Appendix 3: Country specific results

CONTENT

Austria Country Report

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1. Introduction

1.1. Main characteristics of national education system

Educational administration is 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) 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[1].

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.[2]

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[3]. (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[4].

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

[1] Source: STATISTICS AUSTRIA (http://www.statistik.at/web_en/statistics/information_society/index.html)
[2] Source: https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf
[3] Source: https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf
[4] Source: https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf

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.

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') [5].

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".

[5] http://www.eun.org/c/document_library/get_file?uuid=4a576578-e619-4689-84f2-baa468d07396&groupId=43887

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 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[6].

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[7] 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.

[6] Source: https://ec.europa.eu/digital-agenda/sites/digital-agenda/files/Austria%20country%20profile.pdf
[7] Source: http://www.eun.org/c/document_library/get_file?uuid=4a576578-e619-4689-84f2-baa468d07396&groupId=43887

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.

Environmental education is defined as the concern with the relationship between man and the environment and with the furthering of the readiness to act and the ability to treat the environment respectfully.

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[8].

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.

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

In addition to the Cross-curricular Principle and Educational Concern mentioned above, the ÖKOLOG-Network 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 or 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[9]. 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.

[8] https://www.bmbf.gv.at/schulen/pwi/pa/rundschreiben_1994_35_15069.pdf?4eysu2
[9] https://www.bmbf.gv.at/schulen/lehr/labneu/bne_grundsatzpapier_pbneu_25855.pdf?4dzgm2

In addition to cross-curricula principles, ESD is also specifically mentioned in Austrian curricula[10][11].

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.

The curricula for the first for years include the same mentions as the general Primary school curricula. The second 4 years include general and subject mentions to ESD as the curricula for Lower Secondary.

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 in a much stronger way than previous curricula have done.

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.

Environmental educational 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.

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.

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.

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

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.

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.

Mathematics should contribute to the perspective of rationality.

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.

[10] An overview of all mentions is provided at:
https://www.bmbf.gv.at/schulen/unterricht/uek/umweltbildung_lp_25747.pdf?4dzgm2

[11] An overview of the Austrian educational system in English can be found at:
https://www.bmbf.gv.at/enfr/school/index.html

Physical Education and Nutrition should contribute to the awareness of the relationships between the environment and a healthy lifestyle.

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.

Environmental education is especially mentioned in connection with the various job field. 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.

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.

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.

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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.

Furthermore, there are cross-references to the Curricular Principle in the curricula of the different types of Vocational schools.

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.

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.

Sustainability and Environmental compatibility clearly play a central rôle in the curricula for the Agricultural Schools.

3.2. Identification of SD thems that should be included in national curricula

As above, the anchoring into national curricula in Austria works in a two-fold way in that one 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.

Bulgaria Country report

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1.Introduction

1.1. Main characteristics of national education system

The level of education of population determines every contemporary country and plays an important economic and social role of 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 acquired additional knowledge and skills and promote the growth of the child as independent thinking and socially responsible person who is refers to life with serenity, enthusiasm and a significant public commitment.

The main institutions ordered to deal with monitoring, evaluating and improving the educational system in Bulgaria is Ministry of Education and Science.

The Ministry of Education and Science carry out the national policy in the field of education and science; organizes the development and the implementation of the national programs for secondary and higher education development, programs for qualification and re-qualification; coordinates the implementation of national programs and projects in the field of research, development and implementation of sectoral programs for equal access to education, integration in education and training, lifelong learning, information and communication technologies in education; development and implementation of the national policy for qualification and career development of teachers; development and implementation of state educational requirements, development of educational programs and training materials, development and application of national examination programs, methodical assistance of school and kindergarten activities, coordination, control and inspection of activities related to pre-school and school education and outdoor activities, etc.

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 and accreditation and 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 in Bulgaria were developed several national strategies and programs for the next programming period, 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 г.

National Strategy for Development of Teachers

Strategy to reduce of early school leavers (2013-2020)

National Youth Strategy 2010 - 2020 г.

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.

Of a few years an ESD support Program is in effect. It serves as a basis for developing national and regional ESD strategies. The Program takes into consideration all national and international documents and agreements concerning environment and ESD. It is meant to facilitate the application of the basic guidelines of the ESD Strategy of the European Economic Committee of the UN. The Program views ESD in terms of Environmental education and Nature conservation education. It allows every interested party to perform activities for ESD development on local, regional and national scale. Its main purpose is to support and encourage ESD in formal, informal, and non-formal education, as a means of creating life-long learning skills, too.

2. National capacities for e-learning

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

Broadband basic facts: At the end of 2013, fixed broadband covered 93% of homes in Bulgaria (97% in the EU). In rural areas, fixed broadband covered 60% of homes. At the same time, Next Generation Access capable of providing at least 30 Mbps download was available to 68% of homes (62% in the EU).

54% of the households had a broadband subscription at the end of 2013, considerably lower than the EU average (76%) but 3 percentage points higher than at the end of 2012. The share of high speed connections (providing at least 30 Mbps) was considerably higher than the EU average (42% compared to 21% in the EU). Ultra-fast connections (providing at least 100 Mbps) accounted for 3% of all subscriptions (5% in the EU).

On the mobile side, 4th generation (LTE) was not available. The take-up rate (subscription per 100 people) of mobile broadband was 51%, below the EU average of 62%.

Results show that a large percentage of Bulgarians has low or no digital skills. Within the workforce, skills are higher. Figures for households without internet access reporting lack of skills as a reason. But according to a broad definition, the share of ICT specialists in total employment in Bulgaria was almost equal to the EU average.

Internet usage: In 2013, 51% of Bulgarians reported using the internet at least weekly (regular users), well below the EU average of 72%. Bulgaria exhibited lower rates of daily use of the internet (frequent users), with 43% of the population reporting going online every day, compared to an EU average of 62%. In 2013, 41% of the population had still never used the internet; lower than in 2012 and significantly higher than the EU average of 20%.

Digital skills - Survey of schools: ICT in Education

Results obtained from a newly developed Digital Skills Indicator show that, in 2012, 81% of Bulgarians had low or no digital skills, compared to 47% for the EU average. Disadvantaged people (i.e. individuals who are aged 55-74, low educated and/or unemployed, retired or inactive) in Bulgaria are less highly digitally skilled than is average in the EU. Within the workforce, skills are higher; 77% of the workforce has low or no digital skills. On average in the EU, the figure is 39%. At 51% in 2013, figures for households without internet access reporting lack of skills as a reason for no access are higher than the EU average of 37%. According to a broad definition, the share of ICT specialists in total employment in Bulgaria was 1.7% in 2012; below the EU average of 2.8%.

Around 50% of students in general education use a desktop or a laptop during lessons at school at least weekly, but around 20% of the students at the same grades never or almost never use a computer during lessons.

Most teachers have been familiar with ICT for teaching and learning for some years but still use it first and foremost 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.

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

Computer technology is among Bulgaria's most advanced scientific branches. Bulgaria, once known as the Silicon Valley of the Eastern Bloc, has started to regain its position as a leading centre of high-technology research and development, particularly in information-technology (IT) and nanotechnology research, development, production and distribution. Bulgaria became one of the first European countries to develop serial production of personal computers in the beginning of the 1980s. According to the Brainbench Global IT IQ report, today Bulgaria ranks one among the first in Europe in terms of IT-certified specialists per capita and 8th in the world in total ICT specialists, out-performing countries with far larger populations.

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

The main objectives of the education in ICTs and their application in other school subjects are defined in three directions: personal-social, professional, and pedagogical. The personal-social context implies that all pupils should obtain general knowledge and good mastery of computer appliances and systems, including the Internet, as a basis for their full-scale development as individuals living in a dynamic social environment with a large flow of information resources. This objective includes forming of skills for lifelong education through ICTs. The professional context implies that all pupils from professional schools need to be prepared to use ICTs in their future jobs. The pedagogical context is connected with the application of ICTs in the process of education with the purpose of improving the organization of education, introducing new more efficient techniques and means of teaching, studying, control and assessment, creating willingness to use ICTs as a means for solving different educational problems.

The envisaged funding is designated for the supply of schools with equipment and software, access to the Internet in all schools, development of a national school network, training of teachers. Other funds for the program realization are expected from projects connected with participation in international programs.

With the implementation of the National Educational Strategy on ICTs the following results were achieved:

Up-to-date educative material and organization of education, based on the integration and application of ICTs (State Educational Requirements, educational programs and appliances, products for remote education, new forms, techniques and means of education, updated legislation).

Acquisition by Bulgarian pupils of up-to-date computer literacy and skills to work with ICTs.

Supply of modern ICT facilities in Bulgarian schools.

Up-to-date and flexible training on ICTs of pedagogical personnel and provision of opportunities for perpetual improvement of qualification. Mastering of active and interactive training techniques on the part of teachers.

Interaction among educational and business structures at solving educational issues.

Integration of the work with information and communication technologies in the process of education in different school subjects throughout the country.

ICT education in mid 1980s to early 1990s was well-developed in specialized schools – mathematical schools, foreign language schools and some technical secondary schools, but it covered less than 5 percent of the students. Basic ICT education was introduced to Bulgarian secondary schools in the 1999/2000 school year. A general course on Informatics and IT is currently taught at fifth through tenth standard grades at all schools nationwide.

Teachers' confidence and opinions about ICT use for teaching and learning affect the frequency of students' ICT use for learning: boosting teacher professional development makes a difference, and appears to be a condition for an effective 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.

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

Bulgaria is making 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 were provided computer terminal stations or funds to purchase. Were conducted trainings for increasing the teachers qualification 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.

Next steps of Bulgarian strategy are:

• To modernize the whole education system and improve the quality of education so that all students are prepared to enter the information society by achieving a satisfactory level of computer literacy.

• To develop the skills of all teachers and use ICTs for teaching and learning.

• To provide quality education system based on the experience of the EU countries.

The following priorities are set on the basis of the analysis of the present situation and the experience of other countries, as well as on the basis of the general policy of the government for modernization of the education in the context of building an information society in Bulgaria:

• Training of staff. Providing multi-channel technical support.

• Providing sufficient technical resources.

• Providing appropriate software and educational multimedia content.

• Changing and updating the legal framework of the ICTs education.

• Changing the educational content and organization of the educational process.

• Providing and implementing an efficient management information system to support the process of decision-making.

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 which will be held on 6 November in Sofia.

It was proved that important for the effective application of technology is not only ICT infrastructure itself, but also the skills to handle it, the appropriate administrative and legal procedures, and the availability of adequate modern educational content and information. Does school equipment in this country match up modern requirements, how the Strategy for Effective Implementation of ICT in Education and Science of the Republic of Bulgaria (2014-2020) is planned to change the current situation, what is the state of ICT skills of all participants in the educational process, what are the current funding programs and public policies for the development of e-education, what are the career opportunities of young professionals and does the level of their competences correspond to business requirements: these are important topics which are laid down in the agenda of the 10th anniversary edition of the Conference on e-Education. In 2014 the conference will focus on the status of ICT in secondary schools and universities, on best practices for successful implementation of ICT in the learning process and on the development of technological base in Bulgarian schools and universities.

3. Sustainable Development (SD) in Education

3.1. Representations of SD themes in national curriculum

SD issues are part and parcel of Bulgarian textbook contents and school syllabus State Educational Requirements. Environmental Education emphasizes the ecological laws that determine the ecological balance and guarantee man's healthy way of life, as well as one's personal and social responsibilities to abiding by these laws. ESD emphasizes the importance of the relationship between nature and culture. Nature Protection Education focuses on conserving the natural environment. Though not introduced as a separate subject in Bulgarian curricula, SD issues are studied through integrated themes in different relevant subjects on all school levels. In secondary education ESD issues are differentiated in Biology and Health Education, Chemistry and Environment Protection, Geography and Economics, Physics and Astronomy, Philosophy and Democratic Citizenship. Thus within their compulsory studies students not only acquire knowledge and awareness as to key topics of SD through various approaches but also develop their skills and competences in this sphere through presentations and field-work projects which are part of the teaching methodology of these subjects.

Cultural and educational field "Science and Ecology" provides the formation of a system of knowledge, skills and those of their relations connected with nature. The goal is in the minds of students to form 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:

- To 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 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.
- To analyze the causes and consequences of violation of ecological balance.

The Chemistry is the part of educational field "Science and Ecology" and provides the formation a system of knowledge and skills about chemical elements, their structure and distribution in nature. 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:

- To 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.
- To form practical skills for observation of objects and processes in a variety of vertebrates, for self-monitoring and evaluation of health.
- To develop skills for healthy and environmentally lifestyle.
- Aware the need for rational use of natural resources.
- To 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.
- To know the materials that can and should be subjected to recycling.
- Naming principles of waste-free and harmless proceedings and describe the principle of purification systems.
- Describe unsolved problems of environmental protection.

Regarding 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.
- To assess the possibilities for efficient and environmentally sound use of different types of energy.
- To 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 solving World Global problems. In Information Technology are provided hours for work of project. By the decision of the teachers in these classes can be included topics affecting SD.

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:

- To explain global issues associated with the protection and rational use of natural resources and the environment and to know the concept of sustainable development.
- To identify the causes and consequences of natural disasters - earthquakes, floods, and more.
- To explain the processes of global warming and ozone depletion.
- Be familiar with the principles of environmental monitoring and the need of it.
- To know the modern political map of the world and global political processes.
- To analyze the demographic problem and discuss the geographical aspects of its manifestation in different parts of the world.
- To understand the basic mechanisms of the market economy. To compare level of economic development of individual countries in basic socio-economic indicators.
- Outlines the problems of regions and discuss their solution according to the concept of sustainable development.
- To assess the role of international organizations to peace and stability in the world.
- Evaluate the concept of sustainable development as a global strategy.
- To discuss the problems of sustainable development of 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 level. Study the prerequisites for integration and the accession 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 themes and concepts of SD are not mentioned. In some of subjects, themes related with sustainable development are affected and are studied in detail, but outside the context of SD. For example, the subject Chemistry and Environmental Protection no emphasis on sustainable development, but many of the themes 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

The majority of Bulgarian stakeholders consider that is not enough available offers concerning e-learning and e-teaching courses for teachers and students in country, there has not required equipment, and no technical expertise of teachers. Around 75% of respondents think that is strongly necessary technical support for schools 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 aware somewhere with National strategy for using ICT in education. Most of them are convinced importance of sustainable development and think is true that a good education is essential to achieving sustainable development. Most of them are not convinced that 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. Quite understandable 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 his 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 view about e-learning and SD

The Survey findings provide evidence that teachers are confident in using ICT, positive about ICT's impact on students' learning, and organise more frequent ICT based activities than previously. They do it most when they are in schools with easy access to pervasive equipment, but also do it more often even when they are in schools with low equipment provision than teachers lacking confidence and not positive about ICT but in schools with high equipment provision and easy access.

The Survey finds that students, as well as teachers, have the highest frequency of ICT use and ICT learning based activities during lessons when they are in schools which combine policies about ICT integration in T&L generally speaking as well as in subject learning, incentives to reward teachers using ICT, as well as concrete support measures including teacher professional development and the provision of ICT coordinators.

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 present 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 find the many lessons 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 system in Bulgaria will bring about better consistency between the educational level and 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 for 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.

In general students in Bulgaria are in schools where above EU averages of ICT strategies are implemented, placing Bulgaria in leading group of countries at all grades. There are EU average percentages of students in Bulgarian schools with strategies to support teacher collaboration. 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 is an important prerequisite for the successful implementation of the Strategy for 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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Croatia Country Report

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1. Introduction

1.1. Main characteristics of national education system

The institutions in charge of monitoring, evaluating and improving the educational system in Croatia are:

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 Centre 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 Centre Bjelolasica, Croatian Standards Institute, Education and Teacher Training Agency, Meteorological and Hydrological Service, "MiroslavKrleža" Lexicographical Institute, National Centre 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 Centre - SRCE, Zagreb University.

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

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

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.

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 Centre 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. 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 40th place). In science and reading, Croatia scored below the average (placed in 34th place and 35th place respectively).

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 Olympiad and International Olympiad in Informatics. There are outstanding individual cases with extraordinary results, be it students, teachers or even schools.

1.2. Existing strategic documents in the field of education

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 Programme of Education for Human Rights and various statutes and decisions drafted and issued by Ministries and Agencies.

General aims acclaimed in these documents 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 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 programmes, develop a system of quality insurance on all levels of education and to support inclusive education, lifelong learning and adult education. Certain documents 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.

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. They also address the concept of sustainable development.

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 programmes and comprehend basic principles of the computer making. They should also be capable to apply ICT to problem solving in various areas.

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.

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 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.

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). The schools are connected using various technologies (optic, ADSL) with varying connection speeds.

A separate project 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, 21 schools on the islands have been connected via the video-conference system and the e-islands project.

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. 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.

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

Through GÉANTnetwork all CARNet users can connect with colleagues from over 40 European countries in over 8 000 researches and education institutions.

"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.

According to Digital Agenda for Europe, 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.

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%

Available frequencies are 800 MHz LTE - 900 MHz, 1800 MHz LTE, UMTS - 1900 MHz, 2100 MHz UMTS - 2500 MHz IMT and 3500 MHz WiMAX.

Students use web browsers and social networks on everyday base. They use interactive whiteboards much less frequently than the EU average. Students' confidence in their 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. 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.

Although there are studies showing the frequency of use of ICT in lesions is average in comparison to EU standards, our experience 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 5th to 8th grade and a mandatory separate subject in secondary schools), 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. There are 44 570 students in high schools and 118 955 students in primary schools attending informatics classes, with 1 236 teachers of informatics. As the adjustment of the learning process to include ICT is under way, some schools have introduced e-directories for teachers or smart boards and have educated their teachers accordingly.

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). 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. The Ministry of Science, Education and Sports has an agreement for software licensing for all schools with Microsoft Croatia.

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

All Croatian teachers received basic ICT training (basic ECDL programme) 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. ICT is a part of higher education for future teachers in university, but 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 programmes 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.

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). National Curriculum Framework integrates ICT in many subjects in addition to regular teaching ICT as a separate subject.

Teachers most commonly use PowerPoint presentations as a tool in teaching.

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

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.

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

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.

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.

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.

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.

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.

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. 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 in them, 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.

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. 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 lacks deadlines or outcomes. 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

Prepared by Brigitte Hertlein-Puchta and Christiane Spies

State Academy Esslingen

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.

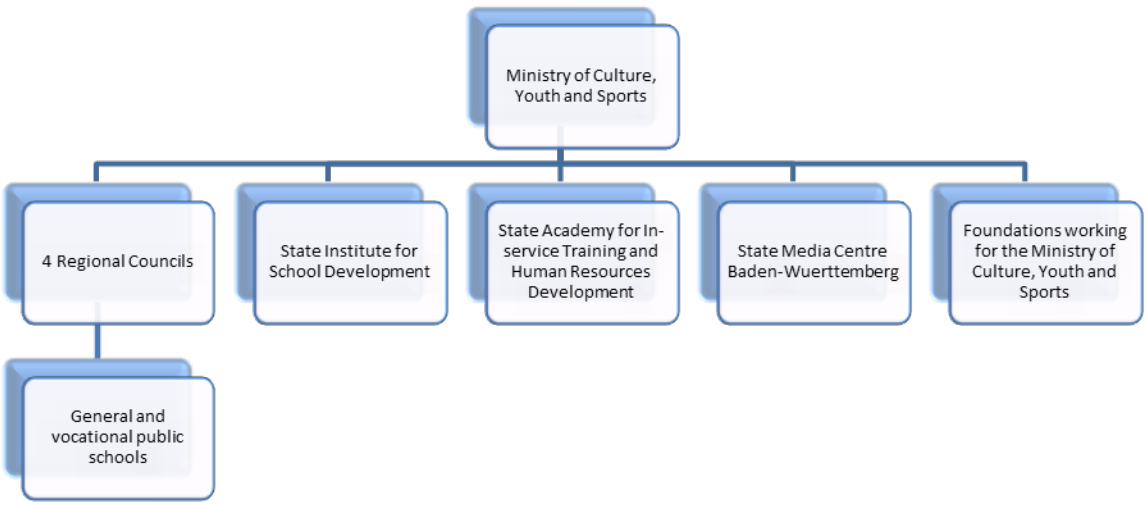
The detailed definition for these curricula and exam requirements is up to each German federal state. The federal curricula and exam requirements differ from each other due to the federal circumstances. Therefore the following study containing the German part is based on the data of the German federal state Baden-Württemberg 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.

1. Introduction

1.1 Main characteristics of the national education system

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



The Ministry of Culture, Youth and Sport Baden-Wuerttemberg

The leading institution (top education authority) in the area of education is the Kultusministerium für 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.

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).

The Landesakademie für 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.

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.

The Landesinstitut für 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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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), the State Institute (the State Training Server) and the State Media Centre.

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.

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.

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.

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.

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
- 2012: Nutrition
- 2013: Mobility
- 2014: Conclusion, Review of the previous topics, Outlook.

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.

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. 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 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.

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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), 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

The following Institutions have been ordered to deal with monitoring, evaluating and improving the educational system in Hungary:

- Ministry of Economy and Transport (task: coordination between relevant agencies and ministries)
- Interministerial Committee on Information Society (task: Provides advices on various Information Society-related policies)
- Ministry of Social Affairs and Labour (task: Responsible for vocational training, adult education, lifelong learning, as well as for training of disabled and unemployed people)
- Ministry of Education and Culture (task: Responsible for public and higher education)
- Local governments (task: Responsible for financing public education Institutions)

The other actors that are influencing eLearning developments as follows:

1. *Associations*-Promoting the importance of eLearning developments and Information Society. In some cases co-ordinating functions:

- Hungarian Distance Education Foundation (MATAL)
- Association of the Hungarian Content Industry (MATISZ)
- Hungarian Association of IT Companies
- Hungarian Telecottage Association (Magyar TeleházSzövetség)
- Digital Library Directorate of John von Neumann Digital Library and Multimedia Centre (Neumann House)
- Hungarian Association of Virtual University Network

2. *Research institutions*- Research activities in the field of Information Society and/or eLearning, promoting and lobbying:

- National Institute for Public Education
- Centre for Multimedia and Educational Technology
- Centre for Education Innovation and Adult Learning
- BME UNESCO Information Society Research Institute40 (ITTK)
- eLearning Department of the Computer and Automation Research Institute of the Hungarian Science Academy.

The OECD's Programme for International Student Assessment (PISA) reviews the extent to which students have acquired some of the knowledge and skills that are essential for full participation in modern societies. In 2012, PISA focused on examining students' reading ability, skills in maths and

level in sciences, as research shows that these skills are more reliable predictors of economic and social well-being than the number of years spent in school.

The average student in Hungary scored 487 in reading literacy, maths and sciences, close to the OECD average of 497. On average, girls outperformed boys by 9 points, more than the average OECD gap of 8 points. The best-performing school systems manage to provide high-quality education to all students. In Hungary, the average difference in results, between the students with the highest socio-economic background and the students with the lowest socio-economic is 121 points, much higher than the OECD average of 96 points and the one of largest gaps amongst OECD countries. This suggests the school system in Hungary does not provide equal access to high-quality education.

The Hungarian Institute for Educational Research and Development, founded by the Ministry of Human Resources also supports medium- and long-term educational planning in the education sector. In this area, it relies on the output of research undertaken that inquiries into the social effects of policy decisions; it additionally assists policy makers in the making of evidence-based decisions.

The responsibilities of the Institute also include preparing analyses of currently existing educational processes while examining their likely effects, as well as participating in international research projects. Research is also carried out on classroom procedures, inquiring into the activities of the most important actors in education (teachers and pupils) and examining their interactions.

Development activities aim to increase the effectiveness of school education and are supported by related research. Program and curriculum development activities include the development of new pedagogical/professional methods, educational programs, textbooks, teaching aids and related instruments. The societal and social situation of the young and their educational opportunities are also analysed, focusing especially on the integration of Roma and special needs pupils. The Institute actively participates in the implementation of educational development programs supported by the European Structural Funds of the European Union.

1.2. Existing strategic documents in the field of education

In primary and secondary education a three-level structure constitutes the overall framework for curricular matters:

- 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.
- 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.

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 the National Core Curriculum digital competence is recognised as the key competence:

Digital competence comprises the confident and critical use of Information Society Technology (IST) for work, communication and leisure purposes. This is based on the following skills and activities: recognising, retrieving, evaluating, storing, creating, presenting and exchanging information as well as communication and cooperation in networks via the Internet.

Digital competence refers to the understanding and extensive knowledge of the nature, role and opportunities of IST in personal and social life and work. It includes major computer applications - word processing, spread sheets, databases, information storage and management, opportunities offered by the Internet and communication via electronic media (e-mail, network devices) - in the context of leisure activities, information sharing, cooperative networking, learning and research. Students should understand how IST facilitates creativity and innovation, be aware of problems associated with the authenticity and reliability of information and the ethical principles pertaining to the interactive use of IST.

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. It includes the use of tools that promote the creation, presentation and interpretation of complex information, access to Internet-based services, conducting research with these tools and the use of IST in critical thinking, creativity and innovation.

The use of IST requires critical and deliberate attitudes towards the responsible use of available information and interactive media. This competence is also encouraged by participation in cultural, social communities and networks and/or those serving professional purposes.

Appendix of Parliamentary Resolution 18/2013 (28th March) is about National concept on the transition towards sustainability, which is a strategy for the period of 2012-2024. The Framework Strategy intends to promote a common national understanding of sustainability, which is not only a political and governance issue, but each individual, family, enterprise, civil organization should live by such values, make such daily decisions and take such initiatives that ensure the achievement of sustainable society.

The comprehensive goal of education for environmental awareness is to help students develop their behaviour and way of living in a manner so that the rising generation is able to protect the environment facilitating thereby the conservation of the natural environment and the sustainable development of societies.

Sustainable development requires lifelong learning so that informed and active citizens will grow up who think creatively, find their way in the spheres of nature, the environment, society, law and the economy, and take responsibility for their individual or shared actions.

This can be achieved by special focus on the development of students' way of thinking in the field of natural sciences. If students become sensitive to the condition of their environment then they will be able to interpret and produce a basic analysis of the specific features and qualitative changes of the environment, to recognise and conserve the natural and artificial values of the environment, and to undertake their civic commitments and to exercise their rights with regard to the environment. Environmentally friendly conduct that is based on one's knowledge of the environment and personal responsibility should be a moral principle that determines the life conduct of students both at individual and community level.

During their education for environmental awareness, students should become familiar with current processes which make our planet suffer from symptoms that suggest an environmental crisis. They should learn through concrete domestic examples what positive and negative effects socio-economic development has on an individual in view of the environmental consequences. They should understand the relationship between consumption and natural resources and the principle of sustainable consumption.

Students should be involved in the preservation and enhancement of the values of their close environment. Respect for nature, responsibility and the prevention of environmental adverse effects should be a dominant factor in their way of living. They should gain first-hand experience in the shared management and settlement of environmental conflicts.

2. National capacities for e-learning

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

In General in Hungary, all education institutes generally have been supplied with free and unlimited internet connection and multimedia computer lab by the Ministry of Education and Culture.

The programme of "SulinetExpressz" which started at 1st of July 2003 and ended on 31st of December 2006, have increased the supply of digital tools of the Hungarian Families. As a result of the competition of Internet services, the price of broadband Internet connection availability decreased to an acceptable level.

In Hungary there are national strategies covering training measures and research projects in the areas of e-learning, e-inclusion and digital/media literacy. There are central steering documents for ICT learning objectives 4 at both primary and secondary education level for, knowledge of computer hardware and electronics, using a computer, using office applications, searching for information, using multimedia and developing programming skills, and also in using mobile devices and using social media at secondary level. In Hungary there are fewer computers available for all grade students than the EU average. Hungary is lagging behind the EU average in almost every aspect of ICT: penetration of schools and families, skills of teachers, educational content, and helpdesk support available for schools.

The most important sources of public financing are the state budget and budget of the ministries, as well as the municipalities' own resources. The greater part of state support is a normative sum per head of students, which depends on the level of education concerned. ICT equipment of schools of all levels and of public libraries is financed from the central budget, but the local governments also allocate financial resources to local schools.

In the period 2007-2013 two Operative Programmes focused on the tasks related to the dissemination of ICT supported education, training and the improvement of digital skills, as well as the development of ICT infrastructure at national and regional level. The Social Renewal Operative Programme was financed by the European Social Fund and focuses on re-qualification and lifelong learning. The Social Infrastructure Operative Programme financed by ERDF focuses on ICT infrastructure developments.

The Private sector gained importance in financing eLearning at public institutions. For example Microsoft, Cisco Systems or Hungarian T-Online support different educational institutions and finance ICT and eLearning projects.

With the approval of the Ministry of National Development, numerous new enterprise development tenders will open this year within the New Széchenyi plan for the 2014-2020 development periods.

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

Computer sciences and informatics are compulsory subjects in public education, as well as in higher education. Due to this fact, every secondary school and higher education graduate possesses at least basic digital skills. Employment agencies and the Regional Training Centres provide ECDL courses and other programming courses for unemployment people. For disabled people basic computer training and eLearning based courses are also provided. These possibilities make it possible for disadvantaged groups to gain or improve their digital skills and to be involved in the information society.

In spite of the initiatives, tenders and measures of the Ministry of Education and Culture which have equipped state schools with ICT appliances and the increasing number of teachers taking part in ICT training and the digital materials available, the usage of eLearning is quite rare in comparison to most

of the EU countries. Motivation of teachers and the presentation of best practices are missing. Major achievements in digital eLearning material developments are proclaimed in the eLearning material for public education initiated by the Ministry of Education and Culture and co- ordinated by its background institutions. Sulinet Digital Knowledge Database provides high level quality eLearning materials for teachers and pupils in public education in Mathematics, Biology, Physics, Chemistry, Informatics, Geography, History, Hungarian Literature, Arts and Languages. Considering public education, the available eLearning materials are not fully utilized, since teachers lack competence and motivation. The attitude of teachers towards ICT supported education is largely negative. Hungarian education is rather theory-oriented than practice-oriented, which could be solved with a paradigm change in education.

One of the basic aims of the new National Core Curriculum is that the use of ICT be promoted in mainstream education to address vulnerable social groups, such as students with disabilities, students with learning difficulties and socially disadvantaged students.

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.

NGOs act as professional stakeholders to advise on policy-making for ICT in schools, taking into account new technology applications, curriculum development and pedagogy.

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.

Data on the availability of ICT in schools is collected through the Public Education Information System (KIR: http://www.kir.hu) and all education establishments are obliged to provide information.

Good practices are collected and disseminated by agencies under the Ministry of Education and Ministry of Development.

The central level has exclusive responsibility for defining policy. In Hungary, this includes agencies under the Ministry of Education and Ministry of Development.

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.

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)

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.

Data on the availability of ICT in schools is collected through the Public Education Information System (KIR: http://www.kir.hu) and all education establishments are obliged to provide information.

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.

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

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

At school level the traditional forms of environmental education use extracurricular methods (activities, camps, museums and zoo pedagogy, special days, local initiatives competitions, exhibitions, etc.) for the integration and harmonisation of various school subjects related to the environment (Havas, 1997). Since environmental education has no separate school subject definition it is realised mainly in other subjects or in extracurricular teaching activiities. This so-called “diffusion” as a comprehensive, overreaching and coordinated educational approach to learn about the environment is a widespread and accepted method worldwide. The learning content includes the natural, the constructed environment as well as aspects of economic, civic and democratic education, which in turn indicates the transformation of environmental education towards a new paradigm of education for sustainability (Vásárhelyi J.- Nagy T., 2004).

The National Strategy for Environmental Education is widely appreciated and the Hungarian Association for Environmental Education launched a widespread initiative for “school-greening” aiming to enlarge school-based and extracurricular environmental educational good practice.

Trends and initiatives provide a synergic impact and pave way to strengthening the education for sustainability in Hungary for the future.

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

Key issues raised by stakeholders are:

1. Basic values, quality of life
2. Learning & systems thinking
3. Labour market, employment
4. Public administration reform
5. Regional & rural development
6. Equality
7. Family, population, intergenerational issues
8. Sustainable communities
9. International cooperation
10. Infrastructure
11. Innovation & comparative advantages
12. Public participation
13. Sustainable consumption & production
14. Health
15. Liveable environment

4. Teacher's view about e-learning and education for sustainable development

Considering public education, the available eLearning materials are not fully utilized, since teachers lack competence and motivation. The attitude of teachers towards ICT supported education is largely negative. Hungarian education is rather theory-oriented than practice-oriented, which could be solved with a paradigm change in education.

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.

In a broad sense, findings from environmental psychology show that pro-environmental norms and behaviour are rooted in a pro-environmental value orientation. Gaining more knowledge on issues concerning SD can have an impact on people’s behaviour, but what is critical is whether they initially

have pro-environmental norms. To really make an impact on future generations' attitudes and SD behaviour, a key strategy would be to only recruit truly — green students to teacher education programmes. However, maybe there is more to add to this argument concerning the fact that becoming a teacher also includes possible influences from organizational norms and rules?

The teacher in the educational institution needs especially competences in teaching, communicating and mediating on various levels such as: with students, teacher colleagues, leadership and educational board. But this is not sufficient. To do ESD you need as an individual teacher to be able to create and formulate visions based on reflective activities.

The teacher and the educational institution are part of the society and there is always a given relation between the three. ESD requires openness, understanding and action, which are relying on competences such as networking, cooperating and publishing. But also the teacher has the competence of organizing and fostering networking while teaching through cooperation between classes and students of different levels.

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.

Teacher as a guide of learning processes. The teacher is able to acquire relevant and embodied knowledge about SD challenges and issues. The teacher knows the concepts of SD and ESD and the most relevant national and international policy documents relating to SD and ESD. The teacher has mastered SD key concepts and knowledge. The teacher is able to value knowledge as the result of cultural heritage and is able to critically reflect on it. The teacher is able to help students to distinguish between factual knowledge and opinions. The teacher is able to select educational goals for SD, taking into account the developmental stage and the prior knowledge of the pupils or students, and the diversity within the group of learners. The teacher is able to identify locally and globally relevant SD issues and to connect the local and global aspects of the issue involved. The teacher is able to create a powerful learning environment for teaching SD issues. The teacher as a member of the school and the educational community. The teacher acquires sufficient knowledge of relevant SD issues in order to contribute to the construction of a curriculum that integrates SD into the whole school curriculum. The teacher as a member of the society. The teacher is able to find partners outside the school community and to co-operate with organizations which promote sustainable development.

5. National conclusions and recommendations

Research and development concerning sustainability - including state funded projects - must be placed on firm foundations, they must be strengthened and supported, and research activities must be coordinated. A domestic research strategy must be elaborated and incorporated in domestic strategies. Firm foundations must be created for monitoring systems as well.

Scientific results must be linked to social knowledge. Important and relevant information should be made available in a form making it possible for members of society to understand it.

Themes and values of sustainability must be presented more prominently in the contents and forms of education. Sustainability must become a fundamental requirement in order to enable accommodation of new knowledge and to help people find their way around under changing social and economic conditions. Spreading and developing knowledge concerning all aspects of sustainability is a crucial requirement (preschool education, education in the schooling system, training, education and extension training outside the schooling system, culture, dissemination of knowledge, and publication of books).

The spreading of a holistic and practice-oriented form of education should be accelerated and it must be incorporated in day-to-day practices (a schooling system based on analytical knowledge, fragmented into 'subjects' is not really suitable for bringing up a society having a systemic approach). Practical knowledge of 'life', methods of conflict management and global knowledge should be given more emphasis in education and instruction. Education should lead to exploring relationships between problems and to authentic presentation of solutions.

A programme based on a holistic approach has to be introduced in the Hungarian public education system - affecting the entire structure of education and training - that would comprise the teaching of development improvement and human rights, education towards peace and prevention of conflicts, intercultural education and environmental education (so-called global education). Such education and instruction of young people should be started in the pre-school age, for this is the only way to develop commitment that will be a dominant motive later on. Global education prepares people for democratic and responsible citizenship in line with the global dimensions of sustainable development.

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.

Supporting the non-formal and informal activities of learning is crucial, where cultural public institutions may also play an important role. Informal learning at the work place creates values for both the employer and the employee. In the framework of the process of informal learning about sustainability, the activities carried out by the media towards enhancing economic, social, and environmental awareness should be strengthened and the media should be assisted in conveying the system of values relating to sustainable development.

To raise general levels of culture/education and to improve the quality of cultural socialisation, there is a need for improved access to basic cultural services through developing community spaces and cultural infrastructure; furthermore, the role of culture and community activities in education and training needs to be strengthened.

To develop responsible behaviour of citizens, the role of self-teaching and self-improvement must be strengthened. Publicly accessible knowledge must be enhanced and its transfer must be improved.

Students in Hungary benefit from levels of computer access close to the EU mean, and almost all are in 'connected' schools with broadband internet (although at slower speeds than in other countries). It is at grade 8 where both teacher and student use of ICT is highest, and is close to the EU average, above as regards students. At all grades surveyed teachers' confidence in ICT is lower than the EU mean but students' is generally higher. Professional development is generally formal and takes place outside school, and many students are in schools without ICT coordinators. Analysis of the data in the Survey of Schools: ICT and education suggests a '5C approach' to addressing issues identified in the survey:

- Capacity building, through sustained investment in teachers' professional development
- Concrete support measures, accompanying specific policies at school level
- Combined policies and actions, in different policy areas within a systemic approach
- Country-specific support, addressing large differences and degrees of ICT provision and implementation
- Competence development: these four actions directed at increasing effectively and dramatically young people's digital competence and the key competences described in the European framework.

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7. List of stakeholders

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Romania Country Report

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1. Introduction

1.1. Main characteristics of the national education system

In Romania, access to free education is guaranteed by Article 32 in the Constitution of Romania. Education is regulated and enforced by the Ministry of National Education. Kindergarten is optional under the age of six. Education is compulsory between the ages of 6 and 16 years old. The school educational cycle ends in the twelfth grade. In 2010, there were approximately 4.700 gymnasium schools (students aged between 11 and 15) in Romania [1]. Students are dealing with ICT starting from the Primary school, when they have 1 or 2 classes of introduction to computers.

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 [5]. According to the same document, namely Statistical Yearbook 2012 [5], 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 [18].

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 create a culture of quality and improve the learning outcomes, being the national public institution under the Ministry of Education, with legal personality approved by Law no. 87/2006 [8]. Every year, A.R.A.C.I.P. is evaluating around 450-500 schools, both private and state-owned [11]. County School Inspectorates are also subordinated to the Ministry of Education.

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 [11]. 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 [11], among them 32 were external evaluators [9]. 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 [11].

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).

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 1st September 2013 is performed using an on-line platform 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 [12, 13], Romania is ranked below other countries from the region in terms of secondary education performance. This is mainly due to under-funding and a rigid and overly centralized system. A comparative assessment 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 Czech Republic, Hungary and Estonia, which had approached the Western educational features on one hand; on the other hand the remaining Central and Eastern European countries, including Romania, with a much poorer performance, didn't prove the capacity to educate its young generations in order to become competitive on the EU 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 those of successive PISA tests drawn up by OECD, suggesting that the performances of Romania's secondary education are far below than of those countries from the region that have managed to close the gap with the Western states [12]. Moreover, according to Mathematics performance among PISA 2012 participants (65 countries), at national and regional levels, Romania had a score of 445 points, the upper rank being 43, and the lower rank being 47, respectively [13]. 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 [22].

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 [25]. 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.

Moreover, in some cases, the schools have an internal evaluation strategy that is focused on the needs of pupils and development [23].

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 Presidential Commission for the Analysis and Policymaking in Education and Research adopted the Strategy ***Education and Research for the Knowledge Society***, with its main purpose 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 [16].

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:

- 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:

- 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, one that can bring prosperity, **sustainable development** and the personal development of each citizen.

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 [24].

Instead, the ***National Strategy on Digital Agenda for Romania 2014-2020*** doesn't mention specifically the issues of e-learning or sustainable development.

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 [2], in Romania there are fewer computers (desktops and laptops) available for students than the EU average. For example, at 8th grade, Romania ranks at the low end of the scale on this indicator with 13 students per computer, 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 [3]. 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 [4]. According to the report of the Ministry of Education from 2010, there were more than 4 million beneficiaries of the SEI program across Romania [7]. Even so, Romania is in the lower half of countries as regards to the virtual learning environments at all grades [2].

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 around 25% 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 [2].

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 [6].

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 terms of the quality of the education system [14]. On the other hand, according to the report ***Digital competences in the digital agenda*** published by European Commission, Romania ranks 2 at European level in terms of 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 [15].

Starting from 2006 approximately 200.000 students from pre-university school have received a PC voucher through the Euro 200 program, enabling them to purchase a personal computer [10].

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

In Romania, in the lower and upper secondary level, teachers who teach ICT are different from those who teach at primary level field, so it is the responsibility of ICT teachers to teach this subject. 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. It is therefore essential that all teachers receive the training they need to create these opportunities for 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 knowledge and skills in ICT through continuing professional development [19].

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 [4]. 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 [7].

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 [20].

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 [21].

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).

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.

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 Ploieşti), 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:

- 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 [17].

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* [26].

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 [27], 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 precious 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

Generally speaking, the 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

1. *Ovid Caledoniu* Technological High School Tecuci-Galaţi
2. *Dinu Bratianu* Technological High School Ştefăneşti- Argeş
3. *Ştefan Bănulescu* Technical College Călăraşi
4. Technological High School from Giurgiu
5. *Elie Radu* Technical College Ploieşti-Prahova
6. *Ion Ghica* Economical College Târgovişte-Dâmboviţa
7. *Lazăr Edeleanu* Technical College Ploieşti-Prahova

8. *Ovidius* Theoretical High School Constanţa
9. *Matei Corvin* Technical College Hunedoara
10. Energy Technical College Bucureşti
11. *Vasile Sav* Technological High School Roman-Neamţ
12. *Dimitrie Leonida* Technical College Timişoara-Timiş
13. *Ion Ghica* Economical College Bacău
14. *Nicolae Iorga* Theoretical High School Vălenii de Munte-Prahova
15. Teacher Training Center Piteşti-Argeş

Serbia Country Report

Prepared by Vitomir Jovanović and Nataša Simić country

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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 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. They propose general and special achievement standards, competence standards for teachers and preschool teachers and their professional development, competence standards for managing directors of institutions or 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 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 (PISA 2012).

1.2. Serbian strategic documents and its main aims

Strategy for Development of Education system 2020 (SEDS 2020) 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.

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" 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 and for national level are:

- 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:

- 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:

- 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. 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.

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.

Regarding economy, 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. 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.

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 pre-requisite of flexibility in the labour market and to ensure that quality education is accessible to all. Serbia has to strengthen early education and develop a system of permanent education, and through changes in the system of education to provide complementarity of theoretical and practical knowledge, meaning broad competences of educated people in line with changes in technology and changes in the economic environment. The biggest problem of the current (unsustainable) system of education in Serbia is lack of efficient and effective education, a low educational level of the population, and the rigidity of the existing (outdated) system of education.

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. The level of environmental awareness in Serbia is very low. According to the Strategy, average citizens of Serbia do not have a developed positive awareness of the need to reduce pollution, establish rational use of energy and non-renewable

resources. 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. 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 μg/m³). In Bor and Belgrade over the past ten years, the annual limit of ambient air concentrations of SO_2 was permanently above the allowed limit. Strategic goals are to harmonize national legislation relevant 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 public awareness.

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, more than half of population are internet users (58, 5%). There is not 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.

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 all computers in teaching and learning. Data that may worry is that there are 10% of schools without informatics as a subject.

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.

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 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" (Standards of Teacher Competencies and their Proffesional Development, Institute for Improving Quality of Education, National Education Council).

Concerning initial teacher training, ICT was not a part of it, but 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).

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 (p. 78, SEDS, 2020).

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

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).

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.

The goal is to fulfill set goals of high and medium priority "Guidelines for Improving ICT Use in Education" in next five years.

3. Sustainable Development (SD) in Education

3.1. Representations of SD themes in national curriculum

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.

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 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, curriculums rarely comprehensively present SD. Although there are mentioning of SD in the goals and tasks in most of analysed curriculums, 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 curriculums, 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*, 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, 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.

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 curriculums, 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

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).

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, www.matematiranje.com, www.srpsijezickiatelje.com, 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). 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 write 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 8th 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

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2. Jelena Stanisavljević, PhD, Professor, Faculty of Biology, University of Belgrade
3. Slavoljub Jovanović, PhD, Professor, Faculty of Geography, University of Belgrade
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Slovakia Country Report

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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).

National Institute of Vocational Training is responsible for state educational programme (curriculum) at secondary vocational schools (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).

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).

Methodology and Pedagogy Centre delivers the following services: provides continual education for pedagogues and other staff; provides expert methodological support in the area of continual education of pedagogical and non-pedagogical staff; carries out research and publishes various materials. There are several regional offices all over Slovakia (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 and a specialised scientific public library focused on technical sciences and statistical data for prognoses and management of education (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.

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.

A lot of attention is paid to better linking 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. The state institutes formulated the state education programmes (curricula) and the schools adopted 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.

Strategic framework: The EU-wide strategy Europa 2020 is in Slovakia mirrored in *National Reform Programme* setting structural measures to achieve sustainable economic growth, employment growth and growing of quality of life. Education is included in the *National Reform Programme*. *National Strategy for Global Education 2012-2016* is a strategy promoting the principle of global thinking in learning. *Strategy of Informatisation in Education Sector by 2020* (2013) 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.

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.

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.

The *Partnership Agreement 2014-2020* 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).

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. Sustainable development as such is not mentioned and is included in the concept of environmental education.

With regard to ICT, the state curricula for general and vocational secondary schools include the subject Informatics to cover the areas: Information around us, Communication on the basis of ICT, Algorithmic thinking/Problem solving, Principles of ICT functioning, Information Society.

With regard to environment, the state curriculum for general secondary schools introduces a cross-cutting subject Environmental education with the aim to introduce the environment in its complexity of relations among various organism and man-nature and make students to understand that only their harmony leads to sustainable development. The state curriculum for vocational schools contains the features of environmental education in all subjects with the same aim as in general schools.

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.

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 informatization 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.

The Commission 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 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.

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 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.

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, the *Report on State of Education 2012/2013* states that for example the interactive boards are often used only as a screen.

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. 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.

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.)

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. 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).

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. 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.

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.

For example, the graduates of the Faculty of natural science 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.

The national curricula of most of subjects comprise the development of digital competencies as one of priorities.

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.

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 simulation, 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 though provision of digital teaching materials).

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, 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.

The *Report on State of Education for 2012/2013* states that 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%).

According to the *Report on the State of Education 2012/2013*, the use of didactic technology and ICT is rather low and the reason is the low level of ICT skills of teachers. Another problem is the aging of ICT and insufficient funding of new purchases. Teachers also stress the missing technical support for hardware and software at schools.

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. But is seems it 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
- Broadbank 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.

Newly launched national project *Modern Education – Digital Education for General Knowledge Subjects (2013-2015)* has the aim to introduce new education content at the 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.

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.

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 subject Environmental education. Its aim is to form the pupil's personality so as he/she understands the relationship between a 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.

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 *Decade of Education for Sustainable Development* proclaimed by UNESCO for 2005-2014.

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.

The subject 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.

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.

The *Report on the State of Education in 2013/2014* states that the environmental education at general secondary schools was included into the topics developing one's moral standpoints and values. 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 *Report on the State of Education in 2012/2013* states that "regarding practical use of theoretical knowledge in problem solving tasks, the teachers managed to link the results with the impact on the environment". The topics which were covered the 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). 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 cross-cutting topic of Environment education).

Participation 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". 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. It is formulated by a 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. It 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.

A part of the Strategy is formulating the new content of the cross-cutting subject 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 among others 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.

4. Teacher's view about e-learning and education for sustainable development

In general, 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 opinion of 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 continual education courses provided by Methodology and Pedagogy Centres. According to one of the MPC staff, 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 offered subject of ecology and SD since 2004.

The teachers believe that SD should be more dealt with, 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 subjects is falling. The teachers would appreciate a more interdisciplinary attitude towards this topic. (Before 2008, there was a specific subject of Ecology at 4th 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 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. Based on these, we received two applications, supported by the school management, to participate in the project.

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 continual education and pupils through subject 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 eTwinning which supports the cooperation of European schools through the use of ICT and 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.

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na gymnáziu v školskom roku 2013/2014 v SR.(The Report on the State of Education 2013/2014)

7. List of stakeholders

1. Riaditeľ odboru prierezových aktivít, Úrad vlády SR *(Director of Department for Cross-cutting activities, Office of Government of the SR)*

2. Splnomocnenec vlády SR pre vedomostnú ekonomiku MŠVVŠ SR *(Plenipotentiary of the Government for Knowledge Economy, Ministry of Education, SR)*

3. Štátny pedagogický ústav *(National Institute for Education)*

4. Štátna školská inšpekcia *(National School Inspection)*

5. Štátny inštitút odborného vzdelávania *(National Institute of Vocational training)*

6. Metodicko pedagogické centrá *(Methodology and Pedagogy Centres)*

7. Národný ústav certifikovaných meraní *(National Institute for Certified Educational Measurements)*

8. Centrum vedecko-technických informácií *(Slovak Centre of Scientific and Technical Information)*

9. Slovenská akademická asociácia pre medzinárodnú spoluprácu *(Slovak Academic Association for International Cooperation)*

10. Riaditeľ odboru školstvo, mládež, šport, Úrad Bratislavského samosprávneho kraja *(Director of Department of Education, Youth and Sport, Office of the Bratislava Self-governing Region)*
11. Stredná odborná škola, Ivánka pri Dunaji *(Secondary Vocational School)*

12. Gymnázium Ul. Ladislava Sáru 1, Bratislava *(Secondary General School)*

13. Gymnázium Metodova 2, Bratislava *(Secondary General School)*

14. Gymnázium Jána Papánka, Vazovova 6, Bratislava *(Secondary General School)*

15. Prírodovedecká fakulta UK *(Faculty of Natural Sciences, Comenius University)*

16. Špirála – celoštátna sieť organizácií venujúcich sa environmentálnej výchove *(Spirala – national network of institutions devoted to environmental education).*