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Macedonia e-Schools Final Report

Prepared by the
Education Development Center, Inc.

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Acronyms

AED	Academy for Educational Development
BDE	Bureau for Development of Education
COP	Chief of Party
EDC	Education Development Center, Inc.
EEC	Education and Employment Center
ICT	Information Communication Technology
IR	Intermediary Result
LAN	Local Area Network
MASSIT	Macedonian Information Technology Professional Association
MES	Ministry of Education and Science
M&E	Monitoring and Evaluation
NGO	Non Governmental Organization
PC	Personal Computer
PR	Program Result
PRC	People's Republic of China
RFP	Request for Proposal
RFQ	Request for Quote
SEEU	South Eastern European University
USAID	United States Agency for International Development
WLAN	Wireless Local Area Network

Executive Summary

From 2003 to 2008, the Education Development Center, in association with the Academy for Educational Development, Net Assessment and WorldLinks, executed the e-Schools project in Macedonia. This final project report presents EDC's major activities and accomplishments during the life of the program. The USAID funded e-Schools Project's objectives over the past four years were to promote alternative and non-traditional methodologies by placing the student in the focus of the learning process. e-Schools' endeavors were directed towards integrating information and communication technology in the learning process and changing the role of the teacher from presenter of information to facilitator of learning. The e-Schools Project prepared training for teachers from all over Macedonia in order to achieve its complex goals at the primary school level. When all preparations were over, on November 1st 2005, the Training in Innovative Use of ICT in Primary Schools for nine master trainers, 344 teacher trainers and 6,620 teachers began. The e-Schools Project was commissioned by USAID to install 5,950 computers donated by the People's Republic of China in 360 primary and 100 secondary school buildings throughout Macedonia. The e-Schools Project also conducted the comprehensive training program which lasted until February 2007, in order to best guarantee computer application and proper use in the learning process.

In addition to teacher training and hardware installation, the Project contributed to the instilment of information and communication technology in the Macedonian primary education system through the development of the first educational software in Macedonia, ToolKid. Its target students, and therefore teachers, were in grades K-4. The e-Schools Project localized and adapted the ToolKid software package to align it with the existing K-4 grades curriculum, and translated it into Macedonian and Albanian. One hundred licenses were donated to the same number of pilot schools determined by the Bureau for Development of Education. 414 teachers from the 100 selected schools that received the software were trained in its use with their students in collaboration with the USAID World Learning program. The e-Schools project, through the Macedonian Civic Education Center, continued the training of all 2,336 K-4 teachers from the preselected schools. Over eighty additional ToolKid licenses were purchased at the end of the project and given to USAID partner World Learning for distribution to schools. The e-Schools Project made efforts to improve the development of education through providing all K-4 teachers with training in ToolKid. ToolKid has been recognized by the Bureau for Development of Education as one of the means for meeting learning objectives in the reformed national K-8 curriculum.

Finally, e-Schools expanded the use of ICT in secondary schools by integrating ICTs across the curriculum and by using ICTs to support Macedonian education reforms already underway in teaching and learning practices that support student-centered learning. The full text of this report explains both the successes and major recommendations of the project team in more detail.

I.   Introduction

As the world continues to move towards knowledge-based societies and market-based democracies, education unquestionably must also transform. It is essential that today's students become tomorrow's human resources capable of creating rather than receiving, skilled in constructing and using their knowledge in different situations and ready to take responsibility for the work they do. In order for the contemporary workforce to undergo these qualitative changes in Macedonia, as in the rest of the world, educators and students need to critically start contemplating their role in the education system and the world in general. It is not enough for school administrators and teachers to merely tolerate students taking more responsibility for their learning, rather it is their responsibility as educators to support that change and move it forward. Teachers need to rethink how to activate and motivate their students so that they reach and even exceed the learning objectives by finding applicability in what they are learning. On their road of discovery, teachers also undoubtedly need institutional and properly structured guidance and assistance on how to better guide and assist their students. The e-Schools project, funded through the dot-EDU leader with associate awards under the DOT-COM Alliance, started a massive shift in how students learn and teachers teach.

USAID established the DOT-COM Alliance to provide digital opportunities for developing nations, bring the potential for information and communication technology (ICT) to transform the way people live, learn and work. USAID asserted that "nations that harness these technologies can look forward to expanded economic growth, improved human welfare, and stronger democratic governance."

Three cooperative agreements were put in place to help USAID missions use ICT to achieve their objectives: one award for policy (dot-GOV), one for access (dot-ORG), and one for education and learning systems (dot-EDU). The Education Development Center, Inc. (EDC) was the award recipient for the cooperative agreement that helps implement ICT and learning systems. A number of resource partners, including the Academy for Educational Development, Net Assessment, World Links, and a local partner (the I-earn network) were included in the dot-EDU Macedonia e-Schools (previously called E-WorLD) program.

Since 2003, the project provided basic ICT infrastructure and fostered a culture of ICT-enhanced learning throughout the educational system in Macedonia. This report will detail how over 10,000 teachers were trained to integrate ICT into the curriculum and how six thousand computers and 460 servers were installed in schools to change the ICT landscape of the future leaders of Macedonia.

II. Objectives

The e-School's project worked with relevant Ministry of Education experts (teacher training, curriculum development, measurement and monitoring, etc.) to respond to Macedonia's educational and social realities. All activities were designed to reflect goals of e-school elements of community-based and project-based learning. Major project objectives were to:

- Assess the condition of current ICT in Macedonia's education system (primary and secondary) and the strategies available to make use of computer labs in schools to build on community/NGO/private sector relationships in the effort to improve the condition of teaching and learning and make education more relevant to employable skills required by current job market.
- Take advantage of the contribution of a significant number of computers by the Chinese Government (PRC) to establish computer labs in all secondary and 360 primary schools by providing cables, networking solutions, and installation of donated equipment.
- Expand the existing use of ICT in primary and secondary schools by integrating ICTs across the curriculum and by using ICTs to support Macedonian education reforms already underway in teaching and learning practices that support student-centered learning.
- Address current workforce development needs throughout primary and secondary initiatives.
- Establish plans and practices to help ensure sustainability of schools' computer labs through income generation strategies that include community access to these facilities for business and economic development purposes.

These proposed activities were designed to contribute to one Intermediate Result within the 3.4 Strategic Objective "Mitigate Adverse Social Impacts of the Transition to Market-Based Democracies": **IR 3.4.1: Improved quality and relevance of instruction at the primary and secondary levels.**

Thorough monitoring and evaluation was required as part of the e-Schools activity.

The following program results were expected to be realized by the end of the e-schools project:

Program Result 1: Installation and Integration of ICT into Primary Schools

To achieve Program Result 1, the e-Schools program was expected to achieve the following program results:

PR.1.1: Infrastructure assessment of space for computer labs to determine refurbishment needs; Learning Assessment of teachers to determine level of computer liceracy and knowledge of how to integrate the use of ICTs into teaching and learning. (EDC, AED)

Infrastructure assessment began in FY04 Q1, and continued through Q2, Q3, and Q4 Q1. 360 primary schools were assessed for lab suitability and catalogued in a spreadsheet for follow-up. Infrastructure concerns regarding space, security, wiring, paint, etc. were evaluated. Further assessments were made on an as-needed basis for the duration of the project.

These thorough assessments formed a solid foundation for the e-Schools installation process, informed school administers about expectations regarding conditions necessary for receiving computers, and jumpstarted the collaborative e-Schools/school administrator partnership to prepare for the transition to the e-Schools model.

PR.1.2: Deploy available hardware in primary schools. (EDC)

Primary school hardware deployment was completed in July 2007. The phased roll-out of labs in primary schools throughout the country made computers available in many schools prior to this end date. The primary schools wireless networks (WLAN) were completed in FY05 Q4.

Despite several challenges, including some large and unexpected changes in hardware roll-out plans by the Ministry of Education, the e-Schools project installed and configured all available hardware as planned, on-time and within budget.

PR.1.3: Develop content and materials that support the principles of the e-schools.mk model, namely, support project-based learning, reflect real world and real work problems, increase employability skills, have an interdisciplinary approach, and promote student team work. (EDC)

The core strength of the e-Schools project was the materials and content developed to maximize the potential of ICT hardware resources in the classroom. The project developed, adapted, and applied web resources, local network and individual machine-based software, and physical training materials to this end. An inexhaustive list of these materials includes:

1. User's manual for innovative use of ICT in the primary school instruction (Phase 1) Training manual (2006, Printed in Macedonian and Albanian).
2. User's manual for innovative use of ICT in the primary school instruction (Phase 2) Training manual (2006, Printed in Macedonian and Albanian).
3. e-School.mk, The link with tomorrow-- Working groups manual (2005, Printed in Macedonian).
4. e-School.mk WLAN (Wireless local area network) Manual Technical manual (2007, Printed in Macedonian).

5. Algorithms, The computer in primary schools--Fifth ToolKid User's manual (2008, Printed in Macedonian).
6. ToolKid Plus, The computer in primary schools-- Sixth ToolKid User's manual (2008, Printed in Macedonian).

All project activities were designed with an eye to 21st century skills and providing students with the transferable skills and experience necessary to succeed in Macedonia's growing economy. In primary schools, the ToolKid software suite encouraged critical thinking while exposing students to basic and intermediate computer literacy, information technology concepts and common applications.

PR.1.4: Educate and train teachers and a selected number of school administrators with the above e-schools.mk content and materials. (WorldLinks, EDC)

From the outset, the e-Schools program approach was one that concentrated on holistic teacher and administrator training in the use of integrated ICTs in the classroom. Established ICT-enhanced pedagogical theory states that providing schools with technology is not enough; teachers and administrators must fully embrace ICT tools as their own, and be trained in how to effectively use such resources to complement and bolster the existing curriculum.

With this in mind, the e-Schools project conducted a nation-wide training program for teachers and administrators.

In order to achieve its complex goals at the primary school level, the e-Schools Project prepared a training cycle including eight master trainers, 254 teacher trainers and 5,232 teachers trained from all over Macedonia. Preparations for this enormous training were November 1st 2005, and the Training in Innovative Use of ICT in Primary Schools began shortly thereafter. All told, the training included nine master trainers, 344 teacher trainers and 6,620 teachers.

Additionally, e-Schools conducted an extensive training on ToolKid, the first educational software in Macedonia. One hundred licenses were donated to the same number of pilot schools determined by the Bureau for Development of Education. 414 teachers from the 100 selected schools that received the software were trained in using it with their students in collaboration with the USAID World Learning program. The e-Schools project, through the Macedonian Civic Education Center, continued the training of all 2,336 K-4 teachers from the already selected schools.

PR.1.5: Monitoring and Evaluation (AED)

Monitoring and evaluation activities were integrated throughout the e-Schools project. On the primary school level, the methodology included:

1. Asking Teachers:
   - 77% or 5,303 teachers completed online questionnaires
   - 60 teachers participated in focus groups
   - Individual interviews were conducted with 43 ToolKid teachers
2. Asking Students:
   - Interviews were conducted with 50 K-4 students
   - Interviews were conducted with 90 5-8 grade students
3. Asking Principals
   - Interviews were conducted in nine schools that use ToolKid.
4. Reviewing Lesson Plans
   - 4,280 lesson plans from the visited classes
   - 1,360 lesson plans uploaded to www.schools.edu.mk
5. Visiting teachers in class
   - 67% or 4,664 teachers conduct class with "innovative use of ICT" as defined by the research methodology
   - Observations were conducted in 43 classes where teachers used ToolKid.

A full account of the e-Schools project M&E activities can be found in the Formative Impact Report, submitted to USAID in September 2007.

Program Result 2: Use of ICT to Support Reform of the Secondary Schools

PR.2.1: Assessment of physical infrastructure (EDC) and learning needs in selected secondary schools. (EDC)

Infrastructure assessment began in FY04 Q1, and continued through Q2, Q3, Q4, and FY04 Q1. One hundred secondary schools were assessed for lab suitability and catalogued in a spreadsheet for follow-up. Further assessments were made on an as-needed basis. For the duration of the project.

These thorough assessments formed a solid foundation for the e-Schools installation process, informed school administers about expectations regarding conditions necessary for receiving computers, and jumpstarted the collaborative e-Schools/school administrator partnership to prepare for the transition to the e-Schools model.

PR.2.2: Deployment of technology (hardware and networking) in all secondary schools. (EDC, WorldLinks)

The first hardware deployment happened in the second quarter of the project in response to a special request from the Minister of Education to complete the installation of five laboratories. This installation was largely a good-faith expression of the project's potential; it was not part of the original work plan, but a special effort was made to fulfill this request.

Deployment of the remaining computers continued in the wake of the e-Schools technical infrastructure assessment (PR.2.1). Hardware (infrastructure and computers) was completely deployed to all secondary schools by the end of December 2004 (project quarter 6) following rapid deployment activities beginning in May of that year.

PR.2.3: Material and content development to introduce the use of ICT to promote active learning and critical thinking, as well as work-based learning, throughout the secondary school system. (EDC, WorldLinks)

As stated above (PR.1.3.), a core strength of the e-Schools project was the materials and content developed to maximize the potential of ICT hardware resources in the classroom. The project developed, adapted, and applied web resources, local network and individual machine-based software, and physical training materials to this end. A representative list of these materials includes:

1. Manual for use of ICT in the instruction for secondary schools teachers (training dissemination) Training manual (2005, Printed in Macedonian and Albanian).
2. e-School.mk LAN (Local area network) Manual Technical manual (2006 Printed in Macedonian).
3. Chemistry for primary and secondary education, Digital content for chemistry for students and teachers-- available on the Educational Web Portal (2007, Developed and available in Macedonian).

At the secondary level, students were trained in basic computer literacy and more advanced concepts, and trained teachers used the labs, associated software and instructional manuals to truly integrate ICT-enhanced learning into the existing curriculum.

PR.2.4: Education and training activities. (WorldLinks)

The e-Schools project conducted a nation-wide training program for teachers and administrators. Specific activities in this regard for secondary school teachers and administrators included:
- Equipping schools with computer labs and application needed to development

computer literacy among students (coordination of installation of 2000 computers);
- Teacher Professional Development materials translated in Macedonian and Albanian focusing on project based learning and basic ICT skills;
- Awareness raising events for ICT integration in schools;
- Teacher training on how to integrate ICTs into teacher practices, and promote innovative practices with students;
- Two-day orientation workshop for principals for the teacher professional development program.

PR.2.5: Evaluation (AED)

Please refer to PR.1.5 and Section V of this report.

Six-Month Extension

In August of 2007, a sixth-month extension was granted to allow the e-Schools project to install and configure server PCs in 460 schools in Macedonia at an additional cost of $350,000.

This activity was subcontracted to INet and completed ahead of schedule in February 2008.

III. Program Overview

Program Description

Dot-EDU/USAID/Macedonia defined the e-schools.mk process as:

> *A network of schools in Macedonia dedicated to using information and communications technologies (ICTs) to teach children and youth the critical thinking, entrepreneurial, communications, and other 21st Century learning skills needed to succeed in the global workplace. E-schools support local workforce and business development and provide new opportunities for social, cultural, and economic development in Macedonia.*

The e-Schools.mk process also defined four "levels of development" in the use of ICTs to improve teaching, learning and student preparation. Each level of development is defined by objective characteristics in key areas of the education system and indicates a progression from being a "Member of the E-school.mk Community of Practice" to an "E-School.mk Center of Excellence." Reaching established standards was expected to open the opportunity of awards for the school community that could enable it to further enhance progress.

A school's specific level of development was to be determined by its assessment against specific characteristics within key areas of the education system. The six key areas included:

- Pedagogy
- Use of ICTs in teaching and learning
- Community linkages
- Institutions and governance
- Workforce and external links
- Information access and content.

Year One

FY 2003 Quarter 4 (First Project Quarter)

The dot-EDU Macedonia e-schools project began in July 2003. During the first three months of the program, a rapid start-up strategy was put in place. The Chief of Party, Dr. Luis I. Rodriguez, moved to Skopje; EDC's New Projects Coordinator, Rosemary Lombard, arrived in-country to begin exploring local regulations, availability of office space and other preliminary implementation details. Each new NGO attempting to operate in Macedonia needs to go through a formal registration process that enables tax-exempt status. This process, initiated in early September 2003, took approximately six weeks. During this time no operation could be legally performed, including hiring staff, opening bank accounts, purchasing goods, etc. For that reason it was decided to operate on a temporary status, hiring minimal key personnel as consultants, and refraining from any installation activities.

Despite these constraints, the first quarter was eventful. After the core startup team was assembled, an extensive tour of secondary schools throughout Macedonia was conducted in order to gather information on local issues that would influence the computer lab installation process and the future training and technology integration processes to be launched. First contacts with Ministry of Education and Science (MES) officials were made in order to begin working relationships. The MES delegated one person as the liaison person to the project in order to facilitate communication and visits to schools. As part of the initial planning, the first drafts of the work plan and implementation plan were created.

Activities were jumpstarted in the second quarter with a request from the Minister of Education to perform a preliminary installation and inauguration of a small amount of school computer labs in order to show the public opinion progress, as the computers had been distributed months prior to each school and were awaiting installation. A special effort was made to fulfill this request.

Registration was completed in the second quarter. Office space was identified, staff recruited under their initial three-month probation period, housing for the COP was secured and a project car was obtained through a donation made by the USAID/OTI project ending in September 2003.

At the end of Quarter two five labs were installed and inaugurated in ceremonies where the President, the Minister of Education, USAID Mission director and other personalities were present at various occasions. The installation process quickly indicated that the country was ready for more than just installing labs. Readiness in the education community lead the project to propose and launch an entire change process based on the creation of a movement lead by school communities in each school. This movement was identified as the "e-Schools" process and led by an "e-School working group" in each school. The "e-schools" movement was dubbed by the Minister of Education as "The first step towards a reform in the education and decentralization process in Macedonia."

FY 2004 Quarter 2

There was significant and measurable progress in the second quarter. The project had many accomplishments including working concurrently to setup an operating office and install five computer labs. Highlights included:

- Assessment of education situation in Macedonia through a field trip with all partners (EDC, AED and World Links). Conclusions of the assessment team lead to the development of the e-schools concept.
- Installation and inauguration, with high profile ceremonies, of five school labs in Gevgelia, Bogdanci, Kratovo, Debar and Struga. Inaugurations were attended by USAID and GOM authorities in each case.
- Facilitation of the process that lead to the offer made by the government of the People's Republic of China to make a second donation of approximately 4000 computers for primary education.
- Development of a communications campaign in order to develop a positive public opinion around the concept of "e-schools".
- Initiation of the schools technical assessment in order to proceed with the installation of labs. Teams started visiting each of the 100 schools of the secondary school system, checking physical and technical conditions in order to set up the labs.
- Database with secondary school technology information created.

- Creation of "e-school working groups" in each of the schools where labs were installed.

With all of these activities came challenges that would need to be addressed in subsequent quarters; namely, by the end of quarter two the project described in the work plan was becoming increasingly different from the actual work carried out in the field. The reason for this was that the work plan covered only a portion of what needed to be addressed to make the program useful and sustainable. Another emerging challenge came in the form of the additional equipment donated to primary schools, which necessitated expanded installation and teacher training.

The lab installations and education activities began in earnest in the beginning of 2004. The project was divided into two teams: the Technology Transfer Program Team and the Education and Technology Integration Team. Each of these developed their own work program. The Technology Transfer Program team initiated the technical assessment of 100 buildings where future labs are to be installed. Conditions were assessed and site by site work plans were developed (wiring, security, painting, etc). The results of this technical assessment allowed the technical specifications of the tender to be developed. The tender development process was a transparent and concerted effort that was carried out through an extensive information campaign in which all bidders and the Macedonian Information Technology Professional Association (MASSIT) were all informed of the process and requested to provide feedback. Also during this period, meetings were held with local internet providers to explore different possible scenarios for the provision of low-cost internet solutions to schools. The project developed two databases: one was containing information regarding the availability of computer equipment in targeted schools and another of contact information containing approximately 700 relevant entities in education (schools, ministries, NGOs, donor community members and other international organizations).

At this time the teacher training and school working group training strategies were designed in collaboration with World Links. An important series of meetings will all secondary school directors were held in order to inform them of the project and its strategies. On February 11, the project was officially introduced to the public through a media event hosted by the Minister of Education and the USAID mission director.

FY 2004 Quarter 3

During Quarter 3, the e-Schools project continued its evolution from its original scope to a larger and more comprehensive project; lab coverage was extended to all secondary schools, and USAID/Macedonia, in response to a second donation of computers from the People's Republic of China, requested an extension of the program to include all primary schools. For this reason, the e-school.mk initiative was requested to concentrate on secondary schools with the understanding that the primary school component would be put on hold until a new primary education program could be negotiated and a reprogramming could be completed.

Although Quarter 3 was a time of much transition, the project realized several major accomplishments:

Primary Schools: The primary school initiatives were put on hold until extension approval, but it is worth noting that pedagogical institutes were engaged to support teacher professional development.

Secondary Schools: Technical assessments were carried out in each of the 100 buildings where secondary schools operate (some schools operate in more than one building). Parallel to this assessment, meetings with all high school directors were held. The directors were brought to four cities (Tetovo, Kavadarci, Stip and Skopje). The directors were informed about the e-schools.mk program, its purpose, the goals to be achieved and the conditions in which this process would be implemented. Focus groups were carried out with groups of students to determine their expectations for new computer labs and computer labs to be modified.

Other: A social communications strategy was drafted to respond to the communication needs of the project. The e-Schools/3D animation program was started at the suggestion of the USAID Mission Director, with the aim of using a selected number of existing labs to train students in computer based animation skills.

Challenges in Quarter 3 were related to the changing nature of the program and difficulties with external communications (the original budget did not include specific funding for communications activities).

FY 2004 Quarter 4

The final quarter of Year 1, major accomplishments included the installation of all labs in secondary schools and the preparation of the training for selected secondary schools teachers due to begin in August.

The high school labs were installed following a strategy designed on the assessment. The strategy consisted of dividing the installation work into four geographic regions, each of which would be contracted to a different company to allow for simultaneous progress throughout the country. After a transparent tender process, contractors were selected and a rapid implementation plan was carried out. All labs were installed in May and June.

Concurrently, the education team focused on teacher training for secondary schools. Existing World Links materials were translated into Macedonian and adapted to be culture-specific. The teacher training strategies were also designed based on collaboration with teachers and World Links.

EDC's Newton-based Education and Employment Center (EEC) sent two consultants to assist the Education Team in the preparation of the e-schools working groups training and the design of a strategy that would include incentives, projects and other activities that

would foster and sustain the necessary dynamics for each school to become "e-school certified."

Finally, at the end of Quarter 4, an "ICT Committee" including representatives of the MES, USAID and e-schools activity was created. The goal of this committee was to establish a place of dialogue and exchange of information in order to solve the many communication problems that developed among these partners. The committee was designed to meet once a month to provide updates on the implementation of activities, clarify misunderstandings and coordinate activities among partners.

As the primary school initiatives were put on hold in Quarter 3, most achievements in Quarter 4 relate to secondary schools. Specific achievements include:

- All secondary school computer labs were installed (cabling & LANs; actual computers were yet to be configured and brought on line)
- A CD ROM containing 140 titles of Macedonian and Balkan literature was developed under a grant provided to the cultural NGO Blessok. The grant was partial assistance to complete a process started with other donors' support. This CD ROM was produced to be distributed in 40,000 copies as a supplement of a widely known household magazine "Tea Moderna". Through project assistance, e-schools received 600 copies to be distributed in High Schools.
- The e-schools 3D animation process completed its first training during this quarter.

Year Two

FY 2005 Quarter 1

The most important accomplishment of the first quarter of year two was completing the lab installation in all secondary schools. Each school's lab infrastructure, completed in year one, was furnished with computers and open software. Two additional major accomplishments of this quarter included completion of the first round of training for 81 secondary master teacher trainers and the reprogramming of the dot-EDU/Macedonia activity- namely extending it to include primary school computer deployment and teacher training components. The cooperative agreement amendment was signed on September 22 with a start date of October 1 2004.

The new agreement expanded the original program scope to include computer installation and configuration, in addition to the networking and cabling activities previously called for. INET's installation scope of work was modified to include this additional task.

Computer labs were officially "delivered" to the MES on August 31, 2004.

The first round of teacher training for the 81 teachers invited to become master teacher trainers in secondary schools took place the week of August 16, 2004 at SEEU

installations in Tetovo. For this training 81 teachers from 40 schools were invited. Seventy-seven teachers from 39 schools completed the training.

The newly modified e-Schools program started in earnest in October 2004. During this second quarter of project year two, new staff was hired and assessments were conducted in preparation for the implementation of new activities in primary schools.

The secondary school program continued during this quarter, and the activities conducted in this regard can be clustered in five areas:

- A visit to all secondary schools in order to produce a "snimanje" or snapshot of the current use of recently installed computer labs and an assessment of the impact that the first round of training for 81 master teachers might have had in each school community. This "snimanje" produced very interesting results, reported later to the MES authorities and the whole cohort of school principals with recommendations for follow up activities that would address some of the shortcomings emerging from this exercise.
- The design of a second round of training for master teachers, carred out under the subcontract with WorldLinks, and the preparation of a "basic skills training" for all high school teachers in Macedonia, which would be carried out in January of 2005.
- Preparation for a "basic IT skills training" that would be conducted by e-Schools staff for all secondary school teachers in January 2005.
- A two-day awareness-raising, demonstration, skills training and planning to make the "e-School" concept operational workshop with all high school principals (directors) was held in the first part of December. This workshop resulted in the creation of a special committee within the high school director's association to deal with the "e-School" concept and how to get there.
- A consultancy to assess the use of open source software for Macedonia.

The primary school activities consisted of:

- A learning needs assessment carried out under the subcontract to AED. This assessment would provide guidelines for future teacher training activities and other activities to be implemented in primary schools necessary for the successful integration of ICT into teaching and learning.
- Planning a technical assessment to determine the conditions necessary to deploy computers in primary schools.
- Finalization of the workplan for the primary school program.
- Coordination with the Macedonia Connects project in order to plan future offers for broadband wireless Internet access in schools, matching the wireless local network to be installed in primary schools.
- Initial contact with Bulgarian University, in order to explore possible collaboration in a strategy to develop content for the education portal.

The first quarter of calendar year 2005 kicked off with the start of the primary school program technical assessment process. This assessment determined the conditions in each of the 360 schools selected to receive computers. Assessment teams catalogued infrastructural conditions (security, electricity, distribution of classrooms in order to determine wireless router coverage, etc.) that would need to be improved before schools would qualify for computer donations.

At the same time, the e-Schools program began the tender process to select the company that would distribute and install the computers in primary schools. The tender was released in the last week of April following a bidder's conference.

The project also began a series of orientation meetings with all 360 primary school directors. These meetings informed directors about the computer distribution process, planned trainings for teachers, and provided opportunities to discuss ways of ensuring project sustainability. These meetings proved to be an excellent mechanism to keep directors abreast on the situation, get their input and develop ownership of the process.

For the secondary school component, the first round of training on ICT integration, provided by WorldLinks, took place. In January and February of '05, 1,845 teachers were trained in basic IT skills.

Administrative changes to the e-Schools project continued as the implementation team expanded and reorganized its functions. Deputy Chief of Party (Zdenka Nikolovska) was hired in April. Two teams were clearly identified: a Technical Team (led by Darko Arsov) and an education team (led by Olga Samardzic). Finally, it was announced that the current COP of the project would finish his assignment on August 30, and preparations were made to recruit and hire his replacement.

Quarter 3 of FY05 began in April with several changes. Chief of Party Luis Rodriguez left the project, and Zdenka Nikolovska was hired. She immediately assumed responsibilities as Acting Chief of Party. Additionally, the MES requested that the project increase the number of schools to be wired to 360.

The project made major inroads on important project activities despite a leadership transition. The main activities that took place during this quarter include:
- Development and award of RFP for primary network installation;
- Eight regional meetings with primary directors held to discuss strategy and sustainability issues;
- Round 2, cohort 1 of training for 180 secondary teachers on the "Innovative Use of ICT"; and

- Impact evaluation of secondary teachers conducted by Net Assessment's Sergio Cambronero.

These activities were successful and preliminary findings from the impact evaluation indicated that teachers began developing some very innovative technology-based projects at this time.

Two additional developments are also worthy of note. First, exchanges with the University of Bulgaria, and potential collaboration in the adaptation of their children's software began to take shape. Second, the project realized significantly increased collaboration with the Ministry of Education and the BDE.

FY 2005 Quarter 4

The crowning achievement of the last quarter of FY05 was the successful completion of the primary school wireless network (WLAN) installation. This installation was finished on time and included 33 additional locations requested by the MES. A high level of coordination with the MK Connects program existed at all times; this coordination led to the successful connection of all primary schools to the internet.

Many other events of note happened between July and September 2005. The e-Schools website was developed, the e-Schools web portal was planned, inroads were made in developing a sustainability strategy, and the *Innovative Use of Technology Primary Trainers Guide* was completed, translated, and approved by the BDE.

Teacher and administrator professional development activities were also ongoing in Q4 FY05, with second and third phase II workshops for secondary school teachers taking place in August.

Finally, a copy of the report "Impact Assessment of the e-Schools Program Activities at Secondary Level" was submitted to USAID on September 23. Several recommendations in the report provided guidance as the project entered year three, including specific instruction with regards to ICT integration in the curriculum, provision of incentives for young teachers to adopt new techniques, and the need for clearer direction to school directors to be more proactive about financing in-school trainings using already trained teachers as an available resource.

Year Three

FY 2006 Quarter 1

October through December of 2005 was without any doubt the most intensive and dynamic of the project to date. Many key activities and events took place and brought a meaningful and important wrap-up of all activities planned for the 2005 year, thus marking it as a very successful year, despite all the challenges faced.

The following activities and events took place in this quarter:

- Adaptation of training materials for dissemination of trainings in secondary schools;
- Duplication and distribution of training materials for dissemination of trainings in secondary schools;
- Regional meetings with 180 trained teachers;
- Dissemination of ICT Integration trainings in secondary schools by the 180 trained secondary school teachers;
- Monitoring of the dissemination of ICT integration trainings in secondary schools;
- Recruitment of regional coordinators;
- Monitoring of the Primary School WLAN Installation;
- Distribution of WLAN manual to primary schools;
- Development of an e-School web site;
- Adaptation of the e-School working groups manual to current situation;
- Development of secondary school computer lab manual as part of the e-School Working Groups manual;
- Monitoring and Evaluation consultant field visit;
- Recruitment of master trainers for primary schools training;
- Preparation for master trainers training;
- Development of primary school WLAN installation report;
- Orientation training for regional coordinators;
- Continued development of Web portal specifications;
- Selection of a provider that will develop the learning web portal, through an RFQ process;
- Finalizing negotiations with the University of Bulgaria/Virtech;
- Localization of the ToolKid Software;
- Curriculum development as part of educational ToolKid software development;
- Development and/or localization (translation and cultural adaptation) of teaching and learning materials for ToolKid software;
- Training of master trainers for primary schools training;
- Regional meetings with all primary school directors;
- Regional e-School Working Groups orientation meetings;
- Duplication and distribution of the e-School Working Groups manual to secondary schools;
- Duplication and distribution of secondary school Computer Lab Manual;
- Awarding for the RFQ: EDC-2005-03 Development of a Learning Web Portal Solution;
- Selection process of 240 master teachers for Integration of ICT trainings in primary schools;
- Establishment of a ToolKid core group consisted of 20 master trainers;
- Training of 20 master trainers for the use of Tool Kid educational software in primary schools;

In addition, project staff further supported e-schools in the following way:

- Monitoring and Evaluation Specialist Sergio Cambronero performed field visit in order to finalize the evaluation process for secondary schools by interviewing secondary schools students, as well as to develop a primary baseline and result matrix;
- John Wong and Adriana Vilela came out to Macedonia to facilitate the first round of training of the master trainers for primary school trainings;
- Project Director, Sonia Arias, visited the project from December 19-23, 2005. Visit consisted of discussions around finalizing the award process for RFQ for Development of a Learning Web Portal Solution, 2006 Implementation Plan, budget and overall management, and attending the opening of the first round of ToolKid training for the core group;

Project management was especially pleased with project activities, program performance and accomplishments in this quarter. Under the capable management of COP Zdenka Nikolovska, the project staff managed to complete all planned activities although under tight schedules in a very effective and efficient way.

Additional planned activity marks this quarter: A new computer donation from People's Republic of China to the government of Macedonia was finalized and it was decided in discussions with USAID that the e-School.mk project would perform the new installation of 2,000 personal computers.

FY 2006 Quarter 2

The first quarter of calendar year 2006 was largely dedicated to the primary training, web portal development, and ToolKid training. Overall, the following activities and events took place during this quarter:

Primary Training:
- Development of Teacher's Guide for Innovative use of technology trainings in primary schools
- Issuing of on-line application for primary school teachers for the Innovative Use of Technology primary school training
- Selection process of 240 master teachers for Integration of ICT trainings in primary schools
- Training of 240 teachers in Innovative use of technology trainings in primary schools

Web Portal:
- Creation of a subcontract with the selected company for the development of the Learning Web Portal
- Implementation of the Business Analysis and Design phase for the development of the Learning Web Portal

- Implementation of the Needs Analysis and Design phase for the development of the Learning Web Portal
- Development of the Learning Web Portal Prototype

ToolKid Training:
- Training of core group of 20 master trainers for the use of ToolKid educational software in primary schools - Phase 2
- Preparation with World Learning for ToolKid training of 400 primary school teachers
- Training for the use of the ToolKid educational software for the first group of 200 teachers from 50 primary schools

In addition, project staff further supported e-schools in the following way:
- Monitoring of the dissemination of ICT integration trainings in secondary schools
- Monitoring and Evaluation Specialist Sergio Cambronero performed field visit to finalize the primary schools baseline and introduce M&E tools to be used by the Regional Coordinators.

At this point in the program, objectives were being achieved on time and on budget. The staff was pleased with progress, but issues of overtime and overwork for the e-Schools staff became apparent. To alleviate these difficulties, project management decided to move forward with hiring a Monitoring and Evaluation Specialist in the following quarter.

FY 2006 Quarter 3

The third quarter of FY 2006 was largely dedicated to the dissemination of primary school training, web portal development, and ToolKid training. Overall, the following activities and events took place during this quarter:

Primary Schools Training:
- Dissemination of the first phase of the Innovative use of Technology trainings in primary schools
- Finalization of the User's Guide for Innovative use of Technology trainings in primary schools – Phase 2
- Workshop for 9 master trainers and 18 assistants for Innovative use of technology trainings in primary schools
- Planning, preparation and administering the Primary School ICT Survey

Web Portal:
- Development of the Education Web Sub-Portal
- Educational Web Sub-Portal launching event
- Developing interaction guide for users of the sub-portal

ToolKid Training:
- Training of core group of 20 master trainers for the programming and adjustments of ToolKid educational software in primary schools - Phase 3
- Preparation with World Learning for ToolKid training of 400 primary school teachers
- Training for the use of the ToolKid educational software for the second group of 200 teachers from 50 primary schools – first part
- Training for the use of the ToolKid educational software for the second group of 200 teachers from 50 primary schools – second part

In addition, project staff further supported e-Schools in the following way:
- Monitoring of the dissemination of ICT integration trainings in secondary schools
- Monitoring and Evaluation Specialist Sergio Cambronero performed field visit to conduct regional meetings with secondary school teachers and school directors
- Project Director Sonia Arias performed field visit to provide support for the regular activities and for the primary schools training workshop - phase 2

Due to the enlarged monitoring and evaluation activities in both primary and secondary schools, the project management started the process of hiring a Monitoring and Evaluation Specialist.

FY 2006 Quarter 4

The third quarter of calendar year 2006 continued the activities related to the Innovative use of technology in primary schools trainings, web portal development, and ToolKid training. Overall, the following activities and events took place during this quarter:

Primary Schools Training:

- Preparation for the Innovative use of technology in primary schools training-phase 2
- Innovative use of technology in primary schools training for 344 teachers-trainers-phase 2

Web Portal:

- Further development of the Education Web Sub-Portal
- Development of a strategy for promotion of the usability of the Education Web Sub-Portal

ToolKid Training:

- Training for the programming and adjustments of the ToolKid educational software (second phase) for 200 teachers from 50 remaining schools

In addition, project staff further supported e-Schools activities in the following way:

- Project Director Sonia Arias performed field visit in July 10th-14th in order to work directly with the field team on improving the design and functionality of the Education Web Portal
- Monitoring of the trainings for 344 teachers-trainers for Innovative use of technology in primary schools
- Monitoring and Evaluation Specialist Sergio Cambronero performed field visit to train newly hired Monitoring and Evaluation Manager

As planned in the previous quarter, a Monitoring and Evaluation Manager was hired and officially assumed the responsibilities in August.

Year Four

The period October – December 2006 marked the beginning of the last remaining year of the project's original mandate. This period had an increase in school training and monitoring and evaluation activities as this quarter was also the beginning of the new fiscal and school year. Overall, the following took place during this quarter:

Primary Schools Training:

- Dissemination of the second phase of the Innovative Use of Technology in Primary Schools
- Support visits to teacher trainers for Innovative Use of Technology in Primary Schools

ToolKid Training:

- Preparation for the dissemination of the ToolKid training for K-4 teachers in the 100 selected schools

Web Portal:

- Finalization of a strategy for promotion of the usability of the Education Web Sub-Portal
- Development of a Portal Action Plan
- Development of Portal Administration Group Profile

Monitoring and Evaluation:

- Presentation of the Impact Assessment Report 2006 of e-Schools Program Activities at Secondary School level
- Development of M&E Implementation Plan for FY07

- Capacity building workshop for primary school master trainers and regional coordinators regarding the M&E process
- Class visits for support and M&E purposes
- Administration of on-line tools for M&E purposes

In addition, project staff further supported e-Schools activities in the following way:

- Close monitoring of the dissemination trainings for Innovative use of technology in primary schools
- Monitoring and Evaluation Specialist Sergio Cambronero performed field visit to work closely with the project's Monitoring and Evaluation Manager in the process of developing the M&E FY07 Implementation Plan, as well as to present the Impact Assessment Report 2006 to USAID and MES officials.

Project management was very pleased with the development and implementation of the project activities, program performance and accomplishments in this quarter.

FY 2007 Quarter 2

The period of January – March, 2007 marked the beginning of the new calendar year and the beginning of the second school semester during which the dissemination of trainings as well as all other program activities needed to be completed. This period was filled with increased school training and monitoring and evaluation activities, as well as with preparation activities for the new computer installation in the primary schools. In addition, important steps were taken as part of the transferring process of the Education Web Portal to the Ministry of Education and Science (MES). Overall, the following took place during this quarter:

Primary Schools Training:

- Dissemination of the second phase of the Innovative Use of Technology in Primary Schools
- Support visits to teacher trainers for Innovative Use of Technology in Primary Schools

ToolKid Training:

- Dissemination of the ToolKid training for K-4 teachers in the 100 selected schools

Web Portal:

- Coordinating preparation activities for presenting the Education Web Portal to high officials from the Ministry of Education and Science
- Education Web Portal Presentation to MES and BDE

- Planning for the transfer of the Education Web Portal Functionalities and Administration to the MES
- Preparation of an Education Web Portal Memorandum of Understanding
- Preparation for Education Web Portal Usability Testing
- Education Web Portal Usability Testing
- Organizing, Coordinating and Administering the Primary and Secondary School News Campaign

Second Computer Installation in Primary Schools:

- Creation of a scope of work for the new Primary School PC installation
- Preparation of a Memorandum of Understanding for the new Primary School PC installation

Monitoring and Evaluation:

- Training meetings with teacher trainers on observing classes and providing support to trained teachers
- Class visits to trained teachers for support and M&E purposes
- Administration of on-line tools for M&E purposes

In addition, project staff further supported e-Schools activities in the following way:

- Close monitoring of the dissemination trainings for Innovative use of technology in primary schools
- Monitoring and Evaluation Specialist Sergio Cambronero performed field visit to work closely with the project's Monitoring and Evaluation Manager.

At the end of March, two quarters remained in the original project contract. Staff indicated satisfaction with program progress to date, and were confident that all objectives would be completed in the final six months on time and within budget.

FY 2007 Quarter 3

The period April – June, 2007 marked the completion of the 2006/2007 school year. This period was devoted to completing all program activities related to the training, as well as increased Monitoring and Evaluation activities. In addition, there were continued activities in preparation for the new computer installation in the primary schools. The project continued to follow its set workplan and stayed on track to complete its stated goals at the end of the fiscal year. Overall, the following took place during this quarter:

Primary Schools Training:

- Support visits to teacher trainers for Innovative Use of Technology in Primary Schools.

ToolKid Training:

- Dissemination of the ToolKid training for K-4 teachers in the 100 selected schools.

Web Portal:

- On-going activities related to the transfer of the Education Web Portal Functionalities and Administration to the MES
- Administering the Primary and Secondary School News Campaign, including posting of received articles on the Education Web Portal
- Community of practice activity for secondary school teachers

Second Computer Installation in Primary Schools:

- Preparation of a subcontract for the Second Primary School PC Installation
- Implementation of the first - Assessment phase of the Second Primary School PC Installation
- Preparation for the deployment of the new donation of PCs in 233 primary schools

Monitoring and Evaluation:

- Class visits to trained teachers for support and M&E purposes
- Administration of on-line tools for M&E purposes
- Development of ToolKid M&E tools
- Focus groups with teachers and interviews with students regarding the Innovative Use of ICT in Primary Schools
- Class visits, teachers' and principals' interviews for ToolKid software evaluation

Two challenges of note presented themselves during this quarter: transfer of Education Web Portal Administration to the Ministry of Education and Science, and a change in the number of Chinese Government- donated computers allocated to the project for installation. This second issue in particular was unforeseen (a Memo of Understanding had been signed between USAID and MES to have the e-Schools project install 1,254 donated computers into 233 primary schools). The MES' reallocation left 650 computers to be installed in primary schools. Preparations for a modified scope of work were made.

FY 2007 Quarter 4

The period July – September, 2007 being the last quarter of the 2007 fiscal year, marked the closing out process for the e-Schools project according to its original mandate. This period was devoted to completing all program and administrative activities related to the project's close out. In addition, there were continued efforts and activities in preparation for possible extension of the project that successfully resulted in six months cost extension. Overall, the following took place during this quarter:

Web Portal:

- Training of the Portal Administration Group established by the MES;
- Completing the development of digital content for the subject of Chemistry taught in both primary and secondary schools;
- Official handover of the Education Web Portal to the MES.

Second Computer Installation in Primary Schools:

- Completing the process of computer installation in 233 primary schools, based on new number of computers available as dictated by the MES in the previous quarter.

Monitoring and Evaluation:

- Preparation of the Formative Impact Report for the Primary School Level;
- Presentation of the Formative Impact Report for the Primary School Level to MES and USAID officials.

A major challenge in this quarter was caused by a delayed transfer of the last portion of the obligated funds from USAID to EDC. As a result the field office began an immediate close down of activities including giving temporary termination letters to staff and giving stop-work orders to subcontractors prior to the officially expected end date of the project. This caused major concern among the staff and the partners, as well as delayed the completion of current activities within the expected deadlines. Regardless of this challenge, USAID was helpful and worked with EDC to address this issue. While the funding issue was being resolved, the project staff continued to work on the finalization of the current activities and the possible extension of the project which came through in the end.

In September, the e-Schools project was granted a six-month extension to install 460 servers in schools. These servers, like other computers previously installed, were donated by the People's Republic of China.

Year Five

FY 2008 Quarters 1 & 2

A sixth month extension was deemed appropriate to install and configure servers in 460 schools. Providing each school with a server was desirable for several reasons.

Providing each school with a server would provide a significant upgrade to the existing computer lab networks in the schools. It would provide more reliable connectivity to the internet, including the e-Schools portal. Servers would also provide schools the capacity

to have content stored locally and served instantaneously, reducing the amount of broadband connectivity required for downloading large files from the internet. Another added benefit would be reduced costs for internet connectivity which would save schools and the ministry future funds. The configuration of school domains and the installation of a server PC in each school would also, in the long run, increase efficiencies around maintenance

The first hurdle of the extension period was selecting a vendor to install the servers. Prior experience pointed to the fact that very few, if any, organizations in Macedonia would be able to install the servers as quickly or as cheaply as INet, the subcontract awardee that performed the school computer installation for the main award. Further investigation confirmed this INet was singularly prepared to offer this service quickly, at a reduced price, and with the added benefit of cost share in the form of man hours and donated software.

The sole-source justification and selection process was a significant undertaking for the project, and necessarily kept the actual installation of servers from beginning for several months. In December of 2007, nearly three months into the extension period, the sole source was approved and the subcontract was signed.

Server installation proceeded in January at an expedited pace. An ambitious workplan was agreed upon and INet mobilized vast resources quickly. The server installation was completed a month ahead of schedule in February 2008. INet is to be congratulated on its excellent efforts and prompt reporting during this period.

As the extension period approached its end, it became apparent that a significant amount of money would remain for additional activities. This was the result of several factors, most notably that the project lost two staff members that were budgeted for the extension period and the unexpected timely arrival of VAT refunds. The COP reported this to USAID, and received approval for subsequent activities, which included additional printing of teacher training manuals and the purchase of several hundred additional ToolKid software licenses.

The project was able to complete all of the requested activities through continued price negotiations with suppliers and the resourceful use of final VAT refunds, thanks in large part to the tireless efforts of COP Zdenka Nikolovska, USAID staff, and Macedonian officials.

IV. Monitoring and Evaluation

A full account and report of the e-Schools monitoring and evaluation activities can be found in the Formative Impact Report, which was submitted to USAID at the end of the project. A brief summary of that report is found below.

Goals of the M&E Component

The Monitoring and Evaluation Component has had one main goal, namely to closely follow and document all e-Schools' program activities, thus bringing to light the essence of e-Schools' impact on teachers and students achieved through several means: provision of technological infrastructure and educational resources in schools, wide-ranging training for teachers, building of the first Macedonian educational web portal in Macedonian and Albanian and developing the first educational software in Macedonian and Albanian.

To measure the main performance indicator for the e-Schools Project "Increased number of teachers using improved methodology", four performance sub-indicators for the primary school level were formulated:

1. Increased number of classrooms where student behavior shows evidence of focus on alternative methodology;
2. Increased number and type of classroom-based products that focus on innovation through the use of non-traditional methodologies;
3. Increased number of classrooms showing evidence of increased teacher-student collaboration in the use of ICT-based learning approaches;
4. Increased number of lesson plans that integrate ICT are made available on –line and shared throughout the education community.

Description of the methodology of the field work activities

The monitoring and evaluation activity for the primary school level consisted of the following undertakings:

A. Evaluation of the impact made by the Innovative Use of ICT in Primary Schools Training:

1. **Trained teachers' self-reporting using on-line questionnaires –** teachers filled in six questionnaires during and after the training;
2. **Lesson plan review –** a lesson plan review form was used for recording the review findings;
3. **Class visits** – a class observation form and rubric were used for recording the observation findings;
4. **Review of lesson plans uploaded to the Educational Web Portal** – a set of criteria for assessment of the lesson plans was developed;
5. **Group interviews with students** – two sets of questions were developed for the following purpose: (1) one set for group interviews for K-4 grade students and (2) one questionnaire and one set of questions for group interviews for 5-8 grade students;
6. **Focus groups with teachers** – a questions guide was developed for this purpose.

B. Evaluation of the use of the ToolKid software:

1. **Class visits** – two observation tools were used for recording the observation findings;
2. **Interviews with teachers** – individual interviews were carried out with each teacher using a structured questionnaire;
3. **Interviews with principals** – individual interviews were carried out with each principal using a structured questionnaire.

Main Results and Findings

Performance Monitoring Plan Target	Illustrative findings
50% of trained primary school teachers are applying alternative and innovative instructional practices	⬭ 60% of the teachers have successfully undertaken *a group-based lesson or a project-based unit*. They are applying diverse methods in class that stimulate *cooperative interaction* among students. ⬭ One of the biggest advantages of the ICT based classes reported by the teachers is that *students are engaged*. During these classes they are *more motivated, focused on learning and collaborate among each other*. ⬭ During ICT based classes, various *non-traditional student activities* have been observed. ⬭ A great majority of teachers (92%) confirmed to have considered *diverse approaches to learning* in their lesson or unit, such as: *learning by design*; *learning from experience*; *learning to learn*; *learning from errors* etc. ⬭ About 50% of the teachers surveyed report that the use of new technologies has *changed their way of teaching and relating to their students*. ⬭ *Teachers plan a facilitator's role* for themselves (76%) and an *active role for their students* (98%). ⬭ The majority of the teachers (85%) feel *ready to share* their knowledge and skills with their colleagues. ⬭ The majority of teachers see the *e-Schools training as an effective learning experience*. Still, they reported to be in *need of more training and guidance*. ⬭ Technology integration in the instruction *has increased* after the e-Schools training.

Summary of Conclusions

1. It could be concluded that **alternative methodology is already introduced** in the classes and gladly accepted both by teachers and their students. Still, students say that

they learn best when the **alternative methods are combined with the traditional methods**.

2. Teachers have comprehended the need for change of their own and their students' roles during class. The majority of **teachers** make efforts **to be facilitators** rather than presenters of information and **to activate the students** as main actors on the learning "stage".

3. The use of technology in the instruction **stimulates students' motivation and engagement in learning**, as well as their **interaction** during class.

4. Technology used in schools offers many more opportunities for learning and engagement of students in activities that go beyond traditional methods. Nonetheless, the **amount of resources in schools is often very restricted**, which constrains the possibility for using and sharing of the digital products that students create.

5. New methodologies applied in classrooms open opportunities for development of **critical thinking** in students as well as for **diverse approaches to learning**, having greater respect for the **individual skill level and learning pace** of the students. Especially purposefully developed **educational software, as ToolKid** is, enhances students' cognitive development.

6. Although teachers candidly express their feeling that the use of new technologies has changed the way they relate to their students, **the reality is still closer to the traditional model regarding teacher-student collaboration**.

7. Teachers' attitudes towards the use of educational technology, as well as their experiences with it is **very affirmative**, thus offering solid ground for expanding the efforts to **integrate ICT into the curriculum** exhibited so far.
However, teachers expressed **several difficulties** regarding implementation of ICT-based classes – **integration in the curriculum** and **technical assistance**.

8. Most of the **teachers feel ready to share what they have learned** about educational technology during the training with their colleagues.

9. The e-Schools training is assessed as very successful by the trained teachers, who have acquired the ICT skills encompassed by the training and now have a very clear idea how to use computers and Internet in their work.
Yet, **there is a need for more training and guidance** for the teachers in order to retain the already gained knowledge and to further broaden it. It is very important to see that even though teachers are overburdened with so many hours of training and so many changes coming too fast, they express **strong interest in their further professional development**.

1. The new and innovative instructional approaches **should be implemented in combination** with the positive and effective aspects of the currently used methodology.

2. Provide lower grade teachers with **additional support in introducing changes regarding student-teacher roles**. This support should not be to the exclusion of the upper grade teachers.

3. Already initiated technological improvements in schools should be further supported, along with **ongoing training** to the teachers for the use of technology and its integration in their instructional practice.

4. Schools and other relevant stakeholders should join their efforts in ensuring **sufficient amount of supplies** (printer cartridges, paper) that will enable students and teachers to fully use the possibilities given by technology.

5. The emerging teachers' necessity for a variety of educational software should be met by **continuous development of digital content** for different subjects in the local languages.

6. Teachers should be given **more examples or training** on how to enhance the **collaboration with their students** during class regarding the choosing of what to learn, what resources to use and how.

7. (1) Teachers should be assisted in **changing their perception of the possibilities that the curriculum offers for introduction of innovations**.
(2) An emphasis should be put on **providing the schools with technical support** related to the maintenance and sustainability of the computer infrastructure.

8. The use of www.schools.edu.mk Learning Web Portal should be strengthened by promoting its possibilities to the teachers, students and parents and offering attractive educational content for all beneficiaries.

9. Teachers' need for professional development should be welcomed and met positively – by **logically and consequently building on their already acquired knowledge and skills**.

V. The Future of Macedonian e-Schools

The e-Schools project closeout ceremony was held on March 21st, 2008 at the Aleksander Palace Hotel. US Embassy and USAID officials joined representatives from the Government of Macedonia, e-Schools staff members, and EDC employees to recognize the program achievements.

Since 2003, the project provided basic ICT infrastructure and fostered a culture of ICT-enhanced learning throughout the educational system. Six thousand computers and 460 servers were installed, and over 10,000 teachers were trained to integrate ICT into the curriculum. The e-Schools project started an enormous shift in how students learn and teachers teach—and at the end of the project, the focus necessarily shifts to ensuring continued innovation, growth, and investment.

From the beginning, e-Schools' mission has included a focus on sustainability. The knowledge to continue training teachers and using ICT hardware and software now resides in schools, both in the form of trained individuals and instructional manuals. The e-Schools portal is fully realized and provides an ongoing forum for educational professionals around Macedonia to learn and interact. Management of this resource has been transferred to the Ministry of Education and Science to ensure continued availability.

Two topics remain that require continued discussion and dedicated follow-up by USAID and the Macedonian government:

1. There is no concrete plan for the continued maintenance, upgrading and oversight of the enormous hardware and software infrastructure rollout.

2. There is no concrete plan for the associated training and dedicated teacher/administrator upskilling necessary to keep the e-Schools efforts relevant and functional system-wide. The monitoring and evaluation component clearly indicates that teachers want continued training on a regular basis. This falls outside of the scope of the original e-Schools project, and a solution to this has yet to be identified.

These are obviously not easy issues to address. Discussions between USAID and e-Schools staff on these topics were ongoing as the project neared completion, with plans for further development and integration of the project with the Government of Macedonia and other USAID- funded projects.

The tremendous effect of the e-Schools program is already seen in the optimism of teachers and enthusiasm of students, and the benefits will continue to be realized for years to come as students exposed to computers, information technology, and ICT-enhanced student-centered learning make the transition from school to work. The promise of these first-generation e-Schoolers is tremendous, but the ultimate legacy of e-Schools will be determined by the resolve of the Macedonian Government and USAID to ensure progress and continued support of the sea change in education caused by the e-Schools project.