



**Promotion of Lifelong Learning of Scientific Subjects:
Challenges, Opportunities and Strategies
The Bulgarian National Report**



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NATIONAL REPORT OF BULGARIA

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ABSTRACT

The Educational conception "Life long Learning" opens opportunities in front of the particular person to live a dynamic and reasonable life, to develop a personal, professional carrier and good perspectives. The dynamics of the modern economy requires constant increase of the qualification of the people, acquiring new knowledge and skills in order for them to become more adaptable to the needs of the labour market. This report presents in brief structure and contemporary status of Bulgarian education system (school, tertiary and adult education) with their strong aspects, weak points, possibilities for further development and possible obstacles and negative tendencies in effecting this development. An analysis of main obstacles to Lifelong Learning of Scientific Subjects, including basic factors in education in chemistry, is also presented. The most important and successful strategies and initiatives developed at national and local level to promote Lifelong Learning of scientific subjects are described. Conclusions about the national policy and instruments for effective implementation of this policy are drawn.

1. INTRODUCTION TO THE NATIONAL SITUATION

1.1. Bulgarian education system

1.1. 1. School education

A. Structure

Schooling in Bulgaria includes training and education of students from grade one to twelve and is carried out in the following basic types of school:

According to the way of funding:

- state schools – these are funded from the government budget through the institutional budget allocations of the Ministry of Education, Youth and Science or some other Ministries or government bodies;

- municipal schools – they are funded from the municipality budgets;

- private schools which according to the provisions of the law are not funded through budgetary instruments.

According to the level of education offered they are:

grade schools - Grade education is carried out in two stages (primary and elementary) and respectively :

- Primary stage involves – primary schools /I-IV grade/; elementary schools /I-VIII grade/; secondary comprehensive schools /I-XII grade/; schools of arts and special purpose schools.

- *Elementary stage involves* – grade schools /V-VIII grade/; secondary comprehensive schools /I-XII grade/; schools of arts, vocational schools; sports schools; special schools.

secondary schools - *Secondary education* is carried out in high schools, profiled high schools /VIII-XII grade/, vocational schools, special schools and schools of arts.

According to the content of training:

- comprehensive schools;

- vocational schools;

- special schools.

Training is carried out at above type of schools. Vocational colleges are also included in this list as they offer training after secondary school graduation [1,2].

B. Present status of school system

Total number of schools in the country at the beginning of 2009/2010 school year amounts to 2688 of which: comprehensive schools – 2121, vocational – 487, special schools - 80; state schools – 471, municipal schools – 2092, private schools – 137.

The number of students as of September 15th 2009 according to the figures provided by regional school inspectorates is 627163. Last decade marks a persistent tendency of students' number reducing due to the demographic crisis (Fig. 1)

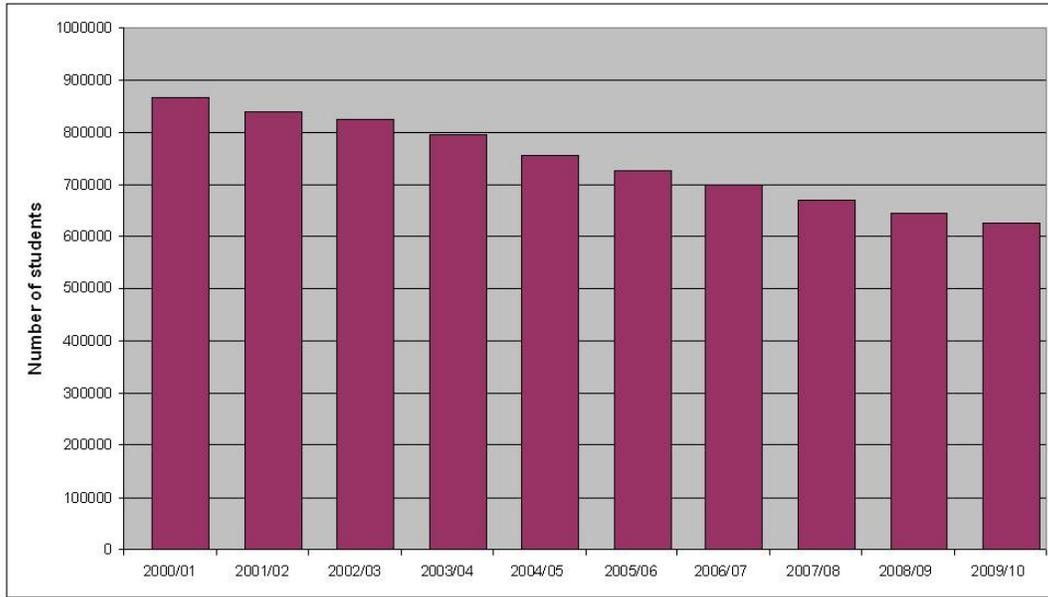


Fig.1. Number of students in Bulgarian schools for the period 2000-2009

Over the last few years the number of students which have dropped out from the school system is considerable (fig.2.). For the last 3 years the statistic is:

- for 2006/2007 – 29 348 out of 904 911 students;
- for 2007/2008 – 23 365 out of 860 042 students;
- for 2008/2009 – 20 055 out of 820 210 students.

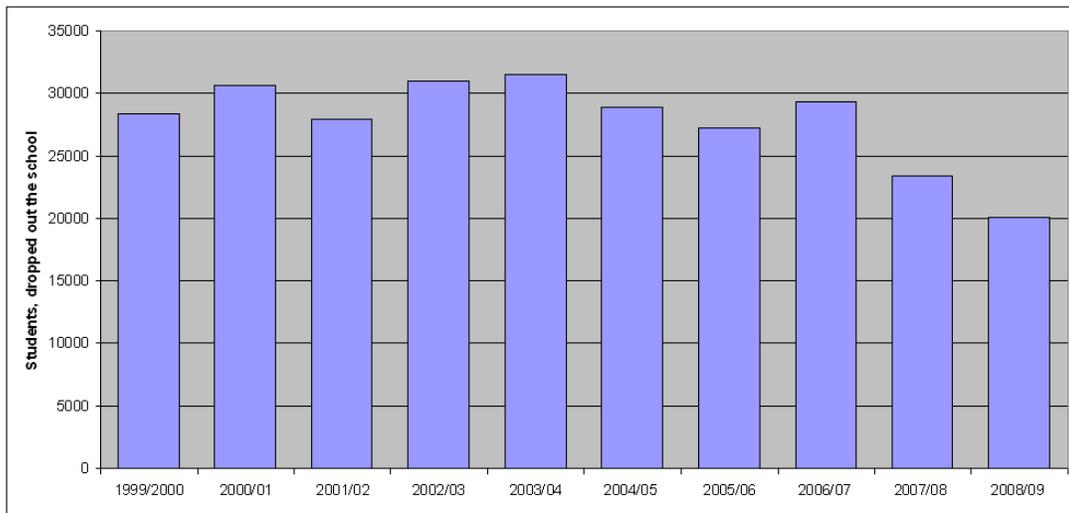


Fig.2. Number of students, dropped out from the school system (2000-2009)

Contemporary school system analysis indicates the following:

Strong aspects:

- Relatively well developed network of schools which guarantees comparatively decent access to education
- New model of funding based on unified expense rates for the support of one school child
- Relatively well developed system for providing access to education – free transportation; free course books and study aids for all school students from grade 1 to grade 7; e-based study contents; special purpose program for additional work with
- Low and high performers.
- Programs for upgrading of the necessary school equipment.

- System staffed by teachers with university degrees.

Weak points:

- Large disproportions in the quality of education offered by schools across the country,
- A considerable number of unschooled students and drop-outs at school age
- Insufficient financing;
- Tight centralization and lack of autonomy for educational institutions which renders them unable to follow their own school policies.
- Poor practical orientation of training and study contents which do not correspond to the contemporary needs of young people; low level of utilizing modern teaching methods.
- Unified approach to learning and educational processes disregarding the individual needs and gifts of students.
- Outdated system for vocational training and poor contacts with business.
- Underrated educational role of Bulgarian school.
- Underdeveloped forms of life-long learning.
- Inadequate upgrading of school facilities and equipment

Possibilities for further development of the educational system:

- Development of integrated learning content and enhancement of practical applicability of training and its orientation to concrete practical outcomes.
- Development of complete and effective system for introducing, sustaining and rewarding qualification of pedagogical specialists and adoption of career development system
- Improvement of vocational training quality and provision of conditions for more effective connections with business.
- Granting greater autonomy to educational institutions which allows for development and implementation of their own school policies.
- Enhancement of both effectiveness and appeal of the learning process and school environment.

Possible obstacles and negative tendencies in effecting this development:

- Widening of the gap of disproportion in education quality observed at individual schools.
- Rise of illiteracy percentage among young people.
- Considerable number of unschooled and dropped out students mainly from ethnic minorities which results in their ousting from the process of worthwhile social realization.
- Low interest in opting for potential teaching career which results in aging pedagogical staff and inadequate number of young highly qualified and well motivated specialists at school; feminization of teaching profession.
- Poor appeal of vocational training and learning, lack of qualified specialists and low level of manifested interest on behalf of business [3].

1.1.2. Tertiary education system

A. Structure

At present the tertiary education system in Bulgaria comprises 51 institutes of higher learning (37 state run and 14 private) including 42 universities and specialized institutes, and 9 individual colleges. According to the release of the National Statistical Institute for 2009/10 academic year the system of tertiary education in Bulgaria is characterized by the following indicators:

Total number of undergraduates and postgraduates – 283 236, of which

- students enrolled in state run institutes of higher learning – 220 260;
- students enrolled in private institutes of higher learning – 62 976.
- 254 289 students following Bachelor and Master's degree courses plus 3625 enrolled in doctorate programs (PhD courses)

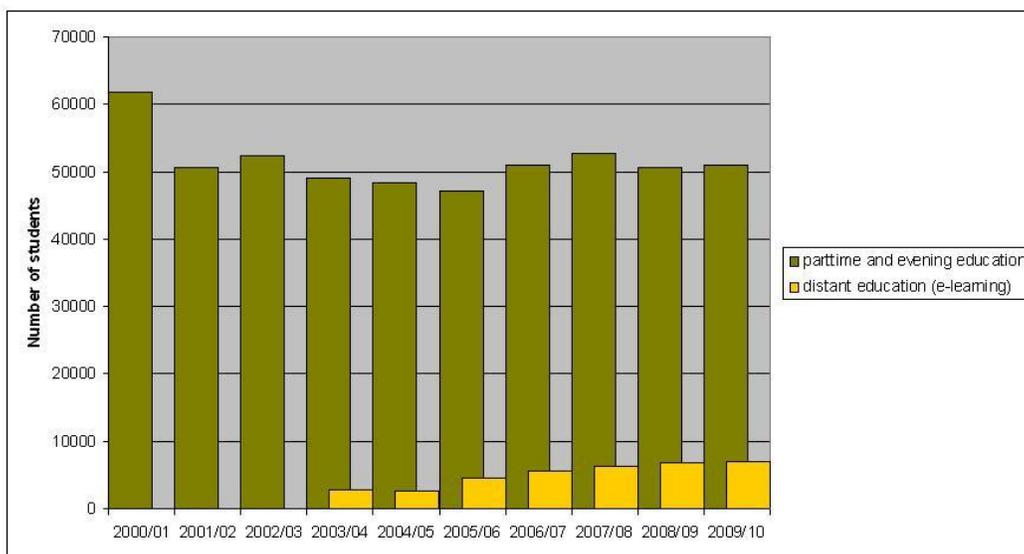


Fig.3. Number of student in part-time and distant tertiary education

Academic staff - 23 207 of which:

- 20 535 teach in state run institutes of higher learning;
- 2 672 teach in private institutes of higher learning.

Bulgarian higher education system is a three-cycle system (bachelor, master and doctor). More specifically:

First degree. Following a minimum of 4-year course of instruction the graduates acquire the educational and qualification degree of Bakalavar (Bachelor's degree). Training for each specialty is finalized by sitting for state examinations or defense of a diploma thesis.

Second degree. Following a minimum of a 5-year course of instruction, or an extra year after the Bachelor's degree, the graduates acquire a Magistar (a Master's degree).

The total number of students enrolled in the two cycle degree system in the academic year 2008/09 was 262 019.

Third degree. It requires minimum a 3-year course of instruction after the Master's degree or a 4-year course of instruction after the Bachelor's degree. Graduates are awarded a Doktorat (a doctor's degree). Doctoral students work according to individual plans and should prepare and defend a dissertation.

Last years the number of student in part-time and distant university education increases (fig.3). It is visible that these forms of education become more and more attractive because of the possibility to save the work during the training [1,2].

B. Present status of tertiary school system

The current survey of the academic system status indicates the following:

Strong aspects

- Introduction and adoption of three degrees of academic training: Bachelor, Master's and Ph.D (in accord with the Bologna process);
- Development of Classifier for the areas of tertiary education and professional trends;
- Introduction of joint program learning with leading EU universities concluding with certified graduation diplomas issued by both partner universities;
- Instituting of the National Agency for Evaluation and Accreditation as independent agency at the Council of Ministers;

Weak aspects:

- Lack of holistic vision (strategy) for development of tertiary education;
- Dysfunctional Act for crediting undergraduates and postgraduates;
- Degree courses and academic programs are not accorded with the needs of the labour market; student admission to universities is not bound to the real figures demanded by the national economy.
- Outdated regulation;

- Aging academic staff, poor motivation and underrated social status of academics; lack of interest in following academic career;
- No diversified sources of tertiary education funding; ineffective system for financing and allocation of the government grant;
- No unified performance rating system for higher education schools;
- Deficiency in research activity during training of students, lack of innovations and inadequate level of cohesion between higher education institutes and science;
- There are real problems with the issuance of the European diploma/certificate supplement and the formal application of the European Credit Transfer System (ECTS);

Possible trends for further development of educational system:

- Establishment of higher schools as potential lifelong learning centres. Development and introduction of performance rating system for all institutes of higher learning;
- Updating and harmonizing of underlying regulation;
- Strong emphasis on the private sector in tertiary education; stimulation of partnership with business;
- Enhanced practical orientation of training and learning at universities and colleges;
- Provision of equal access to quality higher education and proper economic conditions for students;
- Creating grounds and developing a system for enhancement of motivation and professional progress of academic staff.

Potential pitfalls and negative tendencies hindering the progress of this process:

- Substantially lowered interest in Bulgarian higher education;
- Lack of enough well prepared specialists in the fields of priority;
- Insufficient number of academics;
- Institutions of higher education and academic training offered in there are uncompetitive;
- Quality of academic training shows clear downward tendency [3,4].

1.2. Lifelong Learning concept (LLL)

1.2.1. Current situation

In compliance with the Bologna Process priorities, Bulgaria is also developing lifelong learning (LLL). In fact, Bulgaria has a long-standing tradition in organizing continuous training within the higher education system. A variety of educational forms has been offered to those wishing to continue their education, with accredited units for ongoing, continuous and post-graduate training operating at almost all higher education institutions.

Lifelong learning encompasses all formal and informal target oriented activities aiming at improvement of individual knowledge, skills and competencies both regarded in terms of professional and general interest; personal and social objectives [. It is carried out in the following forms:

- **Formal education and /or training** – it is carried out within the structure of the educational system or at Vocational Training Centres. It leads to the acquisition of a degree of education and or degree of professional qualification.

- **Informal training** – It is, as with formal education, target oriented and organized (courses, private lessons, workshops, on site training) and does not lead to acquisition of a degree in education or professional qualification.

- **Individual training** – purpose oriented learning activity aimed at raising the level of personal knowledge and skills(training is effected with the assistance of a family member, a colleague or friend; through the use of printed materials such as course books , professional journals, reference books , computerized study courses , watching TV educational programs and using audio/video CDs etc.)

Educational structure of population based on the National statistical Institute data (adult, 25-64 age segment taken for the year 2007) is shown on figure 4. More than 50% of people have secondary school degree. This part of Bulgarian people is the main potential target group for LLL or continuing education.

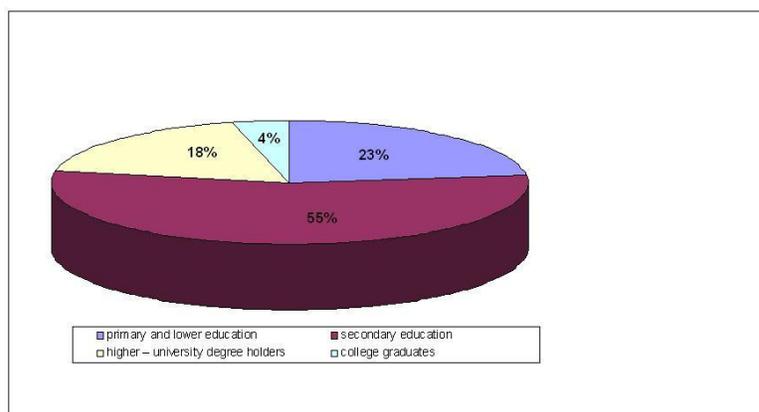


Fig.4. Educational structure of Bulgarian population

Education and training for adults is not a common practice in Bulgaria. One of the goals in the sphere of employment, which is written in the Lisbon strategy papers, refers to "lifelong learning" and sets the average level of involvement in such activities for EU countries to reach in 2010 the figure of 12.5% of all actively working adults (age group 25-64 years). A survey conducted in 2005 by Eurostat among the labour force of EU countries indicates that Bulgaria is the poorest performer with a mere 1.3% of its employees and civil servants being involved in training programs during the last four weeks prior to the survey.

However, despite these findings, the National Statistical Institute has conducted a series of surveys related to the level of participation of adults, aged 25-64 , in one of the forms for lifelong learning. Reported figures vary from 16% for 2003 to 48.5% for 2007.

Common factors contributing for this increase are:

- Overall economic growth of the country;
- Substantial change in the attitude of both employers and actively involved employees toward education and training;
- Active target oriented policy of government institutions;
- Bulgarian membership in EU and the subsequent implementation of many European programs which include measures and learning activities.

A close analysis of the survey outcomes indicates that:

- over one third (36.4%) of the population from the 25-64 age segment were involved in at least one form of formal and , more frequently, informal training by the end of 2007. There is an insignificantly small difference in the percentage of participation of men - 37% and women - 35.0%, respectively. Another interesting observation was found in the fact that only 19.7% of those who had participated in some type of formal or informal training declared their willingness to take part in other similar activities. The remainder 80.3% expressed their unwillingness to continue their possible participation in other types of related learning activities. These data are indicative of a prevalent attitude among the segment of actively employed persons (aged 25-64)to be involved in formal and informal education or training only for the purpose of acquiring the needed level and confined solely to the period under survey, unwilling to enlarge their involvement over and into other similar learning activities
- Individual training covered 28.0% of the population from the segment aged 25-64. Ladies seem to be more active with their 29.7% as compared to men whose share is 26.2%.
- Persons from younger age segment, e.g (25-34) are considerably more active in formal and informal education or training with their 44.7% as compared to 39.7% for the age segment 35-54 and 20.3% for the age segment 55-64.
- Every third person, that is 35.2% of the population in the age segment 25-64, has participated in at least one informal training. For 96.3% of the participants their informal training was closely related to their work whereas for 89.5% their informal training was conducted mostly during their work time.
- Most active participants in learning activities are found among university degree holders 71.1% of which have participated in some form of education or training during the last 12 months prior to the survey. Every second person with a university degree i.e. 50.0% from the population of the 25-64 age segment has participated in some form of informal training for a period of 12 months. This percentage is comparatively lower, 38.2% for secondary school graduates or holders of first level of professional qualification; it is lowest - 15.0% for persons with primary and lower education. Differences in percentage outcomes are much more considerable for the representatives of the three levels of education in terms of their involvement in individual learning which is 54.9%, 24.6% and 10.1% respectively.
- Employed persons participate in various forms of Lifelong learning more actively- (62.1%) as compared to those regarding themselves as unemployed - 19.9 % and those who are economically inactive - 18.6%. Half of the employed - 49.3% have participated in at least one form of informal whereas those who regard themselves as unemployed or economically inactive the percentage rate of participation is 6.3% and 4.2%, respectively. The latter category direct their efforts toward individual training 15-16% rather than getting involved in informal training.
- Almost $\frac{3}{4}$ (72.0%) of all participants in informal training have taken part in one form of training for a period of 12 months prior to their interview ; every fifth participant - 19.7% has

been involved in two trainings ; 3.1% have participated in three trainings and 2.4% have covered four or more trainings.

- Places of residence also affect involvement in lifelong learning as urban residents' share in this process is 52.2% as compared to the percentage of those living in the country - 38.0%. City and town residents are more active and have a wider range of possibilities for participation in informal training -38.1% as compared to those living in the country - 27.2%. Individual training percentage is represented by similar tendency with 31.1% for urban population and 19.1% for the country.

The outcomes of this survey are indicative of a prevalent attitude among those in active work age 25-64 to get involved in formal or informal education or training only in the necessary level and for the period of survey, unwilling to continue their participation in other similar activities of learning.

1.2.2. National strategy and priorities in the field of lifelong learning

The Bulgarian government defines the expansion of activities as well as granting wider access to different forms of educating adults both within the formal system of education and outside it as a very important task. Teaching adults is viewed within the context of a whole strategy for encouraging life long learning (LLL). It includes all types of training activities during a person's life, which aim at developing knowledge and competences of personal, civic, social and/or professional nature. Within the Bulgarian context, participation in different forms of educating adults has been motivated by pragmatic considerations mostly and has been aimed at granting direct access to the labour market and increasing the competitive power of both the employed and the unemployed.

In the past couple of years, there have been several growing tendencies, which determine the increased necessity to educate adults in various spheres:

- The number of school drop-outs is growing – every year between one-fourth and onethird of all students do not finish their secondary education (fig.2). Having no professional qualifications, such young people have poor chances to succeed in life;

- Vast increase in the number of unemployed specialists holding a Bachelor's or a Master's degree. The latter is due to the number of students admitted to universities being unrelated to the real demands of the labour market;

- Another tendency, worth noting is that a great part of the specialists with a tertiary education degree take a position requiring lower qualifications. Despite their high qualifications these people turn to different forms of education, re-training, master's programmes in other spheres in order to increase their own competitive power on the labour market [1,3]

A National Strategy for Continuing Professional Training (2005- 2010) has been developed by the Ministry of Education, Youth and Science, Ministry of Labour and Social Policy, the Ministry of Economy, the Ministry of Finance, the National Agency for Vocational Education and Training, the Bulgarian Chamber of Commerce and Industry, the Bulgarian Industrial Association, and the Confederation of Independent Trade Unions in Bulgaria. The emphasis was laid predominantly on activities determined by the above reasons. All these activities are a significant part of the process of development of secondary and tertiary education in the Republic of Bulgaria, which the major trends are those connected with:

- o life long learning
- o quality of education
- o equal access to education
- o educational institutions offering vocational training
- o employers' organisations – labour market
- o development of the system of teacher training
- o implementation of ICT in education

The general aim of adult education is to prepare the citizens for realization in the economy and in other spheres of public life by creating conditions for acquisition of vocational qualification and its constant improvement. Depending on the needs of society and of the individual person, the specific objectives of adult education are related to giving a "second chance" to people who have prematurely dropped out of the education system, facilitating the access to the labour market by acquiring qualifications in those professions for which there are available positions for employment and demand for specialists, supporting the professional realization of the unemployed. In accordance with the above, the main objectives of the system of adult education are:

- acquisition of vocational qualification;
- gaining legal capacity to practice professions which requires it;
- constant improvement of vocational qualification;
- formation of a system of incentives for realization within a civil society;
- enriching general knowledge on the basis of national and universal values.

Structures, which provide opportunities for acquisition of new personal professional knowledge and skills, are termed Centres of vocational training (CVT). A network of centres of vocational training has been built which supplements the possibilities for training offered by the system of public education

(Fig.5).The centres offer people over 16 years of age flexible and adjustable programmes, depending on the needs of those requesting education and the learners, combining and building on skills and competences. The National Agency of Vocational Education and Training is the institution, which licenses the CVTs, keeps a register of CVTs and exercises consistent control.

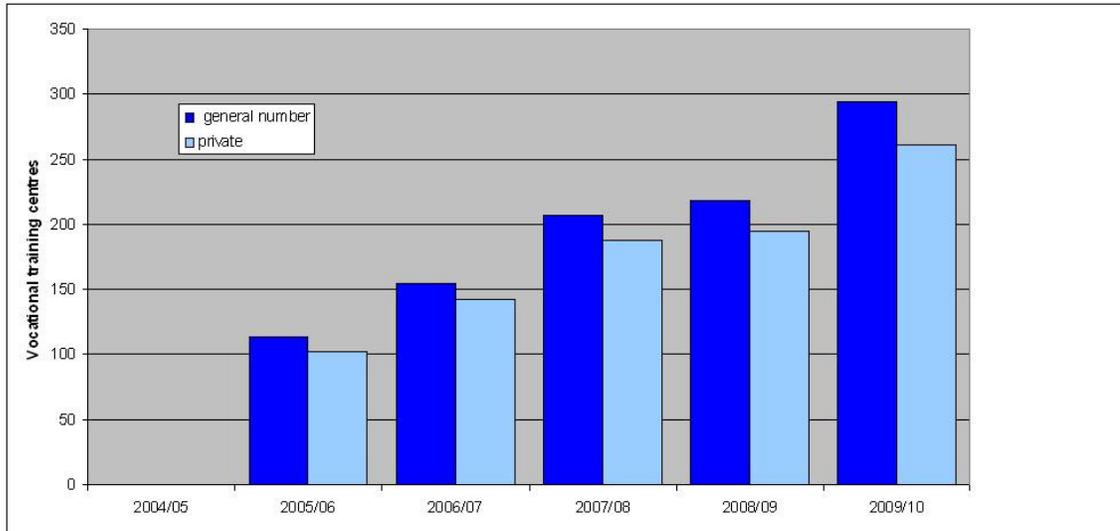


Fig.5. Number of Centres of vocational training

There are a number of other suppliers and those who assign training from the state-owned, the private and the nongovernmental sector:

- *Adult education and continuing professional training offered by vocational schools and high schools* - these are viewed as suppliers of great potential as they have greater capacity to take into account the needs of the labour market and quality of education when preparing their courses;

- *Adult education offered by evening upper secondary schools* - evening schools continue being the major form leading to a secondary school diploma for those who work and adults above 16 who have dropped out of schools because of a number of reasons;

- *Adult training offered by tertiary education institutions* - there are two groups of adults who seek tertiary education – people holding a secondary education diploma who want to get a tertiary degree (most often they look for forms of distance learning) and people holding a tertiary degree seeking a master's or re-qualification degree or taking part in short-term courses and specializations for developing of existing skills

- *Adult education and continuing professional training offered by the Bulgarian-German Centres for Vocational Training* - these centres represent a well-established high quality institution, so the Ministry of Labour and Social Policy and the Ministry of Education, Youth and Science seek for ways to integrate this model in the practice adult education and continuing professional training.

- *Adult training offered or assigned by the National Employment Agency and the Labour Bureau departments (LBD)*- the consumers of LBD services are the unemployed, employers and employees who use the new scheme for financial support in cases of adult training and continuing professional training provision;

- *Adult training and continuing professional training assigned by enterprises* – different enterprises (mostly the biggest national and international ones) supply of continuing professional training as far offering inservice training for their employees is concerned; out of the 28% of the firms offering continuing professional training for their employers, 77 % offer continuing professional training in the form of training courses, 25% invite other firms to carry out continuing professional training, training at the work place – 65% etc.

- *Adult training and continuing professional training offered and assigned by the social partners* - the national syndicates and employers have established training centres mostly for employees and for the unemployed; the National Centre for vocational training at the Bulgarian Chamber of Commerce and Industry has been licensed also to offer training in the sphere of forestry, textile and shoe-making, leather industry, hotel and restaurant management, catering, finances, banking and insurance;

- *Adult training offered by private suppliers including non-government organizations (NGO's)* - the community centres (chitalishta) network comprises 3,500 community clubs (traditional Bulgarian cultural and training centers, in most cases partially supported by the Ministry of Culture and the municipalities) where can be organized language courses, computer clubs, music lessons etc.;

especially in smaller towns and villages they are the only places with access to libraries, which in itself is an important consideration in the light of the LLL conception;

- *“Znanie” network (an association for circulation of knowledge)* – it is the biggest Bulgarian NGO that offers adult training and supports suppliers of adult training through institutional building and development of human resources. In all big cities there are branches of the Association with centres, teachers and other specialists who popularise LLL; the main target groups consist of people with low qualifications, permanently unemployed and socially isolated people.

In the Private sector there are the following centers: “Veda consult”, Gabrovo – an adult training centre; Training Centre at the Novotel, Plovdiv (training for waiters, barmen and similar vocations from the sphere of tourism); “Dančovata kashta” Restoration center in Plovdiv (a centre for continuing professional training in crafts) and many others [1,2,3,5,6].

Generally, the main sources of adult education funding are:

- State and municipal budgets;
- Professional Qualification and Unemployment Fund;
- Household budgets;
- Internal corporate funds for occupational training;
- External sources.

1.3. National and regional public bodies and agencies in charge of the support of Lifelong Learning in scientific subjects

1.3.1. At national level:

- **Ministry of education, youth and science (MEYS) and its General directorate “ structural funds and international educational programmes”** – one of the main programmes is the Operational Programme “Human Resources Development” - The strategic goal of the Operational Programme is to improve the quality of life of people in Bulgaria through enhancement of the human capital, achievement of high employment levels, improvement of the productivity, access to high-quality education and lifelong learning and strengthening the social inclusion; the directorate has a well-developed frame of regional coordinators in all over the country.

- **Ministry of labour and social policy (MLSP)** – in co-operation with MEYS the ministry is responsible for activities under the Operational Programme “Human Resources Development”; the regulation body at national level is General directorate “European funds, international programmes and projects;

- **National Agency for Vocational Education and Training** - specialized body to the Council of Ministers of the Republic of Bulgaria established in 2000. Its mission is:

- Assuring and maintaining quality in the vocational education and training of young people and adults according to the labour market needs and the development of the Bulgarian economy competitiveness;

- Cooperation with the social partners in implementing coordinated policies for lifelong learning, continuing vocational training and introducing successful European practices;

- Expanding the access of the unemployed and the employed to vocational education and training according to the labour market needs;

- Ensuring public access to useful information concerning the continuing vocational training and lifelong learning in the country and in the EU.

- Development of the List of professions for vocational education and training

- Development of State Educational Requirements (standards) for acquiring qualifications

- **Bulgarian National Agency of the Community Vocational Training Action Programme “Leonardo da Vinci”.**

1.3.2. At regional level:

- Regional Inspectorates of Education – there are 28 regional structures of MEYS, which support and control secondary schools activities.

- “Veda consult”, Gabrovo – an adult training centre.

- Vocational training centre – Technical University of Gabrovo – it is an authorized centre for adult education.

2. Main obstacles to Lifelong Learning of Scientific Subjects

2.1. In school education

Education starting from the kindergarten and continuing up to the higher school preserves and develops the learning skills, invention and tolerant attitude towards the “different”. The learning process helps all graduates to acquire solid skills for reading, writing, speaking and mathematical knowledge. It encourages them to think creatively, logically and independently, to argue clearly and precisely, take on responsibility and make individual and collective decisions. In addition, education builds up practical skills for managing, making decisions and relevant choices for health, carrier and the future; it develops aesthetic, cultural and civil sensitivity in children and young alike. All educational structures provide for the necessary information so that the parents and the pupils should make the most suitable educational choice for them.

Nevertheless, many of the students quit the educational system without enough training. A considerable number of them do not continue their education to a higher level and those who remain in the system do not acquire the necessary skills and competences, and do not meet the requirements of the employers. An alarming long standing tendency towards deterioration of literacy level is observed.

An essential feature of modern school education in Bulgaria is the fact that it is directed towards the abilities of the average student. In the existing traditional class-lessons system not enough attention is paid, and suitable forms and approaches are missing, in the work with poor performers and children of smaller learning capabilities or, on the other hand, with students with well expressed capabilities and talents in different fields of science and arts. All these processes are taking place against the background of overall international drop of interest in natural sciences at the expense of the larger interest in humanities and social sciences. The teachers in natural sciences are facing some challenges:

- The educative content of the relevant subjects is difficult to learn and is frequently presented in the incomprehensible, far-fetched language of the existing textbooks.
- Lack of actual inter - subject connections in the operative textbooks in the cultural-educational area "Natural sciences" which contribute to the comprehensive acquisition of knowledge about the natural processes and phenomena on behalf of the young people.
- Work with students having humanitarian interests and skills, who are well acquainted with the modern technologies, but not educated in the smaller classes to the necessary degree which would enable them to make logical reasoning and deductions [7-10].

2.2. In university education

Over the last few years Bulgarian institutes of higher learning have been facing the ever increasing competition on behalf of foreign universities. The National Agency for Assessment and Accreditation has not assisted much in providing for the real modernization and reforming of tertiary education institutions and, similarly, its contribution in creating a solid public trust in higher education has been marginal. Lack of clear rules for binding of the assessment marks with the system for encouragement or sanction of tertiary schools does not stimulate improvement of quality. Accreditations granted by foreign agencies for accreditation are not recognized [11-14].

There exist real problems connected with the issue of European diploma appendix and the formal application of the European Credit Transfer System (ECTS). The system which presently is in force is not harmonized with contemporary European (ECTS), yet. They account the equality between the work load and the outcomes of education. That is why a lot of students have difficulties with their (ECTS) credits acknowledgement (recognition) under the terms and conditions of mobility. There are no existing prerequisites for the universities to be turned into research centres.

In the light of the above, the challenges confronting higher education in our country generate additional gravity. Particularly the case in point is:

- Frequent criticism on behalf of employers concerning the quality and adequacy of preparation of higher schools graduates.
- Shortage of financial resources for the provision of modern educational process conducted by highly qualified teachers.
- Demographic crisis in the society, accompanied by diminishing the number of potential students amongst young people and increase in the number of the people in more advanced age who need to acquire new knowledge and skills.
- Change in the profile of the students as more and more of them opt for learning combined with some form of work [1, 11].

2.3. In the education of adults

Learning in situ (at work place) is implemented through various forms in Bulgarian companies:

- "learning by doing" and transfer of skilled personnel experience which is regarded as specially effective means for introducing of newly appointed staff into their scope of professional obligations;
- Informal education through lectures, seminars and courses organized by either the company or other external organizations aiming at enhancement of qualification of personnel and their adapting to introduced innovations;
- Independent individual education;
- Participation in the formal educational system.

Informal education and training is the most important of the various forms of learning at work place. Participation of Bulgarian employees in informal education is a result of their personal initiative. Higher education level is preferred for participation in the formal educational system on behalf of employees, therefore institutes of higher learning should be treated with special attention and developed into potential centres for lifelong learning. University strategies for lifelong learning should be developed in accordance with three basic principles:

- Flexibility at the entry and exit of educational institutions as well as during the very process of education (for example, accreditation of skills acquired at the work place);

- Orientation of the process of learning toward student needs and formation of certain competences;
- Building up networks and partnerships with other institutions of higher learning and most of all with concrete companies (businesses); establishing of various forms of collaboration between enterprises and educational institutions such as internships, recruitment of most promising performers, organizing modular courses for employees etc.

A survey conducted among adult trainees indicates that there are two main reasons for giving up the option of university studies after secondary school graduation:

- Financial - no financial possibility to pay for university tuition; this urges young people to start work and, consequently limits their options for formal education. In that case the only possibility for training is in the form of informal and individual learning [15-19]
- Lack of appropriate orientation concerning the preferred university or degree course. This leads to inadequate preparation, hence the poor performance at admission exams and the inevitable failure to enrol in the courses of study at the selected university [18, 20-22];
- Other – includes the obligation to do the military service [23].

2.4. Basic factors in education in chemistry

As a part of the fundamental education chemistry learning in Bulgarian schools starts in the primary school, continues in the secondary for a period of 2 - 3 years depending on the profile of the school and finishes in the university degree where (with the exception of the specialized universities) it is taught/studied for one semester [1].

According to learners some of the most frequently faced difficulties in chemistry studies at school are connected with:

- the content of course books which is difficult to comprehend [20]
- poor methods of teaching and inadequate and biased assessment of knowledge [16,20]
- outdated, inadequate or unavailable laboratory equipment which does not allow for conducting experiments and does not contribute to better comprehension of the taught subject [15,17,19,23]

These factors make up an overall understanding among school students that chemistry is an unintelligible and sophisticated science.

Most of the interviewed secondary school chemistry teachers share similar opinion concerning difficulties in acquisition chemistry learning material:

- Academic style of course book content which is difficult to understand for students - Course and reference books in chemistry abound in theorizing which encumbers the students and gives them poor motivation. This tendency is sustainable both at grade and high schools. Knowledge should be grounded on and oriented to practical experience [25-31];
- Depreciated material base and insufficient modern equipment [25 – 35] – the lack of proper equipment is one of the most serious problems related with the study of chemistry;
- No willingness and motivation to study [29,31 - 34];
- Lack of specialized literature written in easy to comprehend language for students who learn chemistry [26,27]
- Not enough training courses for teachers related to the interactive methods of teaching chemistry [30]

The process of teaching chemistry at secondary school level is accompanied with a number of difficulties and unsettled problems. According to teachers most negative impact is due to:

- Insufficient lab equipment and base [26,27,33,34];
- The number of chemistry classes is insufficient at school and, as the usual practice is, there is no time for lab exercises [25-31, 33-35];
- Large classes with no possibility to be divided into groups during lab exercises; There are no possibilities for normally conducted lab exercises and ensuing progress check [25,34,35]
- Too large lesson units- students are unable to extract the most relevant information [30]
- Students are inadequately capable to cull textual information, read charts, diagrams, graphs and chemical equations [25].

Young people are poorly motivated for learning chemistry after secondary school. Interest in learning chemistry has been plummeting for a long time and is rooted in the changes in society, organization of the learning process and the method of teaching this discipline in primary and secondary schools:

- The formulated notion that chemistry is a “difficult” and “dangerous” science - most of the students perceive chemistry as a complicated and incomprehensible science, filled with formulae, mathematic expressions and long inapprehensible terms. That’s why few of them prefer to have close meetings with it. This opinion is expressed both by learners and secondary school teachers [18,20,22,23,26,28]. The above mentioned is a direct result of the following reasons: disorderly and unclear content of course books; poor teaching - progress check and assessment were on a very low level [16]; outdated, inadequate or unavailable laboratory equipment which does not allow for conducting experiments [15,17,19,23, 25-25]; large classes, impossible division into subgroups
- No prospects for professional realization - chemistry is deemed inapplicable in opting for profession [25,29,32-35];

- Destroyed public system of values - long years of continuous disinterestedness of the state in the matters education and culture [25,31]

In general, there is no particular interest in chemistry - that is a process which has been going on for years. Chemistry is not topical because it remains underrated and the material taught is not oriented to practice. Personal attitude largely determines whether someone will continue with university studies in certain area/subject, chemistry included. The Secondary school is the venue where this attitude is generated. How the subject is taught is of crucial importance as well as its further practical applicability. Possible approaches for motivation of learners to study chemistry after secondary school graduation can be found in:

- Development of conditions for self-realization of young people within Bulgaria, not outside it. Young people should be offered clearly defined prospects for self realization and professional progress [25,29,30,32-35];
- By means of additional studies, explanations in easy to understand language and practical exercises [36,37]; by means of comprehensible literature [27,38];
- New hybrid specialties are to be developed such as computer chemistry, for example. Novel innovative methods of training are to be introduced relying heavily on ITC [25].

In conclusion, the following main reasons for the present state of chemistry learning in the country can be put forth as a summary of the points argued so far [39,40]:

1. Lack of precise vision and policy concerning the volume and quality of chemistry knowledge (theory and practice) at the different education levels (primary, secondary, vocational, higher - for chemists and higher education for non chemists) on behalf of the Ministry for education.
2. Shortage of financing for the educational and scientific institutions for modernization of the material base and for use of modern equipment.
3. Insufficient motivation of the learners, the teachers, firm leadership for life long learning (in particular in the field of chemistry).
4. Lack of synchrony between the specialists in information technologies who could work out interactive education and demonstration materials for visualization of difficult for demonstration "alive" of chemical processes and the teachers in chemistry who could present the corresponding tasks and education contents with the aid of these materials.

3. STRATEGIES AND INITIATIVES DEVELOPED AT NATIONAL AND LOCAL LEVEL TO PROMOTE LIFELONG LEARNING OF SCIENTIFIC SUBJECTS

A. National strategies and initiatives in the field of LLL

The most important strategies and initiatives at national level are:

3.1. National strategy for lifelong learning (LLL) for the period 2008 – 2013 [41]

The National Strategy worked out by Bulgarian Ministry of education, youth and science includes a conceptual framework for lifelong learning.

The aim of the strategy is to create conditions to all citizens in Bulgaria to develop their personal and professional knowledge, skills and capabilities, and improve their own welfare and the competitiveness of national economy through:

- increasing the adaptability of each man to economic and social changes;
- encouraging participation in all forms of lifelong learning for professional and personal development.

The strategy was presented by seminars held all over the country.

Results: the basis for creating a comprehensive system of Long-life learning has been established.

3.2. Program for Development of Education, Science and youth policies in Bulgaria for the next 4 years [3]

The program, presented by the Ministry of Education, Youth and Sports, aims:

- Achieving high quality of education.
- Ensuring equal access to education and opening up the education system.
- Development of conditions for implementation of the educational concepts "LIFELONG LEARNING".
- Incentives young people in the development and implementation of sector policies.
- Conversion of Bulgaria in the medium term Country in which knowledge and innovation are the drivers of the economy.

3.3. National strategy for continuing vocational training 2005 – 2010 [42]

The aim of the strategy is to support the vocation training reform creating conditions for its realization

Objectives: training process of over 16 years old persons for acquisition of professional qualification

Activities:

- Creation of conditions for equal access to continuing vocational training – developing of national informational system about vocational training, e-learning etc.;

- Enhancing the collaboration between government and social bodies, responsible for vocational training;
- Enhancing the quality of vocational training process;

Results:

- Creation of informational systems for continuing vocational training;
- Increasing the number of courses for continuing vocational training;
- Increasing the number and motivation of trainees;
- Creation conditions for real access to e-learning.

3.4. Festival of Bulgarian education

The Festival of Bulgarian education is not a commercial exhibition. It is a complex event - informational, advertising, PR, celebration, communication, held annually at the prestigious congress and exhibition centre in Bulgaria - National Palace of Culture. The festival is a place for public presentation of educational institutions, to search and create new contacts and partnerships with NGOs, businesses, other educational institutions, media;

Results:

The festival builds links between different educational institutions - private, municipal and state – and between educational institutions and students and their families also. It creates area for interaction between educational institutions, family and business.

3.5. National Contest in Chemistry and Environmental Protection

The National Contest in chemistry and environmental protection is an annual competition of high school students: grades 9-12. Participants are divided into two categories 9-10 and 11-12 grade class. Held each year in a different school. The contest aims at verifying the quality of education in chemistry and the environment in all schools in Bulgaria. The Contest is targeted to students from all secondary schools in the Republic of Bulgaria.

Results: The contest builds links between secondary schools in Bulgaria teaching Chemistry. It also allows assess students' knowledge placed in a different environment from day to day. Competition creates a strong link between knowledge and its application. It also allows for comparison between different training schools and is a natural place for the exchange of new approaches to training students in chemistry and environmental protection.

3.6. National educational strategy for information and communication technologies –[43,44]

Contemporary education on (ICT) - an opportunity for everyone - Given the role of ICT in the information society the school should provide conditions for development of functional computer skills for all students completing their secondary education.

Integration of ICT in the complete educational activity and culture - The education on ICT and their use in the school should not only help the achievement of specific educational goals but also should assist the improvement of instructional and educational quality as a whole. ICT should be integrated in multiple school activities and forms.

Leading role of the individual in the technological changes - each person:

- should have an active and critical attitude towards the technology development,
- should know it
- should be able to use and direct it in conformity with the law
- should not allow the technological changes to be the main factor determining the social development.

Life-long learning - In the information society knowledge is a **strategic resource**, learning is a strategic process, each individual will need to learn during his/her whole life in order to maintain high level of professional qualification and ICT play a **significant role** in this process.

3.7. ... Life Long Learning (LLL) – another instrument for a society knowledge”

Basic activities:

- Support of the creativeness, competitiveness and the spirit of undertaking.
- Support for the best use of the results, the innovative products and processes.

3.8. Agreement for cooperation between the social partners in the chemical industry

The agreement aims cooperation between manufacturers, unions and workers in the chemical industry in Bulgaria. It emphasis on long-term measures for training and qualification of workers in the sector. LLL is possible to achieve the objectives of such cooperation. Target group of the agreement: employees in chemical industry enterprises in Bulgaria.

Objectives:

- Improving the image of chemical industry;
- Investments in human resources;
- Vocational education and training of personnel in the chemical industry.
- Competitiveness;

Results:

- Achieving uniform methods of training of employees in chemical industry laying emphasis on the continuing lifelong learning. There are links between employers and employees with the participation of trade unions.

- The initiative builds relationships and conducts training at national level in the Chemistry sector. Agreement was made between employers, trade unions and workers, which governs the general problems of Chemical industry. It sets the ground for better training of employees in the industry. It is environmentally sensitive and introduces the best practices in training, health and safety.

3.9. Under the Human Resources Development operational program Bulgarian Ministry of labour and social policy proposed financing of projects and activities according to few schemes, enhancing the education system or promoting and encouraging LLL. The most important of these schemes, related to education and LLL are:

- **Making the school more attractive for young people** - main purposes of this scheme are:

- creating conditions for development of the potential of each child, providing opportunities for physical, intellectual and personal development, a full social integration and subsequent career;

- Improving access to education and training through diversification and expansion of out-of-class and out-of-school activities, forms of free time of students and the prevention of dropping out of school.

- **Development of quality valuation system of secondary education and rating system for higher education in Bulgaria** - this scheme consists of two components: *Component 1* - Development of standards for internal and external assessment, *Component 2* - Development of rating of high schools in Bulgaria;

Main purpose of this activity is to develop a framework for internal and external assessment in accordance with the National Program for the Development of school education and pre-school education and training (2006-2015).

- **Information and communication technologies (ICT) in education** - Main purpose of this scheme is to improve the quality of services in education and training, to enrich the educational content and to promote the introduction of innovative educational technologies and methods in the educational process through effective use of modern information and communication technologies.

- **Enhancement of the qualification and creation of conditions for professional development of teachers, university lecturers and principals** – this scheme has three components:

Component 1 Increasing the qualification and/or acquisition of new professional qualifications of teachers and teaching staff in kindergartens, schools and servicing units in the educational system.

Component 2 Develop programs and training for directors of schools, kindergartens and servicing units in the educational system.”

Component 3 Increasing the qualification of lecturers in universities”

Main purpose of the scheme is to improve the quality of educational services through:

- building of effective system for qualification and career development of teaching staff, university lecturers, directors of schools, kindergartens and servicing units in the educational system;

- introduction of mechanisms for monitoring, analysis, evaluation, forecasting and planning of qualification services;

- modernize the management of education and introduction of innovative approaches to management;

- acquisition of managerial skills of senior staff of educational institutions and modernizing the management of education and introduction of innovative approaches to management.

- **Integration of children and students from ethnic minorities in the education system**

The aim of the present scheme is to provide conditions for the successful social and labour realisation of children and students from ethnic minorities, who are threatened by social exclusion through:

- improving the conditions for equal access to education

- increasing the motivation for participation in the education process

- **Student scholarships for equal access to education and raising the motivation for better results;**

- **Support for the education of children and students with special educational needs** -

the aim of the scheme is to support the education process of children and students with special educational needs – the development of integrated and inclusive education as well as of education in specialised schools through the following activities:

- development of supportive environment and elaboration of training programmes

- specialised preparation of teachers for work with children and students with special educational needs

- change in the public believes in support of integrated and inclusive education, etc.

- **I can** - The operation aims to provide an opportunity to the employed persons on a labour contract to take part in vocational trainings in order to upgrade their professional qualification and better answer the requirements of the labour market. Past surveys show that employed persons are the one most interested in participating in life-long learning activities and have the desire for new

knowledge and skills. The operation however aims to include a maximum number of participants including people without education or with lower qualification

B. Regional initiatives and projects in the field of LLL

There are also a number of local and regional initiatives and projects in the field of LLL and education in chemistry in particular:

Project “Continuing education for teachers in Bulgaria”

The project is linked to the dissemination of the concept of continuing education for teachers of all subjects (including Chemistry) in the whole structure of Bulgarian education. Laying emphasis on the establishment of links between universities and schools and between schools and public administrations it will work for relevant formulation and development of the necessary legal framework to encourage the progress of Bulgarian teachers in the aspect of the LLL.

Objectives:

- To arouse public debate and social dialogue on lifelong learning of teachers between the institutions and communities and improve inter-institutional coordination and partnership
- To raise the awareness of the target group and the general public about available opportunities and the importance of lifelong learning
- To contribute to the identification of key factors in creating a successful national strategy for continuing education of teachers
- To create preconditions for the development of coherent national strategy by identifying, analyzing and evaluating existing Bulgarian and European practices and their integration in the Bulgarian model of continuing education of teachers.

Results:

- Developing a strategy for continual education of teachers. Preparation of materials and creation of prerequisites for its elaboration. Findings and recommendations will continue to influence educational policy, particularly the current status of the continual education of teachers.
- Established partnership mechanisms, sharing of ideas and best practices among key players in the continuing education of teachers will be retained.
- The National Information Portal will continue to be operative after the closure of the project. Information materials produced under the project will continue to be available to interested persons and institutions and will be uploaded on a free access web portal.
- Analytical reports and research methodology will be available for use by interested institutions and research units.

It is a large scope project, which should give information on the impact of the introduction of LLL in the Bulgarian education at all levels. Established methods at national level will be offered in practice in two regions of the country - Kardjali and Vratza.

Project “Youth Centre for Education and Information”

Objectives: The project envisages building a network of representations of the centre in 10 small settlements of Sliven Municipality. The project target group is young people who completed secondary education.

Results: A training and information centre is developed in the framework of the project. It provides young people with the general conditions for learning, growth and job opportunities and operates in several directions according to target groups of young people. The Centre will offer assistance through:

- easier access to information about European institutions and programs related to youth development;
- Internet-based distant learning in higher education studies for those who have physical impairments and/or financial difficulties ;
- organization of training courses (computer skills, vocational training, communication skills, foreign languages, etc..) mediation in search of employment at home and abroad, consulting with experts on various issues, organizing club activities to increase involvement of young people in public life.

Project “Virtual Chemical Laboratory”

The project creates a virtual laboratory in chemistry intended for students, teachers and adults who want to consolidate their basic knowledge of chemistry.

Objectives: Opportunity for training, more particularly in the field of chemistry with the subject rendered in a less unattractive way.

Results: Virtual Chemistry Lab which offers:

- visual trials with different chemicals, analytical and presentation of a model chemical reaction, the services of an assistant (to facilitate working with the program);
- valuable reference information on chemical elements, vocabulary, tests Self knowledge, interactive laboratory exercise, supporting documentation in Bulgarian;
- editor equalization of chemical equations converter to convert units, laboratory log book, Calculator, attractive interface and more.

The program has an option for updating on the Internet, which allows to be continuously enlarged by new inclusions. In addition, teachers have the opportunity to add new materials and written comments and also to enrich the program. Using the program, students acquire basic knowledge and skills when working in a chemical laboratory without risk of adverse incidents in the laboratory (incineration with acids and bases, poisoning with toxic substances, etc.). Users can check their knowledge and skills in an unconventional and entertaining way. The program offered can be of assistance to teachers during laboratory work or be used independently by students at home.

This project enables everyone to learn the basics of chemistry without any supervision required on behalf of a qualified teacher. But it can also be used by teachers who want to diversify their way of teaching.

Project: Virtual Chemical Laboratory "Himix"

The project is a regional initiative of High school in Mathematics - Rouse. "Himix" is a virtual laboratory for e-learning in chemistry. It provides opportunities for simulating chemical reactions, access to a large amount of information related to chemistry and unlimited opportunities for renewal.

Objectives: The purpose of Himix Chemical Laboratory is through simulation of chemical reactions to promote interest in the field of chemistry and facilitate comprehension of teaching materials. Target group of the project is students and all who are interested in chemistry

Results reached: Introduced a virtual laboratory that creates interest in Chemistry studies for students of different vocational trends from secondary schools in Rouse.

Project: "Improvement of vocational training in ecology and biotechnology. EUROECOSYS"

The promoter of the project is Foundation for European education and vocational training – Sofia. The aim of the project is improvement of vocational training in ecology and biotechnology of teachers from vocational schools. The project involves partners from Germany and Bulgaria and is of regional significance

Objectives:

- Introducing the latest technological advances in environmental biotechnology and in real terms:

- Participation in workshops on topics: "Ecosystems", "Waste Management in Berlin,"

Cooperation with schools on environmental protection:

- Introduction to vocational training in ecology and biotechnology:

Results: participants in the exchange increased their professional competence. They were acquainted with the German system of vocational training, environmental training courses and curriculum in vocational schools, training specialists in the field of ecology. Teachers will apply this knowledge to update the curricula in Bulgarian schools. From visits to German companies and companies operating in the field of treating and recycling waste exchange participants received information about jobs and the professional competencies.

Practical courses in the framework of the "Lifelong Learning"

The course is aimed at setting and improving the computer literacy of the target group of adults over 60 years. It covers computer and IT skills for beginners. Trainers are employees of various departments of the library. The course includes detailed documentation and emphasis on feedback.

Results:

- 3 training courses "Practical skills in computer sciences and informatics for beginners" have been held.

- Participation in these practical courses entitles trainees to a certificate issued in their name and vouchers for free use of the internet in the library information centre, where they can practice their new skills with the help and support of centre professionals.

Project: Various schools. common problems

This is an international project involving schools from Bulgaria, Czech Republic, Sweden, Italy and Germany. THE project aims to improve vocational training in ecology and biotechnology of teachers from vocational schools.

Objectives: the main objective of the project is to improve the quality of education and performance of students through:

- analysis of curricula in schools and individual partner countries.;
- research and analysis of students' attitudes included in the study subjects (English, mathematics, biology and chemistry), detection of successful learning habits;
- examination of methods of instruction, comparison and exchange of best pedagogical practices.

Activities carried out:

- Compiling of a questionnaire answered by students to evaluate the educational process, validation of the questionnaire through focus groups;

- examination of pupils from class 5 to 10, analysis of results, preparation of CD with the survey results;

- translation of the contents of the studied subjects, comparative analysis of curricula partner schools;
- Recording of hours of discussion and gathering impressions of the students to find the effective elements of our teaching;
- comparing the results with information obtained from questionnaires; fixing of the indicators of successful teaching methods and techniques:
 - create a resource for teachers with lesson plans, hours taken and expert comments;
 - successful implementation of pedagogical practices in the work of all observed classes and objects;
 - Study the impact on students and teachers;
 - Preparation of final DVD with the results, promotion of project results and finalize the work.

Results:

- Improved teaching practice, motivation and satisfaction;
- Increased motivation, confidence and realistic self-assessment of students;
- CD with PowerPoint presentation of the results of testing the quality of education in English, mathematics, chemistry and biology in partner schools :
 - DVD with Lessons quoted and English subtitles;
 - Book of lesson plans, comments by students and professionals.

By inclusion of schools from many countries, the study leads to the maximum number of ways of teaching and the associated improvement of training.

C. Regional Initiatives

“Chemistry on the stage” (scientific theatre)”

An interesting approach for increasing the interest towards the natural sciences and basically chemistry has been chosen in the National Aprilov High School - Gabrovo. It is realized through an original education – theatrical performance, the so called “scientific theatre”. Three such performances have been prepared and performed during the last four years. The participation of the students in the different stages is voluntary and under their own initiative, while the teachers are only coordinators.

The first performance – “Lack amidst plenty“ is dedicated to the water knowledge, bent through the prism of unanimity in nature. The purpose for its creation is provoked by the lack of integrated knowledge on the problem in the school syllabus for chemistry, physics, biology and geography during the whole course of education.

The second performance – “Michael Faradei: The more I work the more I learn“ was dedicated to the achievements of Faradei in the field of physics and chemistry. The purpose again is to stress on the unanimity of the natural phenomena.

The latest performance – “For one gram of radium“ is dedicated to the discovery of the chemical elements radium and plutonium, acquaintance with their characteristics and with the life and scientific activity of Maria and Pier Curie.

4. IDENTIFICATION OF EFFECTIVE SCIENCE EDUCATION INITIATIVES

Some of the interviewed teachers have taken part in projects and initiatives under the national or regional programs as “School as a means to discover yourself “ (under operating program “Human Resources Development” 2007-2013), Ministry of Education program “Making school attractive to young people”, National program “ School – the territory of students” etc.

Based on their professional experience in didactic and chemistry teaching they conclude that personal attitude largely determines whether someone will continue university studies in certain area/subject (chemistry included). The Secondary school is the venue where this attitude is generated. How the subject is taught is of crucial importance as well as its further practical applicability. But It is difficult to propose successful approaches due to one main reason: the lack of possibilities to make self-realization by employing knowledge in chemistry in the period after school graduation. There is no demand for chemistry specialist on the labour market.

Although that, according them follow steps may stimulate the interest in learning chemistry at school and then by LLL:

- Young people should be offered clearly defined prospects for self realization and professional progress; there should be developed new conditions for self-realization of young people within Bulgaria, not outside it [25,29,30,32,33];
 - New hybrid more attractive specialties are to be developed such as computer chemistry, for example [25];
 - Novel innovative methods of training are to be introduces relying heavily on IT - projects, electronic course books, software. In the sphere of chemistry all these are very few in number and of limited content [25,28,45,46]
 - the material taught should be oriented to practice [27]

And, at last but not least, students’ own personal initiative and inquisitiveness in the field of chemistry is also required.

5. IDENTIFICATION OF BEST PRACTICES

In 2009 the Centre for human resources development issued compendiums with the best practices in program "Life long learning" for two of the sector programs – Komenski and Leonardo da Vinci.

Under sector program KOMENSKI 15 projects have been realized mainly with the participation of secondary schools in Bulgaria (7 projects), basic schools (3 projects) primary schools (2 projects) subsidiary schools (2 projects) and the kindergarten and secondary schools in Bulgaria (1 project). Besides 15 Bulgarian organizations which have been project contactors, 76 European organizations have taken part as partners [47].

The projects are two types: school partnership (12 projects) and school development (3 projects).

The following projects represent interest:

- **„Different Schools, Common Problems”** - The main aim of the project is to improve the quality of education and raise students' achievement by analysis of the school syllabus in the different partner schools and countries, students' attitudes towards the school subjects included in the survey /English Language, Mathematics, Biology and Chemistry/, finding successful studying habits, examining teaching methodology, exchange of best practices. Different actors are involved in the project work – teachers, students from 5th to the 10th grade, experts, colleagues from other schools, willing to give professional comment on the video recorded classes, parents, local communities.

- **„Mosaic of Science and Culture”** To investigate the connection between natural phenomena, science and culture; To track out the evolution of science and culture and the work from antiquity up to present; To investigate and observe the natural phenomena, taking place at different geographical positions and to build pupils' responsibility to protect it.

- **Water and water mills** – past and present – one of the purposes of this project is to encourage the acceptance of the water mills as an alternative source for ecological energy. During the first stage analysis of the drinking water was made and the consumption of the water reserve with the aid of questionnaires and the calculations.

- **„Water and Watermills - Their Past and Present”**. to make students consider watermills as alternative sources of clean, renewable, unobtrusive and environmentally friendly energy; 1st stage – Analysis of the drinkable water and survey on the use we make of water supplies. The students collect data using questionnaires, read and interpret them; measure pH and compare results with partners. Final results are published in a leaflet that is distributed to the community to raise awareness on the hydrological situation and problems.

Under the sector program LEONARDO DA VINCI 21 projects have been realized mainly with the participation of the secondary schools in Bulgaria (18 projects), high schools (2 projects), research institutes (1 project), besides 21 Bulgarian organizations which have been coordinators of the projects 32 European and 7 Bulgarian organizations have taken part as partners. The projects are three types: mobility (19 projects), pilot project (1 project), and language competences (1 project) [48]. The most important of them are:

- **„Classical and alternative sources of energy”** one of the main aims is to acquire the European technological achievements and to apply them in the vocational education. The participants in the project learning special subjects in the field of energy have had the practical opportunity to work with a device which produces energy through sun collectors and windmill installations, comparative protocols for the differences and similarities between the energy parameters of one and the same type of classical hydrogen atom power stations - AETZ "Kozludui" and AETZ "Belene". Students had the opportunity to work with a device which produces energy through sun collectors and wind installations. Students prepared reports with comparative analyses including the similarities and the differences between the French and Bulgarian power stations.

- **Project of University "P. Hilendarski" Plovdiv town** – Methodology of the chemistry education increasing the quality of the modern education in chemistry and the professional preparation of the students who will become teachers in chemistry in future. The stress falls on the development of approaches, methods and organizational forms, assisting the specific skills in chemistry and the skills for LLL [49].

6. CONCLUSIONS

The National policy in the field of education including Life Long Learning is based on the analysis of the international practices and the tendencies specific for the country in the economic and social development. Several factors have been identified which are not inherent to the system of Bulgarian education and do impact the government policy on its development:

- Changing demographic situation;
- Change in public values and increased expectations of society in general.
- Continuous rise of required level of qualification determined by the labour market;
- Impact of technologies;
- Impact of globalization;
- Continual financial and economic crisis [50].

In these conditions Life Long Learning not only contributes to keeping of the high competitiveness and of the potential opportunities for ensuring employment but it is also the best way to struggle with the social rejection.

The analysis of the practices in life long learning activities shows that in spite of some differences, there is a core of common principles as a basis for LLL strategies:

a. *Approval of the flexibility as a basic organizing principle for the university education. It is expressed in:*

- Expansion and diversity of the access to the university through creation of opportunities for qualification improvement without being necessary to finish a complete program as well as giving credits for available professional experience;
- different ways for education which allow learning to be successfully combined with work or family engagements;
- a strong market orientation of the courses and their conformation with the requirements of the employers.

b. *Recognition in the higher education of knowledge and skills acquired in an informal way before entering the university.*

c. *Guarantee of the quality of the high education through differentiation at the exit of the high schools.*

Giving careful consideration to these factors, the Ministry of Education has worked out a national strategy for development of education with several priority trends which aim at providing:

- quality of education;
- equal access to education and opening of educational system;
- conditions and environment for practical implementation of the “lifelong learning” concept,
- turning Bulgaria into a country in which knowledge and innovations are the drivers of economy.

Concerning “lifelong learning” concept the efforts are directed toward [51]:

- Improvement of methods of adult training and incorporation of interactive forms of teaching such as case studies and simulations;
- Adoption of normative extenuations for physical and legal entities in conformity with the practice of other European countries aiming at stimulation of lifelong learning and continuous efforts for raising the quality of knowledge and skills;
- Binding lifelong learning with career development.

The practical instruments for effective implementation of this policy are found in:

- Developing effective partnerships between universities, employers and NGOs for the purpose of implementing continuous education;
- Provision and encouragement of access to various forms of continuous education aiming at acquisition of the new skills needed;
- Developing and offering new approaches and standards in teaching and learning which underwrite the application of world standards for lifelong learning in Bulgaria;
- Development and introduction of system for assessment and validation of lifelong learning;
- Developing National qualification frame for lifelong learning which will indicate learning outcomes [2,3].

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