AED
Information Technology
Applications Center

macedonia links
education and
connectivity

mk connects

ABOUT AED AND THE INFORMATION TECHNOLOGY APPLICATIONS CENTER

Since 1961 the Academy for Educational Development (AED), a preeminent human and social development organization, has worked to provide universal completion of quality education in Africa, the Americas, Asia, Europe, and the Middle East. AED's efforts have included improving teaching and learning, involving parents in education, creating more opportunities for girls, reaching out to those not served, and integrating technology into education, always with a view to establishing relevant and sustainable education systems. The AED Information Technology Applications Center (ITAC), which resides within the Global Learning Group, designs and implements programs using information and communication technologies (ICTs) to improve the quality of pre- and in-service teacher professional development, uses pedagogical approaches that enhance student learning, and improves educators' collaborative work through cross-border and national virtual networks. Consistent with AED's focus on solving critical social problems, ITAC pioneers innovative approaches to using appropriate technologies across all sectors.

mk connects:

Macedonia Links Education and Connectivity

January 2009

AED
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Applications Center

FOREWORD

STEPHEN F. MOSELEY,
President and CEO

AED has many opportunities to apply expertise and creativity to the solution of perplexing human problems. It is much more rare, however, to find oneself at the nexus of a set of opportunities that make it possible to make a greater contribution than the original objective. Macedonia's commitment to education, to taking a leadership role in the globalized world, and to being open to change provided that unusual context, and AED was privileged to be a partner in bringing it all together. This summary of our engagement in Macedonia since 2003 describes how all the elements mentioned above came into alignment, allowing Macedonia to become the first wireless broadband country, while providing a broad and deep platform to improve the quality of education.

A decision to modernize an education system or to bring affordable connectivity nationally is a clear acknowledgement of the convergence of political will, technical capacity, legislative freedom, entrepreneurial opportunity, and human and financial resources to work together in a timely way under a coherent framework. To do both simultaneously is a greater feat; Macedonia accomplished this.

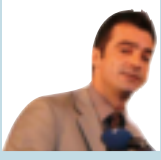
By being willing to see beyond the provision of computers to classrooms for quality enhancement to a vision of a country that uses its schools as a means to connect itself to the rest of the world, Macedonia multiplied opportunities for education, the Government, learners and teachers, citizens, and the private sector. As a key partner, AED was fortunate to work with different arms of the Government, with the private sector and foundations, and with teachers and students to change the present and the future of the country in the span of a few years.

In addition to being connected to the Internet nationwide, Macedonians now have a greatly improved education system that is focusing on improving the quality of learning. At the same time, it is engaged in school renovations that are using "green" technologies for more efficient and appropriate use of resources. It has been, and remains, a privilege to partner with Macedonia and the U.S. Government, which served as a major funding source in this "first of a kind" solution to problems facing ordinary people in their daily lives.

PERO STOJANOVSKI,
Minister of Education and Science, October 2008

The Macedonia Connects (MK Connects) project and the Primary Education Project (PEP), both with a focus on ICTs to enhance education, are tremendously important for the development of practical working skills in Macedonian students. Before MK Connects, broadband Internet was a luxury and few could afford it. MK Connects lowered costs enough that the Internet is now affordable.

Through PEP, digital content was introduced into the schools. It is the natural complement and follow on to MK Connects. It has provided a way for us to allow widespread usage of the ICT infrastructure investments we made and to support the Government's program of a "computer for every child."



SULEJMAN RUSHITI,
Minister of Education and Science, Summer 2006 – Summer 2008

The MK Connects project was highly significant because it provided high speed broadband Internet to all Macedonian primary and secondary schools. It also enabled, for the first time, competition for internet services, which decreased prices markedly. MK Connects fostered the interest in further computerization in schools and in digital learning content. PEP made it possible to contextualize digital content and to make it available to students in their native languages. Because of these two projects, Macedonian students have the opportunity to develop skills that will contribute to their employability in the 21st Century labor market.


LEAGUE
TORONTO
URU

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INTRODUCTION

The Macedonian people have a rich recorded history extending back thousands of years. Today, less than twenty years after declaring independence, its people are making history again.

As the young nation seeks to find its place in the international community and looks outward to global examples of democracy, social inclusion, and economic progress, the country's inward focus on education is an example to the world. Over the course of this decade, a tremendous mix of national political will, international partnerships, and technological innovation has created a sweeping transformation across the education sector. From new pedagogical tools and standards for student assessment to a nationwide wireless Internet backbone and school renovations, the advances are both immediate and enduring. As a partner in these efforts, the Academy for Educational Development (AED) is proud to have played a role in Macedonia's exceptional story.

Although located in a specific social, political, and historical context, the experience of educational transformation in Macedonia offers rich lessons that are applicable to the 21st Century challenges facing education systems across the world. As the implementer of two major education projects funded by the United States Agency for International Development (USAID) covering a period from 2003 to 2011, AED has a unique perspective on how to leverage carefully structured partnerships, available resources, emerging technology, and local assets to build the capacity of local and national institutions to provide a relevant, quality education to all. In the following pages, we will share the story of Macedonia's accomplishments as a bright example of how a determined country is transforming its education system to meet the demands of the knowledge society.

The challenge for education in the 21st Century

The dawn of the 21st Century has ushered in new challenges and opportunities unimaginable in centuries past. In an increasingly globalized world, networks of commerce and communication crisscross with ever-increasing frequency and speed. Rates of technological innovation grow exponentially each year while governments, businesses, and citizens are confronted with the pressure to embrace and adapt to environments created by these advances. Knowledge creation is a critical engine for economic growth and investments in human capital are paramount. In order to harness the power of the knowledge society, citizens and workers must possess new sets of skills that allow them to think critically and analytically, problem-solve, act with flexibility, work in increasingly diverse environments, and communicate effectively in increasingly complex systems.

Classrooms must serve as places of collaboration and discovery...

The demands of the modern society represent a unique opportunity for education systems. Schools that traditionally have taught students to store and recall information from specific content areas must now respond to the challenge of preparing young people for integration and success in societies and economies driven by the transformation of knowledge into new ideas and applications. Teachers must emphasize techniques such as inquiry-driven and project-based learning to equip their students with the skills that allow them to integrate and create knowledge. Students must be given opportunities to manage their own learning. Classrooms must serve as places of collaboration and discovery where information and communication technologies (ICTs) can be integrated into the learning process.

While it is clear that education systems must adapt to new contexts, determining what that change should look like and how to achieve it is a complicated endeavor. Expanding on the tenets of the Dakar Framework for Action and the work of the Partnership for 21st Century Skills, AED has developed a set of knowledge, skills, attitudes, behaviors, and values that enable youth's full participation in the knowledge society *(see Chart)*. As education systems determine how best to develop their students' capabilities, the important role of technology cannot be overlooked. Information and communication technology skills, such as basic computer literacy and web navigation, are necessary to engage in modern life. Technology can also be used to facilitate the acquisition of more general skills such as critical thinking, communication, and life-long learning. New technologies are tools that can be used to improve most areas of education.

LEARNING CAPABILITIES FOR THE 21ST CENTURY[1]

Knowledge	The basic learning content including core subjects; international language ability, and broad-based scientific literacy; as well as self knowledge.
Competencies and Skills	These include foundational skills (literacy, oral expression, numeracy); critical thinking and problem solving skills (reasoning, recognizing and questioning patterns; dealing with uncertainties; analyzing, synthesizing and evaluating information); planning and management skills; life-long learning skills (learn how to learn, to adapt knowledge to new contexts, and to engage in self directed learning); cross-cultural communication skills (ability to communicate in different cultural contexts, negotiate and resolve conflicts); and information, media and technology skills.
Attitudes and Behaviors	Flexibility and adaptability; risk taking; the willingness to take initiative; motivation; respect for self and others; sense of commitment; empathy; responsibility for ones actions and work.
Values	Solidarity; gender equality; tolerance; respect for difference; mutual understanding; respect for human rights; non-violence; respect for human life; and dignity.

1 This table was developed for a paper entitled "Learning in the 21st Century: Supporting and guiding education reform for 21st Century learning" by El Houcine Haichour, Jonathan Metzger, and Mary Joy Pigozzi, (2008).

THE CONTEXT

The Macedonian context

On the eve of Macedonia's independence in 1991 and recognition by the UN in 1993, the national education system struggled to meet the challenges of a changing world. Despite the exhilaration of its newly recognized status of independence, Macedonia, similar to other parts of the Balkans, was troubled by both internal and external tensions. It is now overcoming these in progressing toward a stable, multi-ethnic democracy.

The last decade of renewed peace and stability has allowed the Government to direct greater attention and focus to the education system. Macedonia has 460 primary and secondary schools; many primary schools have smaller, linked satellite schools in remote villages. Despite the country's small size, the mountainous landscape with deep basins and valleys makes travel difficult. In winter, impassable roads and the lack of a robust communication network left many rural schools isolated. At the end of the 1990s, schools in Macedonia were ill equipped to deliver the quality education needed to produce a civically engaged, creative and productive citizenry. Most school buildings in Macedonia were constructed between 1940 and 1960, and the limited funding for maintenance and renovations rarely reached rural schools. In neglected areas, schools could not provide suitable learning environments for their students. In some cases, severe winter temperatures kept children from attending.

Schools were also technologically behind. Before 2003, less than half of Macedonia's schools had working computers. The telecommunications regulatory environment resulted in restricted, slow, and very expensive Internet connectivity. Although the national Macedonia Telecommunications provider offered schools discounted connectivity via an Asymmetric Digital Subscriber Line (ADSL), this option was only available in larger towns. For the majority of schools, dial-up connectivity was the only way to access the Internet. Fees were so high that few schools could afford it. The effects of Macedonia's telecommunications policies extended beyond the education sector as the country had extremely low Internet penetration nationwide (estimated at 4% in 2003), one of the lowest of Europe. Fortunately, the Government owned the majority of communications towers.

4%

Percentage of Macedonia's population with internet access in 2003

- mountainous landscape with deep basins and valleys, impassable roads in the winter
- 460 primary and secondary schools
- many isolated rural schools
- most school buildings in Macedonia were constructed between 1940 and 1960
- before 2003, less than half of Macedonia's schools had working computers
- dial-up connectivity was the only way to access the Internet before 2003

Population: 2,041,000 *(2007 estimates)*

Land area: 25,713 sq km *(National Geographic)*

Languages: Macedonian, Albanian, Turkish *(National Geographic)*

Religion: Macedonian Orthodox, Muslim *(National Geographic)*

Currency: Macedonian denar *(National Geographic)*

Life Expectancy: 73.62 *(2003–2005 estimates)*

GDP Per Capita: U.S. $2,546 *(2007 estimates)*

National Geographic
http://travel.nationalgeographic.com/places/maps/map_country_macedonia.html

State Statistical Office
http://www.stat.gov.mk/english/glavna_eng.asp?br=01

Snow covered cell tower with canopy transmitters on a high Macedonian peak

REVITALIZING EDUCATION

Revitalizing education in Macedonia for the knowledge society

The Macedonian government, however, understood the critical role of technology as an educational tool and embarked on an effort to bring appropriate new technologies into the schools. As a new nation seeking to become a respected member of the global and European communities, Macedonia is committed to improving education quality as a prerequisite to strengthening democracy, growing the economy, and promoting peace and stability. The importance of education in Macedonia's future is also recognized by the international community. Global organizations (such as the World Bank, UNDP, and UNESCO) and national governments (including those of China and the U.S.) have worked with partners such as AED to provide equipment, funding, and technical expertise to support the Government of Macedonia in its efforts to revitalize the education sector and prepare young Macedonians to fully participate in the global knowledge society.

MK Connects has made a great and enduring impact on the country by creating a **nationwide broadband** wireless network

Integrating technology into education: connecting schools to the Internet

The Macedonian government's efforts to modernize education in the country began in 2002 when the president made an official visit to the People's Republic of China and returned with a donation of over 5,000 computers for the education system. This donation served as the catalyst for a series of other investments in education. One of the main supporters was USAID. When approached by the Government for assistance in distributing the computers, USAID assessed that this large donation would put a tremendous burden on the Ministry of Education and Science (MoES), and developed the e-Schools project to devise and carry-out a strategy for computer deployment. The e-Schools project (2003–2008) was responsible for distributing the donated computers and installing computer labs in all primary and secondary schools.

In addition to assisting with the deployment of computers, USAID recognized that the donation would be most beneficial if the labs were connected to the Internet. In 2003, they selected AED to make this a reality through the Macedonia Connects (MK Connects) project. The original aim of MK Connects was to connect 495 sites, including every primary and secondary school as well as additional priority sites such as university dormitories to the Internet. AED not only achieved this goal, but also used an innovative business model to achieve something even greater: MK Connects led Macedonia to become the world's first wireless broadband country by creating a market.

After accomplishing the remarkable feat of providing universal Internet access, MK Connects shifted gears to support the use of the new technology in the schools. The project worked to guarantee that technical issues did not hinder potential users. In collaboration with the local Internet service provider, MK Connects created a system to monitor Internet activity at the schools, visited every non-active site to troubleshoot the connectivity issues, and helped to establish an Internet support hotline for schools.

At the time of the project's close in 2007, MK Connects had made a great and enduring impact on the country by creating a nationwide broadband wireless network and contributing to a significant reduction in the cost of connectivity. The model for providing Internet connectivity using the schools as access points received much international attention. MK Connects also created a solid foundation for the continued integration of new technologies into the education process through targeted teacher training, publicity campaigns, and the creation of on-line resources and ICT training modules.

Beyond connectivity to quality

Certainly the accomplishments of MK Connects and the national wireless network created tremendous momentum for change within the education sector. The project provided schools across the country with access to tools and information that had been previously unimaginable.
The Macedonian government and USAID were eager to maintain the momentum sparked by MK Connects, leverage the technology investment, and focus more closely on the quality of instruction within the classroom. The Primary Education Project (PEP), a five-year initiative targeting all public primary schools in the country, began in 2006 to continue, expand and deepen the changes taking hold in the education sector. AED was selected as PEP's prime implementer.

> "Partnerships are central...with each member bringing a unique strength to the project."

Partnerships are central to AED's work and a collaborative consortium was created to support PEP's implementation with each member bringing a unique strength to the project. In addition to Indiana University, Microsoft, and a number of respected Macedonian NGOs, PEP benefited tremendously from the passion, enthusiasm, and commitment to education of the late Tose Proeski, one of Macedonia's most loved musicians *(see Text Box 1)*.

PEP is a holistic education project that touches on various parts of the education system to promote two main outcomes. The first is to enhance the quality of instruction in the classroom to improve learning outcomes. The second is to increase 21st Century skills in youth so that they will be able to perform better in the knowledge society. PEP is working towards these outcomes through a series of interrelated activities that include creating positive learning environments, revitalizing math and science education, integrating modern computer and Internet technologies into learning activities, and improving school-based student assessment.

Building on the advances of MK Connects, PEP focuses on the integration of ICTs into education. In addition to exposing teachers and school officials to innovative approaches to increase the use of ICTs across all subjects, the project's staff serves as advisors to the MoES. Since the start of the project, MoES has been developing a long-term strategy for ICTs and education and making key hardware and software decisions for which the PEP team has provided considerable input. The project has developed an innovative program to help schools deal with the hidden costs of continued hardware and network maintenance as well *(see Text Box 2)*. PEP's professional development efforts also seek to build the capacity of teachers in all disciplines to use ICTs effectively in student-centered pedagogical approaches with the aim of improving learning outcomes.

School rehabilitation

PEP understands that a school is more than a collection of rooms; schools should house learning spaces that stimulate young people, encourage discovery and provide an environment that is safe and comfortable.

Given the aging infrastructure of Macedonia's schools, providing students with positive learning environments was close to impossible in some areas. At the start of the PEP project, the team carried out a detailed assessment of school infrastructure and created a national map of school rehabilitation needs based on the collected data to assist donor, ministry and municipality officials in setting priorities for school renovations. To select the schools that will receive funds for renovation, PEP holds an annual call for proposals from municipalities and selects schools based on the applications received.

Over the course of the project, 100 schools will be renovated using 'green' energy efficient technologies. By August 2009, renovations will be completed in 77 primary schools. These renovations will have significantly improved the classroom environments and are already contributing to substantial energy savings at the school level. The project is also training teachers and parents on how to create positive learning environments for young children.

BEFORE

AFTER

Rehabilitated classroom at Kiril i Metodij School in Bosilovo, Macedonia

TEXT BOX 1

A great act of generosity

On October 5, 2007, the Macedonian mega star Tose Proeski joined forces with the Ministry of Education and Science, USAID, and AED to give a concert to benefit education. Over 20,000 fans who gathered for the concert at Skopje City Stadium along with the millions others who watched on television and the Internet raised an impressive $106,000 to buy educational equipment for primary schools throughout Macedonia. This event was the largest humanitarian concert ever held in Macedonia.

Tragically, this wonderful act to promote and support education would be Tose's last concert. Less than two weeks after the event, Tose Proeski was killed in a car crash. Before his death, Tose worked with USAID, PEP, and the Macedonian Civic Education Center to establish a fund from the concert proceeds. By the end of September 2008, 117 schools from across the country received educational kits from the Tose Fund. These kits included practical mathematics kits, lower primary science kits, advanced practical science kits, and ICT for music education kits. While his death shook the Macedonian community and he is greatly missed, Tose's legacy lives on through his contribution to quality education.

Math and science

In the area of math and science education, PEP has tapped into a deep pool of international expertise to develop a range of initiatives promoting the acquisition of these elements of 21st Century skills. The main focus of this component is to create opportunities for every math and science teacher in the country to participate in professional development activities. These activities give teachers the techniques and tools to use active teaching methods, such as problem-solving and inquiry learning in their classrooms. Professional learning opportunities include a range of models such as mentor teachers, regional trainings, and school-based programs. The project also participates on the MoES team charged with revitalizing math and science curricula. In close collaboration with the Ministry, PEP is creating knowledge-based standards for specific subject areas alongside pedagogical standards for teachers. Developing standards in concert with the MoES ensures that the PEP's contribution to math and science education is institutionalized and will continue beyond the life of the project.

National assessment standards

School-based assessment is another area where PEP is making significant impact. Before the project, Macedonia had no agreed-upon standards for how teachers should assess their students. A teacher's choice of assessment method was largely personal and it was extremely difficult to determine if assessments were equivalent and fair within and across schools. In 2007 the project developed a set of assessment standards and an assessment code of ethics. PEP then undertook an extensive campaign to seek stakeholder input. This arduous process led to a final set of standards that MoES has approved and adopted. As with the math and science knowledge standards, PEP has succeeded in institutionalizing the assessment standards so that they will continue to guide the interaction between teachers and their students for years to come. PEP's professional development on school-based assessment has introduced a number of teachers to new assessment methods and will reach all of Macedonia's primary teachers by the end of the project.

PEP is only half-way through its five-year lifespan, but there is already visible progress being made at the national level with new standards, and at the classroom level, with the adoption of new technologies and student-centered learning approaches. Ubiquitous Internet connectivity, a legacy of MK Connects, is a part of this transformation as well.

TEXT BOX 2

Student Support Technician Clubs

All of Macedonia's primary and secondary schools now have new computer labs. As part of the Ministry's "One Computer per Child" initiative, an additional 80,000 computers are being installed in classrooms nationwide. This significant investment will greatly expand youth's access to technology in the schools, but it also comes with significant logistical concerns. One of these is how to provide cost-effective, sustainable technical and maintenance support at the school level. AED's PEP project saw this challenge as an opportunity for students to get involved with the management and maintenance of the computer labs and developed Student Support Technician Clubs (SSTCs), and by the 2008/2009 school year the SSTC program had been expanded to every primary school in the country.

SSTCs are groups of 7th and 8th grade students who perform preventative maintenance of the school's hardware infrastructure, undertake basic network management and assist teachers in their day-to-day computer use. Each primary school has one SSTC which operates under the guidance of two teacher supervisors. The SSTCs give students the opportunity to build technical and problem-solving skills while also encouraging teachers of all disciplines to incorporate technology into their lessons by providing needed hands on technical support. The role that student technicians have played in assisting teachers who are unfamiliar with technology has been especially vital. In a survey of 107 schools with active SSTCs, an impressive 61 percent reported significant improvements and 30 percent moderate improvements in the usability and accessibility of ICTs after only one year of having student support technicians.

The PEP project team was instrumental in promoting the concept of SSTCs to primary schools' principals and teachers and also secured valuable partnerships to enhance the quality, visibility, and sustainability of the program. On the technical side, Partners in Learning contributed material on Windows network management to the SSTC technical manual and local universities participated in training the teacher supervisors. Microsoft Macedonia gave support to develop a SSTC logo and provide all participating students with SSTC badges. The project also pursued a partnership with the Macedonian Association for Information Technology (MASIT), which committed its support of the program. Some of MASIT's members have expressed interest in the SSTCs as a potential source of talent for future employees in the IT sector.

TEXT BOX 3

Using ICTs for Active Learning

In the satellite school of Todor Angelevski in Gorno Orizari – Bitola, geography teacher Mite Ristov and his students created a web page (http://www.geo-orizari.tk/) where the students' activities are posted. The page also serves as an information hub for the all of the school's geography classes with postings on events, projects, competitions, presentations, and even video clips. It is a forum for idea exchange, commentaries, photos and links to web pages such as "YouTube" where students can find geography-related videos showing such things as tsunamis, tornados, and volcanic eruptions. Ristov's students visit the site daily and it has generated great enthusiasm for the subject of geography.

Ristov explained his motivation for creating the site, saying, "I wanted to make something interesting for the students, something attractive and useful at the same time. The idea for designing a web page came spontaneously. The children had an active role in the creation and many different ideas for its creation. They were practically competing for a more attractive solution."

In using web-based technology to enrich his students' learning opportunities, Ristov has united his two biggest passions—geography and the Internet. However, this modest thirty-three year old teacher does not think that he has done much. He says, "I just do my job, like any other conscientious teacher. It's just that I am trying to keep pace with the new trends and what the new generation prefers. Of course, the knowledge I gain from the workshops that promote these ideas is of great help."

PRINCIPLES FOR SUCCESS

The current success in transforming Macedonia's education to meet the demands of our modern world has been underpinned by the following principles:

- A **commitment to change** at the local, national, and international level;
- **Partnerships and collaboration** with a wide range of actors in many areas of expertise;
- **A holistic approach**, which touches on all aspects of the education system from national policy to instruction techniques and from the classroom environment to the curriculum;
- **Capacity building**, which is interactive, comprehensive, continual, and cuts across topic areas;
- **Sustainability** through the institutionalization of standards and the creation of professional development mechanisms that will live past the life of the projects;
- **Innovation** in leveraging the Internet connection in schools to cover a country and in developing the student support technician approach; and
- **Stakeholder involvement** including students, teachers, parents, academics, and school and government officials.

ACHIEVEMENTS TO-DATE

As a result of AED's two education projects in Macedonia there have been many accomplishments in the education sector including:

Comprehensive professional development activities for primary teachers.

Hundreds of teachers have participated in interactive professional development activities focusing on school-based teacher assessment, integrating ICTs into the classroom, new pedagogical tools, math and science education, and positive learning environments. Teacher participation in professional development activities is complemented by an extensive set of support materials including a guidebook on how to promote 21st Century skills' acquisition in the classroom, a manual on project-based learning, a guide for school-based assessment, and example lesson plans. These materials are currently being assembled into a dynamic "Tool for changing the classroom" that will include both paper- and web-based content. Follow-up visits to schools to provide professional development support and feedback to teachers have been conducted as well. As a result of these professional development efforts, teachers have embraced new methods to engage their students in active learning, integrate ICTs into their classes, and conduct student assessment. *(see Text Boxes 3 and 4).*

Improved school learning environments.

Seventy-seven primary schools have been renovated using energy efficient technologies such as double paned windows, and replacing wood burning stoves with modern equipment. In addition to generating cost-savings for schools, children are now able to learn in warm, welcoming freshly painted classrooms.

New standards for school-based assessment.

A set of standards for student assessment and a related code of ethics were developed and widely shared with teachers, policy makers and academics. The standards have been approved by MoES and an in-depth training module has been created with input from international experts. A teacher-friendly handbook outlining school-based assessment standards and tips was produced.

Innovative computer maintenance support.

All primary schools have been assisted in setting-up Student Support Technicians Clubs (SSTC) that consist of 7th and 8th grade students, supervised by two teachers, who are in charge of basic computer maintenance, network management, and teacher assistance. The teachers involved have participated in training in technical and management issues and the students have a comprehensive SSTC manual covering networking and operating system maintenance. Further support on trouble shooting particular issues is provided via the SSTC blog. Schools benefit from the sustainable maintenance support and students gain valuable problem-solving and technical skills.

Broad support for and involvement in improving education.

Local, national, and international actors from public and private sectors have been mobilized to contribute to education in Macedonia. Nationally, MK Connects and PEP attracted the support of MoES, the Ministry of Telecommunications, the Macedonian Civic Education Centre, MASIT, On.Net, Microsoft Macedonia, and the music star Tose Proeski. Internationally, AED secured partnerships with acclaimed academic institutions, corporations and foundations, such as Indiana University, Motorola, Hewlett Packard, Earthwalk Communications, and Oracle Education Foundation. And locally, the projects have closely involved students, parents and teachers in school renovation, computer maintenance, standards design, and professional development.

The world's first wireless country.

Nationwide wireless Internet infrastructure was built providing Internet coverage to 95% of the population, dramatically increasing access. Every primary and secondary school, representing over 200,000 students, is connected and 65 percent of schools have created their own websites. Deregulation, expanded market access and competition have also dropped the price of broadband Internet by as much as 75 percent since 2004. Simultaneously, Internet use in Macedonia has increased by 52 percent.

TEXT BOX 4

In their own words: reflections from Macedonian teachers

ON ACTIVE LEARNING METHODOLOGIES:

"The novelty in our work with the projects is that now when we plan for implementation, students are involved in the planning. It is also a new for them to assess their own products. A competitive spirit is rising. But, they collaborate during the implementation of the activities. I enjoy watching their presentations."

"We have always worked on projects with our students. The benefits of the workshops for us, as teachers, are the new ideas we get about the innovations we can build in our projects, so they are never the same or boring. Projects are the students' favorite activity because they have opportunity to choose, plan and create on their own. We only give directions. They are very pleased with their final product and they put it on the wall with pleasure."

ON USING ICTS:

"Previously, we could only use chalk and board to draw, but now through animation, students have better understanding of the atom's structure and chemical relations".

"We were all a little afraid because we are not informatics experts and we were not sure whether we are able to realize the goals of the class after our professional development. There were certainly some classes which did not achieve the goals, but, looking backwards I can say that the quality of instruction is much higher using technology."

ON ASSESSMENT:

"The assessment workshops helped us to change the way of thinking and to clearly understand our role."

"Students like this change [to include self-assessment methods]. Previously, when I asked their opinion, they always asked for the highest grade. Now, they are more reflective. They tell me what they did not know and they discuss their work among themselves."

These quotes are taken from interviews conducted by PEP's Monitoring and Evaluation Coordinator. They were conducted in Macedonian or Albanian and translated into English.

BEYOND MACEDONIA

Beyond Macedonia — scaling the model

In the global economy, countries are looking for ways to increase their national competitiveness and prepare the next generation of leaders, entrepreneurs, and employees to have meaningful and productive lives. The MK Connects model is being followed in neighboring Montenegro where AED, in collaboration with CHF and USAID, has helped to bring more than seventy percent of the country on-line. Senegal is the first African country to start work on replicating the model with support from USAID and implementation by AED. As the first decade of the new millennium comes to a close, more and more education systems recognize that capitalizing on innovations and cost-efficiencies of ICTs will enable them to better serve their communities.

Macedonia's experiences and achievements in revitalizing education will always be unique, but the principles of success can be applied in countries around the world. AED understands the new demands on education for the 21st Century and has been a leader in supporting governments as they seek to transform their education systems.


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