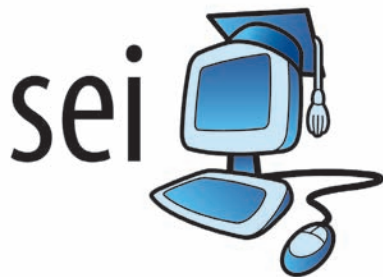
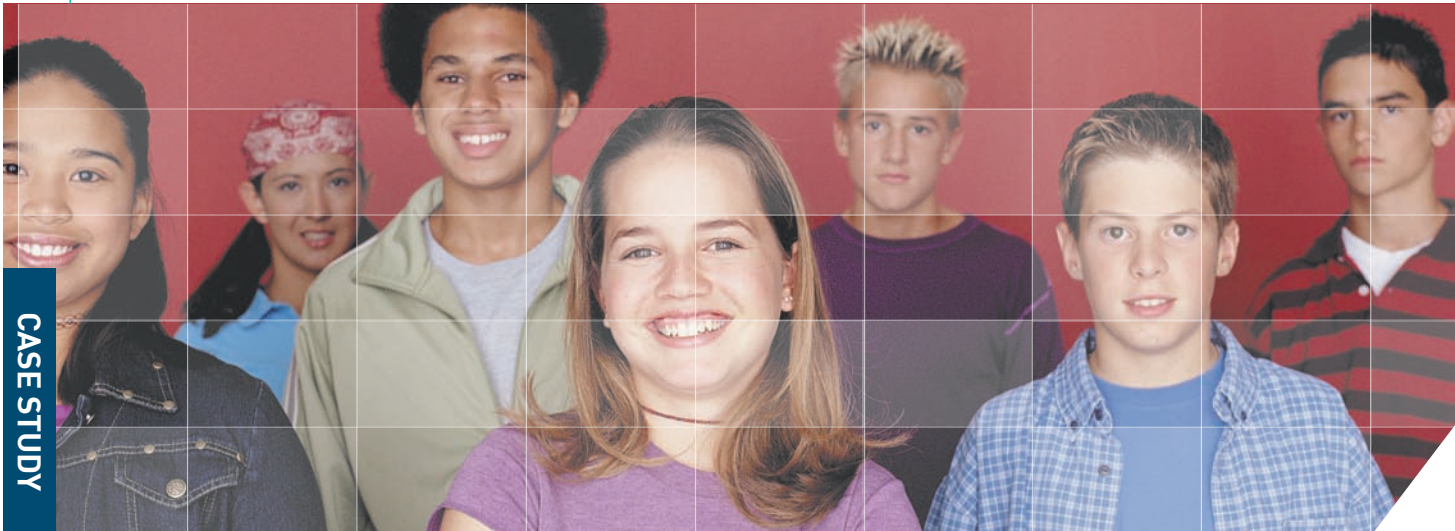




Ministry of Education,
Research and Innovation



SEI-The IT-Based Educational System

National Program for introducing IT into
pre-university education

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What is SEI?

SEI, the IT-Based Educational System is a complex program initiated by the Ministry of Education, Research and Innovation in Romania and its basic objective is to support the teaching and learning process in pre-university education with cutting-edge technology.

The program supports the objectives of the educational reform and conforms to the European strategies, eEurope 2005 and i2010, initiated by the European Union as part of the European eLearning initiative.

The Ministry of Education, Research and Innovation has chosen for implementing the SEI program a consortium of companies including SIVCO Romania - for educational software, multimedia educational content and services such as software installation and configuration, training and technical support, Microsoft - for applications, IBM and HP - for hardware.

Background

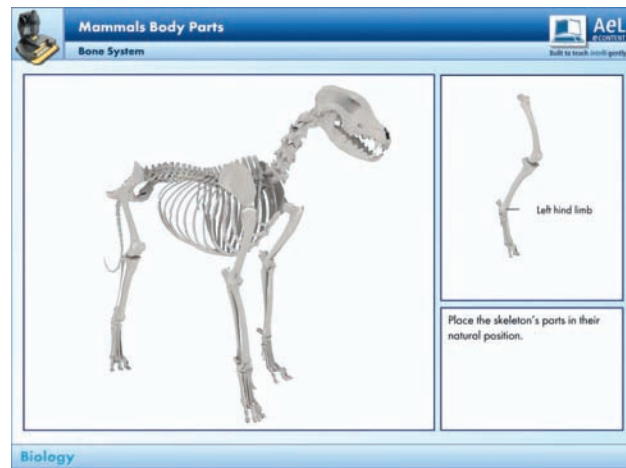
In 2001, the SEI program was launched. In-depth research indicated an average of 3 computers for every 100 pupils in gymnasium education, and 5 computers for every 100 Romanian high school students. On average, for every 100 pupils there were 3.5 computers connected to the Internet.

In order to raise the IT level of the education to European standards, increasing each pupil and teacher's access to computers was a priority. For such an endeavor to be successful, the massive endowment, at national level, of all the schools was undertaken.

Objectives

SEI aims to:

- Endowing all the Romanian schools with a complete IT solution package tailored to the teaching-learning process. Today, the high schools and gymnasia benefit of IT laboratories, where teaching takes place, based on educative subjects in accordance with the national curricula. The software provided allows a good



management of the schools' activities;

- Introducing interactive resources in education through specific projects, designed for certain didactical and administrative purposes, such as: the computerisation of the national examinations, high school admission examination, baccalaureate, teachers' nomination upon vacant positions etc.;
- Computerise of both internal and public communication;
- Elaborating of the National Education Database, which will allow effective use of in-depth analysis to function as a decision support instrument;
- Ensuring all participants in the educational system has access to equal IT&C resources.
- Creating a critical mass of knowledge intended to encourage teachers and graduates to make efficient use of computers.

SEI Benefits

One of the major forecasted benefits of this program is the assurance of an optimum level of IT knowledge for each student in pre-university education. SEI aims at encouraging innovative learning and increased stimulation of both the teachers' and pupils' creativity.

The intention is to provide a general framework, favourable for progress towards knowledge based economy, as well for encouraging the participation of all the educational system stakeholders to the development of the information society. Nowadays, it is a fact that by using intuitive and interactive didactical materials, the quality of learning process will increase. Not only do the students have at their disposal abstract or static illustrations of the educational content, but also they can use realistic simulations and dynamic images to stimulate their practical skills.



The multimedia lessons offer the pupils a strong intuitive support, creating the link between the subject taught and the real world. The teacher saves valuable time, by skipping "writing on the black board", and can focus on the effective teaching.

The interactive materials represent realistic alternatives for laboratory experiments, which are difficult to carry out in school because of the high cost of the necessary equipment or substances, or because of the high degree of risk. SEI assures support for the school's management and for the structures subordinated to the Ministry of Education (at county and central level) for the aggregation of statistical data and decision-making.

On a broader perspective, the program helps increasing competence and creativity, increasing the number of persons with higher education and specialised ICT training. By increasing the degree of knowledge for pupils and teachers at a national level and in the IT sector, a major step towards what the eEurope initiative is calling "An information society for all", takes place.

Framework. Stages. Results.

In the first stages of the SEI program, current levels of pre-university education were evaluated. Today, Romanian schools benefits from cutting-edge technology:

- Over 7 million people involved in project directly or indirectly - pupils, teachers, instructors, administrative personnel, parents;
- 3,000,000 pupils and teachers with access to the eLearning AeL platform, AeL eContent and latest technology;
- 15,000 IT laboratories, with 192.000 desktops and laptops;
- Over 140,000 trained teachers on using ICT tools;
- 3,700 AeL multimedia lessons, dictionaries and encyclopaedias;

A computerised educational platform composes a combination of computers, Internet, electronic multimedia educational content, methodology and teachers' training. The platform design incorporated a unitary and standardised manner, and all these platforms have been integrated into a national IT based educational system.

STAGE I - PILOT 2001-2002

The first stage of the SEI Program took place during the period of 2001-2002 and included:

- The supply of 120 IT laboratories including 3,120 computers and servers;
- Educational software;

- Development of projects for administrative support:

- ♦ ADLIC - High-schools and vocational schools admission exams 2001 and 2002 -Awarded by the European Commission with the "Best Practice" label at the ministerial level Conference "From theory to practice", Brussels 2001;
- ♦ Electronic evaluation of the manuals and tender for the acquisition of school manuals 2002;
- ♦ Creation and administration of the SEI portal <http://portal.edu.ro>.

The screenshot displays a physics lesson interface. On the left, there's a text box with the equation $pV = \text{constant}$ and a diagram of a gas cylinder with a piston. In the center, there are three graphs showing the relationship between pressure (p) and volume (V) for an isothermal process. On the right, there's a diagram of a shipwreck with balloons and a text box explaining that as the shipwreck rises, the volume of air in the balloons increases, leading to work done by the air.

STAGE II - 2003

The second stage of the SEI Program took place in 2003 and included:

- The installation and configuration of 1,100 IT platforms laboratories including 28,600 computers and servers;
- Educational software;
- Multimedia educational content: 80 lessons, 30,000 questions for electronic tests;
- The training of system administrators between 2 and 4 people in each location;
- Advanced training of over 15,000 teachers - minimum 6 for each location;
- Development of administrative support projects, such as:
 - ♦ ADLIC High schools and professional schools admission exam 2003
 - ♦ Teachers' nomination upon vacant position, 2003

STAGE III - 2004

The main objective of this stage aimed the finalisation of the high schools' endowment with IT labs, comprising of 290 complete IT platforms, 312 interactive multimedia lessons, software instruments for creating content, training of over 5,000 teachers and development of administrative support projects (High schools and vocational schools' admission exam 2004, Bacalaureate 2004, Teachers' nomination upon vacant positions 2004).

STAGE IV (2004 - 2008)

The main objective of this stage was the introducing of IT into gymnasium level education. This included:

- The supply of 3,228 IT laboratories for gymnasia and the endowment of 42 county training centers which ensures the continuous training of the teaching staff;
- 40,948 computers and servers were delivered;
- Assuring the technical support for 4 years during the development of the 4th stage of SEI, for all associated locations, as well as for the 1,510 laboratories endowed during the first three stages of the SEI Program;
- The endowment of all these locations with multimedia educational content, realized during all previous stages and in the current stage, its implementation, as well as training of the system administrators and teachers;
- Hardware update of 120 locations endowed with IT laboratories during the first stage of SEI-2001;
- Endowment of 1,000 schools with computers and printers for administrative use;
- Elaboration of 1,225 multimedia lessons and their distribution in all IT laboratories;
- Elaboration of multimedia electronic lessons for learning English language, covering study years 1-8;
- Training of 33,000 teachers in schools and 21,000 teachers within programs organised by the Teacher's Training Center from each county;
- Development of IT projects in 2005 and 2006 to support the national examinations:
 - High schools and vocational schools' admission exams;
 - Bacalaureate;
 - Teachers' nomination upon vacant positions.
- The implementation of a complete documents and workflow management system in the Ministry of Education and the 42 County School Inspectorates (CSI);
- Ensuring direct access to the technical support team using the TELVERDE 0800.410.444 free toll line (free of charge from the Romtelecom and RDS networks).

- Supplying the data center of Ministry of Education Research and Innovation and the County/Bucharest Municipality School Inspectorates (BMSI) with computer technology;
- Improvement of the County School Inspectorate/Bucharest Municipality School Inspectorate Internet connection to support the document management system, national examinations and the national educational database;
- Provide support for the restructuring, administration and maintenance of the portal belonging to the Ministry of Education, Research and Innovation <http://www.edu.ro>. Meanwhile, provide support for the administration and maintenance of the SEI Educational Portal, <http://portal.edu.ro>;

Introducing IT to schools in rural areas

Implementation of this project took place during November 2007 - February 2008 and focussed on installing computerised educational platforms for 1,974 schools in rural areas. A total of 33,813 computers, laptops and servers were installed.

As part of this project 16,500 teachers and administrators throughout the country received training in the use of computers and eLearning applications.

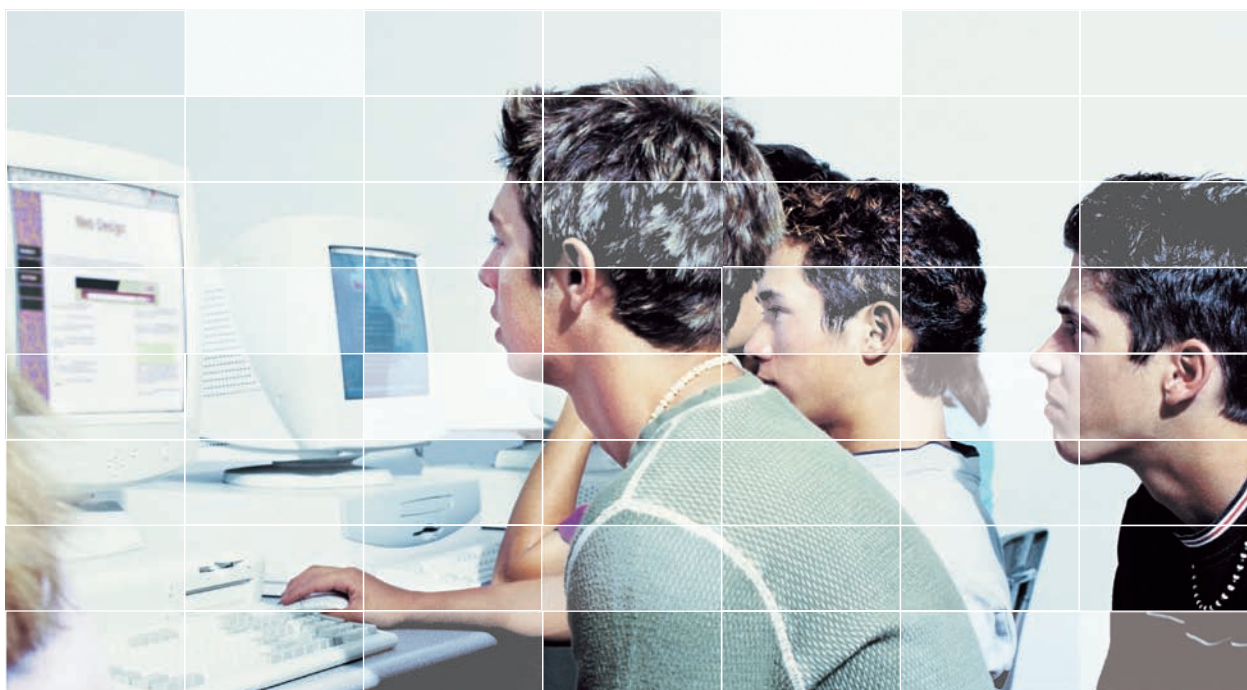
STAGE 2008 - 2009

This phase of the project included:

- The supply of 8,191 platforms for schools, totaling 79,284 computers, laptops and servers, and other equipments such as projectors and copying machines;
- Microsoft Vista software, Microsoft Office, antivirus;
- The AeL eLearning platform;
- 2,000 new interactive learning units;
- Face to face training for over 40,000 teachers.
- The SEI Educational Portal, <http://portal.edu.ro> reaches 149.000 registered users, with over 1,300,000 posted messages.
- Development of IT projects to support the national examinations:
 - High schools and vocational schools' admission exams (ADLIC - over 1.855.000 students);
 - Bacalaureate (1.338.995 students);
 - Teachers' nomination upon vacant positions (392.748 teachers).

What AeL is

AeL is a teaching, learning and content management system (Learning Content Management System) developed by SIVCO Romania. AeL enables all participants participants in the act of education - teachers, students, administrative and management personnel) within the Ministry of Education - to benefit from the many components of the eLearning solution.



AeL is the backbone of the SEI Program offering support for teaching and learning, evaluation and grading, administration, design and monitoring of multimedia content use. In addition, it assures the means necessary for the communication and synchronisation between local and regional centers within the SEI Program.

General features

- User friendly interface easily adaptable to allow differentiation by roles, groups, access rights;
- Easy administration of roles, groups, users and access privileges associated with them;
- Based on recognised high standards: AeL is compatible with MathML, SCORM and IMS;
- Easy to install and administer;
- Regional support offered by multilingual professionals

Functionalities

AeL allows the visualization and administration of numerous types of educational content, such as interactive materials, tutorials, exercises, simulations, educational games. The educational material library acts like an administrator of materials: it is adaptable, easy to configure an indexed to allows user-friendly search.

Even beginner users are able to:

- Create content (HTML editor incorporated, editor of mathematical formulas, tests and dictionary editors);
- Import/export content from files, resource archives using packing standards like SCORM and IMS;
- Adapt or edit content;
- Create personalised courses using pre-existent components.

The content may be structured and adapted depending on the teachers' requirements and enriched with information related to the program, keywords, version, author etc. The access rights for each user or group of users may be adapted and applied to any segment of the educational material library. The knowledge base offers hierarchical, filtered or keyword function search.

Benefits obtained using AeL

AeL is optimized for learning within a synchronous system (together with a teacher), which is controlling the entire lesson, creating, coordinating and monitoring the educational process. **AeL** also offers facilities that enable asynchronous learning (individual study, as the students' pace), collaboration and distance learning projects.

Evaluation tests integrated into the pupils' study sheets, enable the system to monitor and record the educational evolution of each pupil.

Assistance for administration and monitoring:

- Management of official registration certificates and of the schedule;
- Management of organizational structure, teaching staff, pupils, administrative personnel, pupils' groups;
- Management of school curricula integrated with the AeL educational material library and with the organisational structure.

AeL builds on modern educational principles, in compliance with three successive phases used to define the knowledge gathering process:

- Obtaining basic knowledge;
- Development of tactical thinking;
- Development of strategic thinking.

AeL eContent

- AeL eContent - a repository of interactive lessons represent a new way of teaching and learning. AeL is a scalable and solid tool complementary to the traditional educational resources, allowing teacher to motivate the pupils and to combine various teaching methods.
- Throughout the SEI Program – The IT based Educational System Romanian pupils from pre-university education system have access to over 3,700 multimedia learning units, comprising over 16,000 Reusable Learning Objects, covering a large variety of subjects such as Math, Physics, Chemistry, History, Biology, English, Geography and Technology.
- Using the most powerful psycho-pedagogical methods combined with modern principles of didactical design, AeL lessons succeed in transforming the attitudes of pupils towards modern education. Teachers who implement these complimentary educational techniques typically experience an 89% increase in students' motivation to learn;
- The educational process becomes more dynamic and intuitive. Students are stimulated to experiment with what they learn and to practice the knowledge they have acquired. The teaching and learning process becomes more educationally efficient;

The screenshot shows a lesson interface with a title bar 'The Law of Universal Attraction' and 'The Moon-Earth Gravitational Attraction'. The main content area features a diagram of the Earth and Moon in orbit, with text explaining the gravitational force between them. The text includes the formula $\frac{GMm}{R^2} = M\omega^2 R$ and discusses the application of this principle to planetary motion. A 'physics |' label is visible at the bottom left of the content area.

- In 2005, AeL interactive multimedia lessons received recognition as the best educational content in the world, at the World Summit Award, competing against advanced educational solutions submitted by 168 countries.

AeL Implementation

During SEI (2001–2009,) AeL implementation has taken place in more than 15,000 laboratories. In addition to the actual installation, the implementation implies the training of the teaching staff, assuring the technical support and transmission of educational materials.

SIVCO Romania has certified 369 experts in using the AeL system. They travel throughout Romania, according to a preset program, visiting every educational centre endowed through the SEI Program, to install and configure platforms in each laboratory, and to train the didactical and administrative personnel.

The screenshot shows a lesson interface with a title bar 'Plants with Flowers' and 'The Flower and its Parts'. The main content area features a diagram of a flower with labels for 'Petal', 'Stamen', 'Sepal', 'Receptacle', and 'Peduncle'. To the right of the diagram is a list of four numbered points explaining the flower's structure and function. A 'biology' label is visible at the bottom left of the content area.

A training program lasts a minimum of 5 days and is adapted to each type of user; network administrators receive training according to a program based on applicable skills, meanwhile, teachers receive a differing focus in training.

Each training stage is finalised with an evaluation of the knowledge obtained by the students while performing an open lesson with existent didactical materials. Assessment also takes place with new materials assembled by the freshly trained teachers. A full program that includes ongoing training and assessment is required to ensure efficient user skills.

Following this stage, at an interval of 4–6 weeks from implementation, a second team revisits each laboratory to verify the method and quality of work already implemented by teachers, the degree of knowledge acquirement, the manner of usage of the system and the progress made by the school's personnel in using AeL.

AeL experts have already overseen the training of over 140,000 people in the effective use of this educative system.

The schooling program aims to train a minimum of six teachers, an AeL administrator and a secretary in every high school.

Due to the very high interest in AeL, on average 13 teachers per school receive training.

All the trainees can become certified users of AeL following an initial schooling period, and are encouraged to train their colleagues in using the system.

Over 80% of the teachers trained have answered course evaluation questionnaires, and more than half of the interviewed teachers appreciated that the training is extremely relevant for their activity.

At the end of the training period, over 50% of the graduates considered that they had many things to learn and more than 70% stated that the training has entirely satisfied their requirements and has fulfilled their expectations.

Background and perspectives of SEI

The quantitative and qualitative recorded results are significant. At the end of the six stages, SEI has:

- Over 7 million stakeholders - students, teachers, administrative personnel, parents, decision makers within the Ministry of Education;
- 3,000,000 students and teachers with access to the eLearning AeL platform, AeL eContent and latest technology;
- 15,000 IT laboratories, with 192.000 desktops and laptops;
- Over 140,000 trained teachers on using ICT tools;
- 3,700 AeL multimedia lessons, dictionaries and encyclopaedias.

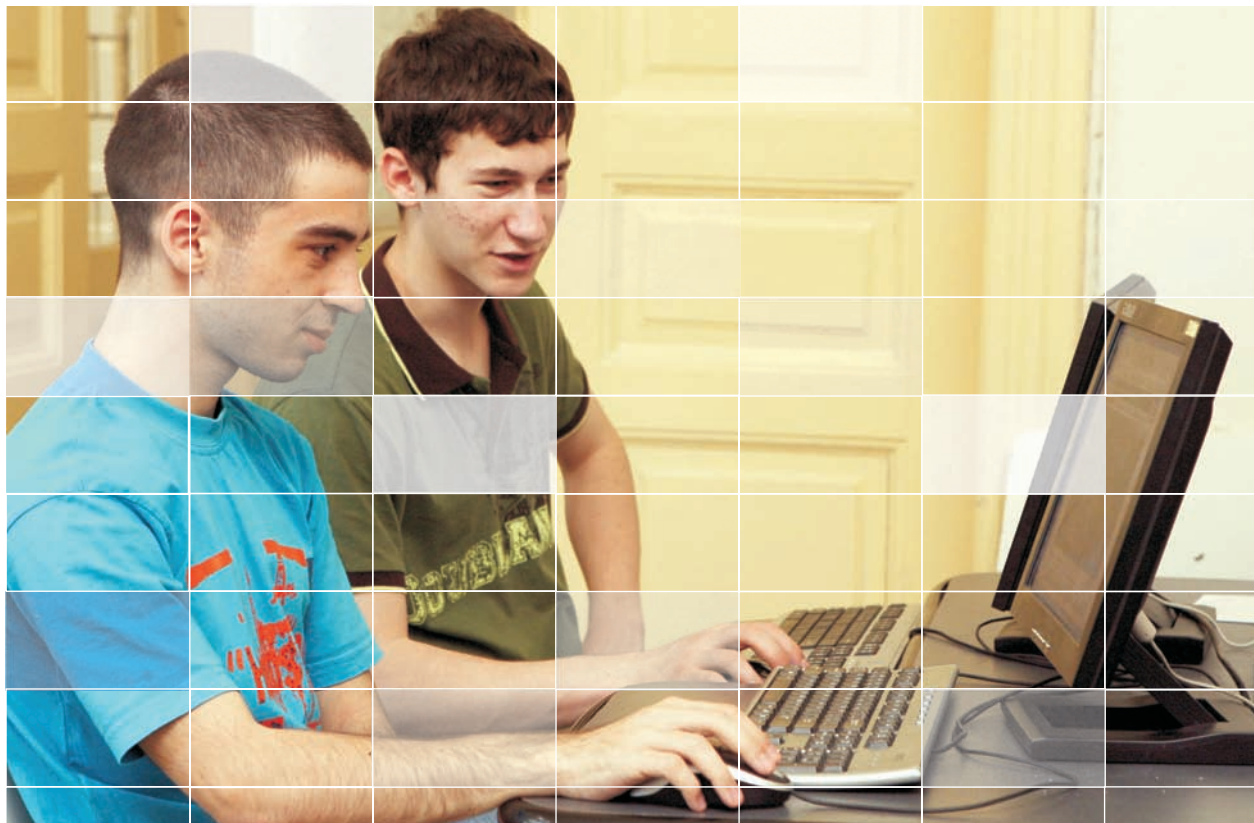
The most important achievement is the revolution in the mentality towards modern education in society, and from schools in particular.

Schools have proven receptive and have shown willingness to change and align to the European standards. The assimilation of the new educational instruments has reached a critical mass level - an important asset for long-term educational strategies.

International recognition

During its implementation, the project was nominated as "an example of best practice" (Jan Figel, European Commissioner for Education, Training, Culture and Youth), having received an important number of international prizes that recognize the high quality of the the services provided, of the software solutions and of the methodology of implementation:

- 2009 - SEI received the label of Best Practice, within the European eGovernment Awards, "eGovernment empowering citizens" category, a competition organised and supported by the European Commission.
- The European IT Excellence Award 2008 for the AeL eLearning solution;
- The National Educational Database (integrated with SEI) received the Good practice label at the European eGovernment Awards 2007, as a recognition of its excellence, credibility and the quality of research;
- 2007 nomination of AeL for the Euro-CASE ICT (Information and Communication Technology) Prize;
- 2007 - the International Project Excellence Awards, organized by IPMA (International Project Management Association);



- 2006 "The Excellence Award in Project Management" for SEI, the national program of introducing IT in the Romanian pre-university educational system, offered by the International Project Management Association (IPMA) and the Romanian Project Management Association (APMR);
- AeL eContent won the World Summi Award 2005, as the best eContent in the world, competition organized within WSIS (World Summit for Information Society) in Tunis, November 2005;
- 2005 Honourable Mention at the eEurope Awards for eGovernment for the AeL eLearning platform. AeL is the eLearning management system implemented in SEI in each school;
- 2004 European Commission nominated the AeL platform for the Euro-CASE IST Prize;
- National Project Management Excellence Award from IPMA and PM Romania (2006);
- Finalist for the IPMA International Project Excellence Awards (Poland 2007, IPMA) (the International Project Management Association);
- The Best Practice label for the Romanian Examination Management System - ADLIC, Brussels 2001 - European Commission (ADLIC 2001 was the first pilot project for management of examinations in Romania).



SIVECO Romania
 Victoria Park
 73 - 81 Bucuresti-Ploiesti Drive, District 1
 Bucharest, 013685, Romania
 Phone: +40 (21) 302 33 00
 Fax: +40 (21) 302 33 91
 Email: marketing@siveco.ro
www.siveco.ro www.advancedelearning.com
<http://portal.edu.ro>