about.htm>). Free use of the system is confirmed through the use of information and communication technologies for teachers, head teachers, librarians and others in order on-line development.

The eLEMÉR assessment tool will continue to provide assistance to the development of educational work of the schools by providing technological solutions (<http://ikt.ofi.hu/english/>).

According to PISA study 74.4 % of students are using computers in school (source: Students, Computers and Learning: Making the Connection; OECD; 15th of September, 2015) In Hungary more than 524 067 student are able to use ICT applications in 2485 secondary school in Hungary (See next figures - data were updated in August, 2016 available on website of the Central Hungarian Statistical Office).

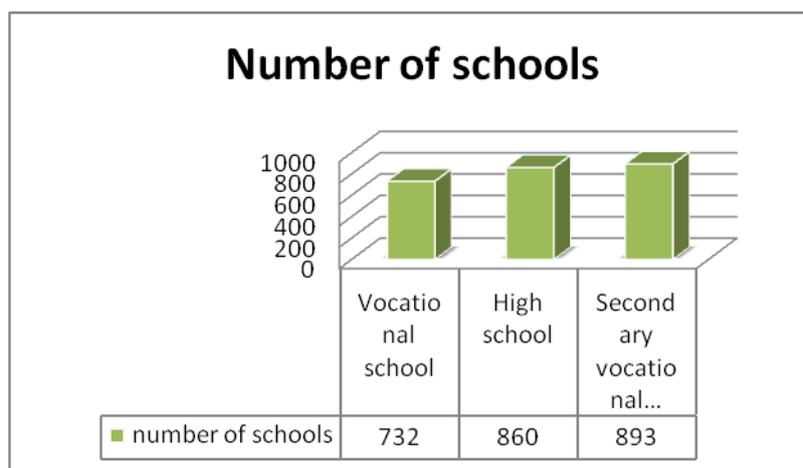


Figure 1 (source: [www.ksh.hu](http://www.ksh.hu))

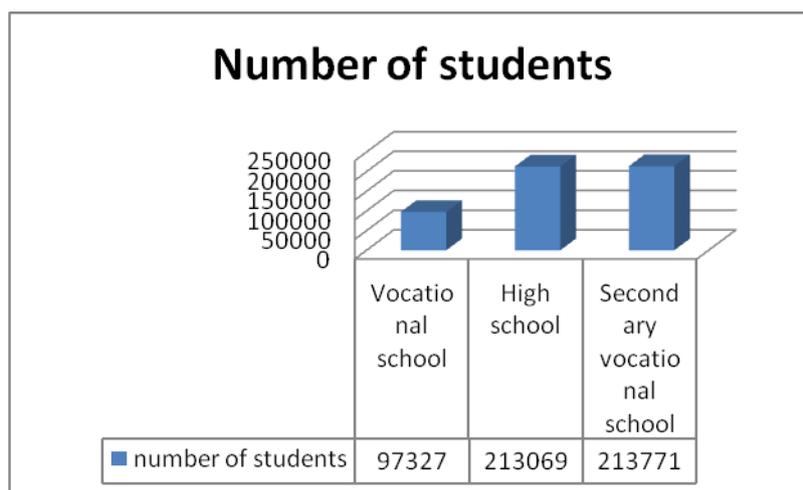


Figure 2 (source: [www.ksh.hu](http://www.ksh.hu))

## 2. New national data (in 2015) about teachers' and students' ICT use

Working Group on Digital and Online Learning works continuously to open educational materials, local and national educational websites, developers and service providers display innovative learning serving (source: [www.ofi.hu](http://www.ofi.hu)).

Hungarian students and teachers will also have opportunities to be trained in the framework of Human Resources Development Operational Programme. It is possible to invest in the development framework (contribution are 2,612,789,000 € in the whole European Union) which serve to lifelong learning ( data from Human Resources Development Operational Programme 2014-2020).

## 3. New national data about representations of SD themes in national curriculum

The Curriculum Framework for high schools (Annex 4 of EMMI regulation 11./2016, Ministry of Human Resources) specify objectives and tasks with expanded, new contents. In summary: students have to understand the various factors that hamper sustainability and sustainable development. They have to be gradually able to understand and interpret certain global issues as well as the correlations between local and individual lifestyles. Students need responsibility in making their own way of life with regard to sustainability criteria. It is crucial to understand the importance of international cooperation in relation to sustainability.

## 4. Additional national data related to e-learning and ESD?

As an initiative of the EMMI (Ministry of Human Resources) the theme of the Week between April 18 and April 22 in 2016 were devoted to the Sustainability (source: <http://www.dth2016.hu/>).

Since the emergence and spread of the "Industry 4.0" it is harder to harder to find IT specialists for the IT companies. In other sectors there is also an increasing labor shortage of IT tools. The main objectives of the strategy are creating the possibility of actually spreading digital literacy at all levels

of the education system, helping to increase the competitiveness of Hungary. The DOS (Digital Educational Strategy) covers the entire Hungarian education and training system: it appears as well in public education, vocational training, higher education and in adult learning (source: <http://ivsz.hu/oktatas/digitalis-oktatasi-strategia/>).

## 5. New national conclusions and recommendations

According to the summary of Humusz Association (who held a forum on the role of NGOs in the field of environmental education) the followings are recommended. The basic principles of environmental sustainability aspects should integrate in all level of educational programs and subjects as a breakdown in order to promote environmental awareness (source: [http://www.humusz.hu/sites/default/files/Dokumentumok/gyerekoktatas/korny\\_nev\\_ajanlas.pdf](http://www.humusz.hu/sites/default/files/Dokumentumok/gyerekoktatas/korny_nev_ajanlas.pdf)).

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Links:

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[www.ikt.ofi.hu/english/](http://www.ikt.ofi.hu/english/)

[www.ofi.hu](http://www.ofi.hu)

<http://ivsz.hu/oktatas/digitalis-oktatasi-strategia/>

## 1. New national data concerning technical capacities for e-learning

In 2015, 61% of households in Romania had access to the Internet network at home; the majority (66.9%) of these were concentrated in urban areas. The regions with the highest percentages were București-Ilfov (78.1%), West (70.7%) and North-West (67%), while the regions with the lowest percentages were South-Muntenia (54.8%), South-West Oltenia (54.4%) and North-East (55%), respectively (INS, 2015a). Regarding the internet broadband connections from fixed points, in 2016 in Romania 89% of households were connected to fixed broadband, comparing with 97% EU average.

Coverage of next generation access (NGA) network (with speeds of more than 30Mbps) is estimated at 72% of homes covered, similar to the EU average. In terms of take-up, the number of subscriptions to fast broadband is among the highest in the EU (63% of fixed broadband subscriptions are above 30Mbps as opposed to only 30% in the EU) (EDRP, 2016).

In 2015, according to statistics provided by National Institute of Statistics, there were 673,715 students enrolled in high school (15-19 years old) and there were 115,990 PCs (105,467 in urban area and 10,523 in rural area, respectively) (INS, 2015b). This means that there is 1 school computer available to 5.8 students.

A national study done in 2016 by GfK (market sondaj) shows that in rural areas: - 95% of the schools are connected to internet, but the connection is used only for administrative purposes; 90% of the schools have an IT lab but only 50% are connected to internet; and only in 75% of the schools equipment is in use (Fundatia Orange, 2016).

## 2. New national data about teachers' and students' ICT use

The GfK study for rural areas also shows that 63% of teachers have an open attitude regarding the use of new technologies in the classroom, even that their experience teaching digital literacy is very low, mainly due to lack of appropriate digital material (such as educational software and digital textbooks). Most teachers surveyed consider that a good solution would be combining teaching method with the modern classic that can provide interactive examples and more easily understood by students.

Regarding the students, the study identified groups relatively equal of familiarity with technology: 32% of children had a high score of tech (they spend on average almost 3 hours a day on the Internet and in 94% of cases they are the most skilled person in the house to work on the computer), 34% an average score of tech, while another 34% had a score of low tech. Overall, 80% of students have internet access at home, and many of them already achieving school activities on the computer. Very often, computer-related activities which they carry on are only for the purpose of relaxation and secondary for educational purpose (Fundatia Orange, 2016).

### 3. New national data about representations of SD themes in national curriculum

No changes.

### 4. Additional new national data related to e-learning and ESD?

The new Romanian National Strategy for Education and Training 2016 – 2020 is considering both topics e-learning and ESD, for achieving the EU average performance in education and training (MECT, 2016).

### 5. New national conclusions and recommendations

Even that the legal frame is enough advanced and has provisions for introducing ICT and ESD in educational process, the level of implementation is pretty slow and the discrepancies between urban and rural areas are pretty high (UNECE, 2015).

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## **Serbia National Report Update for 2016**

**Prepared by Danka Purić and Nataša Simić**

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### **1. New national data concerning technical capacities for e-learning**

The latest information on technical capacities for 2016 issued by Statistical Office of the Republic of Serbia are that 65.8% of households owns a computer and that 64.7% of households have Internet access (RZS Serbia, 2016).

### **2. New national data about teachers' and students' ICT use**

At the beginning of 2016 there were 42 accredited University programs for online learning (KAPK, 2016), which is 83% more than in 2014 and 23% more than in 2015, which reflects the increased recognition of the potentials of and need for e-learning among Higher Education Institutions.

The Ministry of Education, Science and Technological Development has started several initiatives directed toward ICT development. One of them is the program Open Method of Coordination in Education and Training – republic of Serbia, which includes digital and online learning as one of its important aspects (Ministry of Education, Science and Technological Development, 2016a). The Ministry has also introduced the possibility for school principals to propose some system changes (e.g. educational profiles in their school) via online application (Ministry of Education, Science and Technological Development, 2016b), which further points to policy makers' awareness of the relevance of the use of new technologies in different aspects of education. Finally, the Ministry is working on creating the infrastructure necessary for successful ICT implementation in educational and scientific institutions (Ministry of Education, Science and Technological Development, 2016c).

In February 2016, a Conference and Fair on Information and Communication Technologies in Education was organized for the third year in a row, with over 60 exhibitors, 60 lectures and 4000 guests, which is far more than in the previous years (British Council, 2016). Besides this conference, in February 2016 the conference Trends of development was organized for the 22nd time by University of Novi Sad, with the focus on New technologies in teaching this time (Trend, 2016). We can conclude that there is an overall recognition of the issue of ICT use in teaching and learning among scientists and practitioners.

### **3. New national data about representations of SD themes in national curriculum**

There have been no changes in the National Curriculum (Institute for the Advancement of teaching and education, 2016).

There are several ongoing small-scale projects and initiatives dealing with ESD, realized by the organisation Ambassadors of SD and environment (2016). More than 60 schools from Serbia have participated in the international program Eco-schools, initiated by this organization. One should also mention an Eco-quiz for students, realized in February 2016 and the event Education for Sustainability: Eco-schools and young eco-reporters, realized in September 2016 by the same organization.

#### 4. Additional new national data related to e-learning and ESD

A working group for definition of changes of secondary schools' curricula in the field of technology and informatics was active during 2016. The main conclusions of this working group were that there is a need for changes of The Rulebook of teachers' class norms (working hours of teachers), that the Professional Guidelines for integration of ICT in different subjects should be created and that the online platform for exchange of teaching materials and examples of good practices should be established (Syndicate Union of Vojvodina Education workers, 2016).

#### 5. New national conclusions and recommendations

The number of isolated initiatives aimed at raising awareness of the SD and importance of ESD is growing. However, system changes have been implemented slower. Changes in the field of ICT use and e-learning are, however, more specific and visible in practice, especially in Higher Education.

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## Slovakia Country Report Update for 2016

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### 1. New national data concerning technical capacities for e-learning

The *Report on the state and level of pedagogical management, process and conditions for education in gymnasia in 2015/2016* states that the inspected schools were equipped with didactic technology including ICT up to 91.3%, which is considered a very high level (SSI 2016).

The document *State educational programme* states that all newly established gymnasia must have a multimedia classroom and the existing schools which do not have it yet must do so within a 5 year period. The multimedia classroom is to be equipped with at least 17 student + teacher PCs with internet connection. Besides the multimedia classroom, there must be at least 36 PC/notebooks in school, internet connection at least in one classroom together with interactive board, data projector and audio/DVD (SPI 2016).

When comparing the data from the *Annual Survey of ICT in Schools* for 2014 and 2015, in general the numbers grew: number of PCs/tablets, interactive boards, data projectors, internet connections, fast connections. Regarding the use of ICT by teachers, there were more teachers in 2015 who used ICT regularly during lessons. Also the level of ICT competences of teachers increased. The number of qualified teachers of informatics increased as well (IIP 2014, IIP 2015).

There is no specific data on the e-learning courses in secondary schools.

However, thanks to nationwide projects financed by EU funds, more digital content becomes available for teachers (ME SR, 2016).

In schools, the usual practice is that one of the informatics teachers takes care also of the basic ICT maintenance. If the school participates in a project providing ICT equipment or new digital content, there is usually also technical support provided.

There are several ways of financing – budget (state), gift, from EU project budgets or other projects. In 2015 (32 122 pieces) there were less ICT items bought than in 2014 (44 250 pieces) (IIP 2015). The biggest difference is in the line of EU project budgets which may be linked to the end of the EU programming period falling to school year 2014/15.

### 2. New national data about teachers' and students' ICT use

For the 2016/2017 school year new content of the subject Informatics was elaborated. Students are led to understanding the key vocabulary, methods and techniques used in work with computer systems. The subject is divided into 5 modules: (i) the information around us, (ii) communication via ICT, (iii) process, solutions, algorithmic thinking, (iv) principles of ICT functioning, (v) information society. (ME SR, 2016)

In-service training for teachers is provided by the Methodology and Pedagogy Centres.

The use of ICT in the educational process is in spite of the ICT availability not satisfactory. Its practical application and development of ICT competences reached only 26,9 %. Teachers on the monitored schools used for example assignments requiring the work with notebooks, specific software (Prezi), various learning programmes (from a portal with digital content called *Planet of knowledge*) and short videos. Students worked out on-line assignments using interactive board, elaborated powerpoint presentations, used internet as a source of information and videos from Youtube. The inspectors concluded that there is still insufficient development of digital competence and team work. (SSI, 2016)

For 2015/16, it is recommended to schools/teachers to create positive environment for implementation of innovative pedagogical methods using ICT and develop ICT competences of students, to use open educational resources alongside with classical methods, and to participate in the European partnership projects [www.minedu.sk/etwinning/](http://www.minedu.sk/etwinning/) (ME SR, 2016).

### **3. New national data about representations of SD themes in national curriculum**

In harmony with the National strategy for global education in 2012-2016 it is recommended to schools to apply global dimensions of sustainable development in the school educational programmes; to develop awareness raising activities for students in order to realize interconnectedness of social, economic, political and environmental processes on local, national, regional and international levels; support volunteering of students in environmental activities, support participation of schools in various green projects and support in-service training of pedagogical staff in this topic (ME SR, 2016).

Since 2015 the SD themes are present mainly in the so called horizontal subjects: personal and social development, environmental education, media education, multicultural education and healthy life style.

However, the representation of horizontal themes in the School educational programmes is often very formal and not always implemented, or only partially implemented. In the report about pedagogical process in gymnasia for school year 2015/2016 the development of competences in ICT use, lifelong learning and social competences were evaluated as those which need improvement. It is expected students will understand the complexity of topics (SSI, 2016).

### **3. Additional new national data related to e-learning and ESD**

In the Pedagogical and organisation rules for 2016/2017 it is recommended to schools to involve to the school educational programmes themes related to multicultural education, education supporting humanism, education supporting human rights, rights of children, gender equality, prevention of all forms of discrimination, xenophobia, anti-Semitism, intolerance and migration. (ME SD, 2016)

The work on new strategy for global education is starting. At the moment, it is driven by the Ministry of Foreign and European Affairs (MFEA) and the Platform of Non-Governmental Development Organisations as it is perceived as a part of development cooperation/policy. Both actors stress the importance of the Ministry of Education taking part in drafting the new strategy.

## 4. New national conclusions and recommendations

Continuous efforts to equip the schools with computers, (fast) internet connection and other ICT items on the one hand and critical evaluation of ICT use in actual teaching by the State School Inspection should lead to the conclusion that ICT competences become seriously measured and further built.

According to the recommendations for schools and teachers in the field of ESD, horizontal topics were developed/broaden, also with respect to the migration crisis and conflicts related to it. It is recommended to schools to work with students on SD topics within the relevant subjects, horizontal subjects and also during extracurricular activities, e.g. support volunteers.

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