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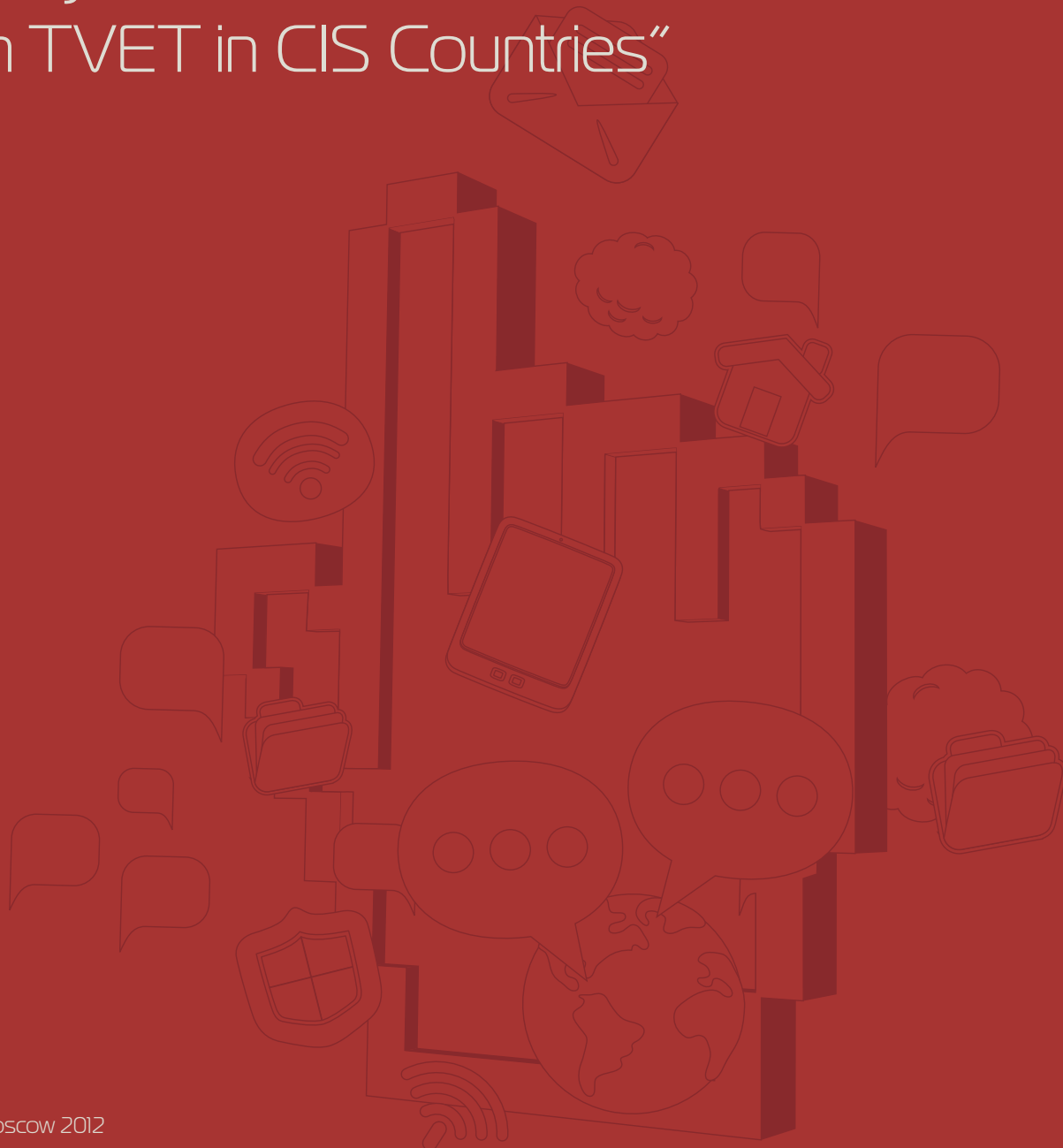


UNESCO Institute
for Information Technologies
in Education



SPECIAL REPORT

on the Activities Implemented
Within the Joint IFESCCO/UNESCO IITE
Project “Promotion of the Use of ICTs
in TVET in CIS Countries”



UNESCO Institute for Information Technologies in Education

Special Report on the Activities Implemented Within the Joint IFESCCO/UNESCO IITE Project “Promotion of the Use of ICTs in TVET in CIS Countries”

This special report is prepared by the UNESCO Institute for Information Technologies in Education (UNESCO IITE) within the framework of the joint project with the Intergovernmental Foundation for Educational, Scientific and Cultural Cooperation of CIS (IFESCCO). The publication contains a narrative project report, photos from the expert team meeting, a brief overview of the analytical report on the current situation in ICT use in TVET in CIS produced under this project, as well as information on major results achieved.

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Brief Information on the Project

PROJECT TITLE: Promotion of the Use of Information and Communication Technologies in Technical and Vocational Education and Training in the Commonwealth of Independent States

BENEFICIARY COUNTRIES: Kyrgyz Republic, Republic of Armenia, Republic of Azerbaijan, Republic of Belarus, Republic of Kazakhstan, Republic of Moldova, Republic of Tajikistan, Republic of Uzbekistan, Russian Federation and Ukraine

IMPLEMENTATION PERIOD: May 1, 2010 – March 31, 2012

FUNDING SOURCE – IFESCO: USD 65,340.00 (including 10% programme support cost)

CO-FUNDING SOURCES – UNESCO: USD 8,000

EXECUTIVE ORGANIZATION: UNESCO

RESPONSIBLE SECTOR/DIVISION: UNESCO Institute for Information Technologies in Education (IITE)



This special report is prepared within the framework of the joint project of the Intergovernmental Foundation for Educational, Scientific and Cultural Cooperation of the CIS (IFESCCO) and the UNESCO Institute for Information Technologies in Education (UNESCO IITE). The publication contains a narrative project report, information on major results achieved, photos from the expert team meeting, and a brief overview of the analytical report produced under this project.

The importance of development of governmental policy on Technical and Vocational Education and Training (TVET) in the Commonwealth of Independent States (CIS) was stressed during the International Conference on TVET and Education for Sustainable Development (ESD), which was held on May 14-16, 2009 in Minsk, Republic of Belarus, and attended by the Ministers of Education from CIS and several European countries. As one of the Conference outcomes, the present project was elaborated with a special focus on Information and Communication Technologies (ICTs).

The project was initiated jointly by IFESCCO and the UNESCO IITE with a view to promote ICT use in TVET in CIS and to ameliorate educational policies in this sphere. It was implemented by the UNESCO IITE in close cooperation with IFESCCO, Ministries of Education, National Commissions for UNESCO, CIS national experts, as well as with TVET institutions of these countries.

A comparative analytical report on the current situation with ICT application in TVET in CIS has been prepared. Ten countries have been covered by the survey: Kyrgyz Republic, Republic of Armenia, Republic of Azerbaijan, Republic of Belarus, Republic of Kazakhstan, Republic of Moldova, Republic of Tajikistan, Republic of Uzbekistan, Russian Federation and Ukraine. UNESCO IITE contribution to the implementation of the project was made through elaboration of guidelines for the conduction of comparative studies, coordination of project team work, organization of the face-to-face national experts meeting, and elaboration of recommendations for further promotion of ICT use in TVET in CIS countries with consideration of major UNESCO normative documents on TVET, such as the Convention on Technical and Vocational Education (1989), the Revised Recommendation concerning Technical and Vocational Education (2001), and the UNESCO and ILO Recommendations on Technical and Vocational Education (2002).

PROJECT MAJOR RESULTS ACHIEVED

1. Professional contacts between different project stakeholders, including national experts, Expert Team Coordinator, UNESCO IITE project team, IFESCCO responsible officers, National Commissions for UNESCO and Ministries of Education of CIS, established.

2. National policies in CIS countries concerning ICT use in TVET reviewed and analyzed. Relevant recommendations on their further improvement developed and being widely disseminated in CIS countries.

3. Access by CIS countries to the UNESCO legal instruments on TVET as well as their implementation encouraged, and related interregional mechanisms supported.

4. Initiatives and partnerships created to promote interregional cooperation in ICT use in TVET in CIS countries.

5. International and regional partnerships at the professional level strengthened, the attention of governments attracted to the question of the improvement of ICT use in TVET.

6. Priorities for the development of ICT use in TVET in CIS, taking into consideration national and international developments, experience and contemporary socio-economic situation, as well as relevant UNESCO normative documents, defined in the analytical paper.

7. Best practices on ICT use in TVET shared.

8. Further building bridges between TVET and manpower development in order to adapt TVET to the diverse and constantly changing needs of the labour market promoted.

MAJOR ACTIVITIES

The implementation strategy has been elaborated by joint efforts of IFESCCO and the UNESCO IITE. In accordance with the purpose and objectives of the project and in line with its implementation strategy, the following activities have been performed:

Activity 1

The criteria, structure and requirements for conducting comparative studies on the use of ICTs in TVET in CIS have been elaborated.

Activity 2

2.1 An international Consultant, Expert Team Coordinator, has been selected on a tender basis. He has undertaken a legal commitment to conduct comparative studies on current situation and tendencies in ICT use in TVET (based on materials presented by national experts) and to elaborate recommendations on its further promotion.

2.2 National experts from CIS have been selected on a tender basis. They have undertaken legal commitments to collect and analyze information on ICT use in TVET in their respective countries and elaborate recommendations on its further promotion.

2.3 To conduct the comparative analysis and elaborate the above-mentioned recommendations, the Expert Team Coordinator prepared a questionnaire with detailed instruc-

tions on writing individual reports by national experts. The questionnaire consisted of the following sections:

2.3.1 Section 1 – Description of the background and current situation with the use of ICTs in TVET in the countries studied;

2.3.2 Section 2 – A review of regulatory documents dealing with ICT use in TVET;

2.3.3 Section 3 – Development of modern educational technologies in the TVET system with the use of e-Learning resources and ICTs and provision of access to them for TVET institutions;

2.3.4 Section 4 – Provision of equal access to socially important educational services for different groups of TVET users;

2.3.5 Section 5 – Creation of conditions for the gradual transition of TVET institutions to a new level of education based on the wide application of ICTs. Implementation of distance learning opportunities;

2.3.6 Section 6 – Developing the ICT competencies of teachers, mentors, administrators and auxiliary personnel at TVET institutions. Organization of networking between experts;

2.3.7 Section 7 – ICTs at TVET institutions level;

2.3.8 Section 8 – Shift to e-government;

2.3.9 Section 9 – Recommendations;

2.3.10 Section 10 – Conclusion.

The questionnaire was prepared taking into account topical issues of ICT application and promotion in TVET as well as UNESCO priorities in this sphere.

2.4 UNESCO IITE jointly with the Expert Team Coordinator maintained a constant contact with national experts to provide them with information, administrative and any other support, and to coordinate their work in the framework of the project.

2.5 On the basis of materials submitted by national experts the Coordinator has prepared the comparative analytical report on the current situation and main tendencies in ICT use in TVET in CIS. In accordance with the survey findings, a list of recommendations on promotion of ICT use in TVET has been drafted.

2.6 An online meeting of national experts and UNESCO IITE project team was held on May 20, 2011. The aim of this meeting was to discuss the first version of the analytical paper and the afore-mentioned recommendations on enhancing ICT use in TVET, their adaptation and modification in line with the countries' needs.





Activity 3

A consultative meeting of national experts was held in the framework of the joint Meeting of the UNEVOC CIS Regional Network: “Networking and Building Capacity for TVET and Education for Sustainable Development (ESD) in CIS” in Ufa, Republic of Bashkortostan, Russian Federation, 29 June – 1 July 2011. The event, held on the venue of the Bashkir Institute of Social Technologies (branch of the Educational Institution of Trade Unions “Academy of Labour and Social Relations”), was organized by IFESCCO, the UNESCO IITE, the UNESCO Moscow Office, the Government of the Republic of Bashkortostan, the Commission of the Russian Federation for UNESCO, the UNESCO International Center for Technical and Vocational Education and Training (UNESCO-UNEVOC), German Agency for International Cooperation (GIZ), the Committee of the Republic of Bashkor-

tostan for UNESCO and the Bashkir Institute of Social Technologies.

The main aim of the UNEVOC CIS Regional Network Meeting was to share knowledge and mobilize expertise and resources in enhancing the role of TVET to meet educational, economic and social needs of CIS countries (in line with the UNESCO Strategy on TVET Development and the UNESCO Strategy for the Second Half of the UN Decade on Education for Sustainable Development (UNDESD)). The conference also aimed to foster regional cooperation between UNEVOC National Centres in CIS and strengthen the CIS Network performance in general.

The key objectives of the meeting of national experts engaged in the joint IFESCCO/IITE project was to review country reports and the comparative Analytical Report on the current situation and main tendencies in ICT use in TVET in CIS, and establish the final list of respective policy recommendations.

Activities 4, 5

The Analytical Report was prepared and published in Russian and English languages (500 copies, first edition). Dissemination activities are organized through IITE website, at the Institute’s events as well as via its partner networks.

Activity 6

A Special Report, including major recommendations and photos from the national experts meeting, a narrative project report and the results achieved, constitutes the content of the present publication. It is planned that this report, published in Russian and English languages (500 copies, first edition), together with the Analytical Report will be submitted for consideration by CIS Ministers of Education.

National Experts Meeting

UFA, REPUBLIC OF BASHKORTOSTAN, RUSSIAN FEDERATION, 29 JUNE – 1 JULY 2011

The national experts meeting provided a space for reflection on strategies, policies and best practices of ICT application in TVET. Apart from discussing the draft analytical report, national experts briefly outlined the situation with ICT use in their respective countries, in particular they pointed out that:

In spite of governmental initiatives to stimulate ICT use in TVET, **Armenia** is only starting to apply ICTs in the educational process. Lack of necessary methodological tools, educational and technical programmes, as well as of a duly elaborated strategy of promotion of ICTs constitute serious challenges to be dealt with.

In **Azerbaijan** top-priority measures to stimulate ICT use in TVET include the adoption of relevant normative documents, implementation of educational programmes on national and regional levels, improvement of material and technical base and the Internet connection of TVET institutions, as well as the creation of professional development opportunities for teachers. Effective public-private partnership may serve to the benefit of TVET as well. UNESCO's cooperation with Azerbaijan in the sphere of education has been aligned with the ten year strategy (2003-2013) to reform compulsory secondary education and to adapt TVET to the needs of the fast-evolving market economy.

Building of an information society is one of the policy priorities of **Belarus**, which is planning to create a nation-wide information-based education system by 2015. This new strategy of promotion of the information society envisages the establishment of a legislative framework, realization of programmes for improvement of teacher ICT competencies, methodological support to pedagogical staff in the field of ICTs and the development of e-Learning resources to satisfy the needs of conventional as well as of distance learning (DL). Creation of a comfortable learning environment in TVET institutions for people with special needs is another challenge for policy makers and educational personnel in Belarus.

For **Kazakhstan** informatization constitutes one of the policy priorities, envisaging inter alia the improvement of quality of TVET. The main accent of this policy is made on the improvement of teachers' ICT competencies, provision of broadband Internet connection as well as on the development of a normative legal base and education quality standards.

Kyrgyzstan faces an exigency to incorporate provisions for ICT use in TVET in all strategic and programme policy documents elaborated in TVET system, as well as to consider the possibility to improve employment rate, e.g. through public-private partnership opportunities.

Moldova has achieved significant results in building the information society, in particular by increasing the density of mobile and fixed-line telephone connection, improving the reliability and efficiency of fiber-optic and satellite connection, augmenting the number of Internet providers and Internet users. However, full integration of ICTs in the educational process in TVET institutions is complicated because of insufficient equipment of classes with

computers and high-speed Internet connection, as well as of lack of ICT competencies among teachers.

In **Russia** the introduction of ICTs into TVET is carried out within the framework of national, federal and regional programmes (such as the Priority National Project "Education", Federal Target Programme for the Development of Education in the Russian Federation, Federal programmes "e-Russia" and "e-Government"), international donor projects and private initiatives. During the last several years the number of such programmes and projects has been increasing. But there are a lot of critical challenges in the Russian TVET system, including quality and efficiency assurance of ICT use in TVET. To improve this situation, it is necessary to launch a number of key initiatives. Among them are the following:

- ✦ Improvement of TVET logistics, including state-of-the-art software and hardware, the introduction of modern virtual modeling technologies into TVET institutions and creation of modern educational-industrial complexes.

- ✦ Ensuring innovative nature of the training, including the introduction of new educational technologies, techniques and training programmes, new forms of vocational education, and the integration of TVET with higher professional education and industry of the corresponding profile.

- ✦ Development of digital educational resources and information and education resources (including those at the Federal level), enabling the improvement of quality and practical orientation of TVET programmes and transforming them into a leading innovative cluster of the Russian economy (nanotechnology and biotechnology, ICTs and information security, mechatronics and microelectronics, nuclear-power and aerospace industries and etc.), science, research and development.

- ✦ Development of an effective system for professional development of TVET teaching, administrative, technical and support staff based on ICTs.

- ✦ Creation of a proper methodological and legal framework for ICT application in TVET.

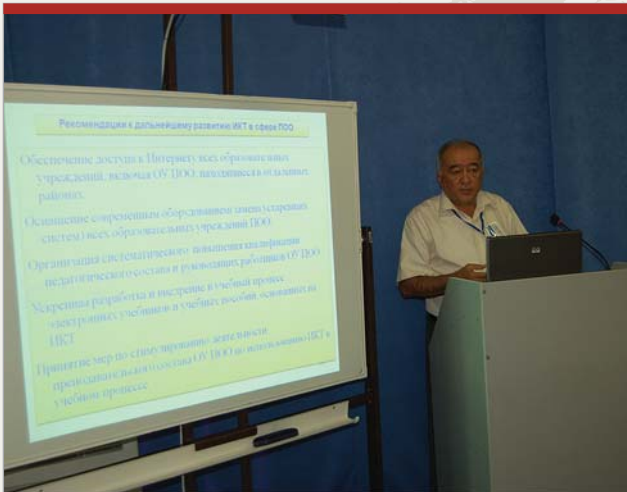
As a matter of priority, **Tajikistan** longs to create a unified system of teacher professional development, based on the state-of-the-art technologies and best practices of ICT use in TVET, and to support TVET institutions in building partnerships with their peers abroad, as well as with business and industry.

Lack of coherency in governmental efforts in improving the TVET system and elaborating a general vision of the role of ICTs in modern educational and production relations are the major obstacles for development of TVET in **Ukraine**. Revision of functions and duties of the administrative and pedagogical staff of TVET institutions and elaboration of practical recommendations on modern management techniques for TVET are absolutely vital to address the challenges of the 21 century.

Expert from **Uzbekistan** emphasized the potential of social partnership in TVET and underlined the necessity to further reinforce material and technical base of educational establishments, develop teacher professional competencies and make use of international best practices in ICT use in TVET.













Brief Overview of the Analytical Report

CHAPTER 1. DESCRIPTION OF THE BACKGROUND AND CURRENT SITUATION WITH THE USE OF ICTS IN TVET IN THE COUNTRIES STUDIED

For a more complete and comprehensive understanding of problems and prospects for ICT deployment in TVET systems in the countries studied it is necessary to consider the background to this issue – paying attention to all key initiatives taken in this area in each state up to now. In each and all the countries under consideration, the problem of ICT use in the sphere of education has become a priority for governmental agencies over the past decade. The task of ICT use at educational institutions (EI) is being resolved within the framework of the computerization of society in general. And although many important and necessary measures are being taken in this direction (national concepts, strategies and programmes) there are still a number of negative factors that delay the achievement of significant results in the use of ICTs in TVET. First, few state initiatives specifically refer to TVET, and focus mainly on general education schools and higher education establishments. Second, the low popularity of TVET is related to its lack of prestige. Third, financial instability in the countries results in the incomplete or haphazard financing of targeted projects. Fourth, the low level of international cooperation. It is obvious that all these elements are interconnected and, as a result, the resolution of any of them will involve a positive change in the others. Consequently, the extension of international cooperation combined with the introduction of successful experience may partly relieve the state of its financial obligations which, in turn, will promote more dynamic rates of computerization, thereby directly affecting the prospects, accessibility, progressiveness and, consequently, the popularity of TVET.

CHAPTER 2. A REVIEW OF REGULATORY DOCUMENTS DEALING WITH ICT USE IN TVET

Obviously, state initiatives play a leading role in the development of ICT use in TVET; and so, in order to evaluate the current situation in this sphere, as well as to determine prospects for this area in a specific country, it is necessary to bear in mind the documents on which the education informatization process is based.

From the information provided by national experts it follows that the authorities of all the countries under analysis understand the necessity and potential of ICT development, and see informatization as one of the most important national priorities. However, the main danger consists in the fact that all the planned initiatives, which have been outlined in documents comprehensively and in detail, may for a long time remain as only plans for the future, in conditions of unstable and incomplete financing.

CHAPTER 3. DEVELOPMENT OF MODERN EDUCATIONAL TECHNOLOGIES IN THE TVET SYSTEM WITH THE USE OF E-LEARNING RESOURCES AND ICTS AND PROVISION OF ACCESS TO THEM FOR TVET INSTITUTIONS

E-Learning materials (eLMs) or e-Learning resources are a basic component of the informatization process; so it is important to consider the stages of their development in each country as well as the specificity of their use. From the data provided by national experts it becomes clear that e-Learning resources, as multimedia interactive materials affecting all the main stages of the educational process (acquisition of information, practical classes and certification of knowledge and skills), exist only in Belarus and Russia. Even in these countries, however, application of e-Learning resources is not widespread, but patchy in nature. The reason for this is the fact that educational resources are frequently created for specific projects and there is almost no demand for them after their completion. So, work is required not only to create e-Learning resources but also to ensure the maximum compatibility of modular resources that have already been created.

TVET institutions in the countries studied mainly use electronic materials on CD that are handed out or resources disseminated via the Internet, but these are mainly texts and audio-visual files that are demonstrative in nature and do not give students an opportunity to practice the knowledge acquired or to be certified. A serious factor impeding the development of the use of e-Learning resources in the teaching/learning process is the low computer literacy of teaching staff. Most teachers are not only unable to participate in the development of new e-Learning resources but are even unable to use the existing ones.

CHAPTER 4. PROVISION OF EQUAL ACCESS TO SOCIALLY IMPORTANT EDUCATIONAL SERVICES FOR DIFFERENT GROUPS OF TVET USERS

Provision of equal access to socially important educational services for different groups of users is one of the necessary conditions for the informatization of education; which is why an analysis of this parameter is very important. Within this section it was necessary not only to determine the rate of reduction in the digital divide in the countries studied, but also the current level of provision of secure and productive training with the use of ICTs at TVET institutions. The analysis revealed that, on average, these figures are quite low. Today, in all the countries being considered, the availability of electronic libraries is more the exception than the rule. Traffic filtration systems are used only in Azerbaijan and Russia. The question of developing a “Student Pro-

file” to record all individual educational and extra-curricular achievements has been raised only in Russia.

CHAPTER 5. CREATION OF CONDITIONS FOR THE GRADUAL TRANSITION OF TVET INSTITUTIONS TO A NEW LEVEL OF EDUCATION BASED ON THE WIDE APPLICATION OF ICTS. IMPLEMENTATION OF DISTANCE LEARNING OPPORTUNITIES

In connection with the development of information technologies and the appearance of new ways of transmitting information, distance learning technologies will play a greater role in the acquisition of knowledge, practical skills and new competencies. Moreover, the development of the e-Learning resources industry, the emergence of a sufficiently large number of training modules in various disciplines and areas of training lead to the need to develop complex systems for their storage and classification, the standardization of search engines for required educational resources as well as the development of educational content management systems – distance learning systems (DLS). Despite the theoretical awareness of the need to create all the necessary conditions to provide distance learning opportunities to students at TVET institutions really working DLS exist only in Russia. And even these are “patchy” in nature. To address specific tasks, specific DLS are created; and after they have achieved their intended results, their content is not in high demand. This situation suggests that countries that are just planning to develop a DLS should, at the initial stages of this development, create conditions and systems to standardize their content and ways of working with it.

CHAPTER 6. DEVELOPING THE ICT COMPETENCIES OF TEACHERS, MENTORS, ADMINISTRATORS AND AUXILIARY PERSONNEL AT TVET INSTITUTIONS, ORGANIZATION OF NETWORKING BETWEEN EXPERTS

The rapid development of ICTs orients the teacher training system towards the development of professional ICT skills, which means the willingness of the teacher to solve professional tasks in an information society. It should be noted that in nearly all the countries studied a great number of effective decisions were taken on the issue of developing teachers’ ICT skills, leading to real results. Perhaps the reason for this is close cooperation with western countries, which are more knowledgeable and more experienced in the computer sphere. For example, Azerbaijan and Ukraine participate in the “Teach to the Future” programme jointly with Intel. Employees of TVET institutions in Kyrgyzstan have taken professional development courses within the framework of the

InWent project. However, not all the countries analyzed are implementing a policy of developing the ICT literacy of employees at TVET institutions solely within the framework of foreign projects. Intrastate projects are being implemented in Belarus and Russia, thanks to which the number of TVET teachers has multiplied during recent years.

CHAPTER 7. ICTS AT TVET INSTITUTIONS LEVEL

Analysis of ICT use in TVET in the countries under the survey demonstrates that for the majority of countries this practice is in the developing state and often “patchy” in nature. Thus, the immediate objective for a number of countries is to provide all EI with free Internet access. Moreover, all countries with no exceptions are facing the challenge of organizing effective methodological and technical support and consulting for TVET EI, as well as of creating and introducing information systems to forecast demand for specialists and to create an order system for staff training by sector and region.

The question of integrating industry and education is being gradually solved. For instance, the national expert from Azerbaijan in her report gives examples of successful partnership of TVET institutions and private companies.

At the same time, all governments recognize an acute need to develop and test technological solutions aimed to support introduction of new education management models. First initiatives in this direction have already been undertaken; for example, a switchover to electronic document management in the education system is in full swing in Belarus.

CHAPTER 8. SHIFT TO E-GOVERNMENT

The use of information technologies by state agencies is a necessary condition for the construction of an information society. To simplify communications between state agencies and citizens as well as to reduce bureaucratization to zero, as many state services as possible should be converted to electronic form. In this area, measures should be taken in the education system to create information systems for the independent accreditation, management and evaluation of the quality of education, and to guarantee transparency, integrity and accessibility of information on the activities of TVET institutions and education management agencies. Obviously, in order to ensure a stable base for the implementation of this initiative a number of preliminary steps are required (the elimination of the digital divide in society, improving computer literacy among state employees, etc.). So, the provision of state services in electronic form requires a sufficiently high information society developmental level.

In general, in the countries studied, the conversion of state services into electronic form is currently mainly at

the planning stages. However, there are several positive examples. In Azerbaijan, admission documents for educational institutions are accepted online, and a national electronic signature system has been introduced. In Belarus and Ukraine, work is underway to update educational web portals, including those dedicated to TVET. In Russia, the Ministry of Education ensures the provision of electronic public services by federal agencies in the sphere of education and science.

CHAPTER 9. RECOMMENDATIONS

This section is dedicated to national experts' recommendations for the further development of ICT use in TVET (summary). It is of special value since all the specialists' recommendations are based on an analysis of current problems in the countries studied. Based on the fact that the main problems with the introduction of ICTs in TVET in the countries studied are the same, it can be assumed that this material may be used by other countries as a practical guide in order to avoid the problems outlined.

It is logical to present the recommendations from national experts in two groups: countries more developed in the use of ICTs in the TVET system (Belarus, Kazakhstan, Russia, Ukraine) and countries just beginning to work in this area (Armenia, Azerbaijan, Kyrgyzstan, Moldova, Tajikistan, Uzbekistan).

Belarus, Kazakhstan, Russia, Ukraine

Based on an analysis of the experts' suggestions for the development of ICTs in the TVET system, it is possible to generate the following recommendations for all the above countries.

1. Improving the regulatory and legal base for informatization and strict observance of all the previously adopted executive documents related to the effective introduction of ICTs in the TVET system.
2. Organizing a system of planned targeted professional development and retraining of engineering, teaching and managerial staff in the TVET system in the effective use of ICTs in their professional activities.
3. Ensuring integrated efforts of TVET teaching staff in terms of the development and introduction of e-Learning tools based on modern ICTs with pedagogical orientation.
4. Improving the TVET monitoring and management system, ensuring unified approaches and solutions for the automation of managerial activity at all levels (institutional, regional, national).

In addition to the recommendations listed above that are common for all the countries in the group, the expert from Belarus has identified the following conditions required for successful informatization:

1. In terms of supplies of computer hardware to TVET EI preference should be given to mobile computer classes based on laptop computers which will support organization of training at industrial workshops.

2. Creation of resource centres on the basis of leading TVET EI for e-Learning tools development. The provision of quality national e-Learning tools for all the subjects in the general vocational cycle.

3. Achieving a level of "1 projector per classroom" in TVET EI.

4. Creation of vocationally-oriented multimedia libraries at every TVET EI.

5. Use of DL in extramural vocational education, conversion of adult additional education into DL.

6. Bringing the percentage of TVET EI connected to broadband Internet to 100%.

7. Formation of extranet-communities by education profile.

8. Creating resources for the national methodological support site.

The expert from Kazakhstan proposes the following high priority measures to be taken for further stimulation of ICT use in TVET:

1. Development of an e-college model.
2. Development of framework requirements for TVET e-textbooks.
3. Organization of joint professional development courses in the field of ICTs for TVET teachers.
4. Creation of an interstate fund to support joint projects for the development of educational resources in the field of ICTs.
5. Introduction of multilateral ICT student exchange programmes based on mutually acceptable conditions.
6. Systematic organization of international comparative surveys of the state of ICT application, using agreed criteria.
7. Creation and maintenance of information resources for common use, and of a unified information educational portal.
8. Organization of joint conferences, seminars and round tables.

Armenia, Azerbaijan, Kyrgyzstan, Moldova, Tajikistan, Uzbekistan

The national experts from the above countries (which are at an approximately identical level of development of ICT use in the TVET system) agree on the need to implement the following steps to quickly achieve positive results:

1. Provision of Internet access for all TVET EI.
2. Supply of TVET EI with equipment and materials (100% computerization of TVET institutions and updating of existing equipment).

3. Systematic organization of professional development courses for TVET pedagogical and managerial staff.

4. Introduction of ICT-based training aids and textbooks in the TVET process.

5. Incentivize TVET teachers to use ICTs in the teaching process.

The expert from Armenia noted that students must be taught to commercialize and capitalize on their knowledge, and know how to price it, and how to convert knowledge into money. Finally, people should be familiar with electronic money, e-commerce and be able to effectively work and communicate in networks. They should be able to work in companies and teams whose members are located in different countries and continents, and communicate in different languages. This provision is of special relevance for Armenia due to its close ties with the expatriate community living in various countries outside Armenia.

The expert from Kyrgyzstan presented a full list of recommendations including the following:

1. Development of a targeted programme for the use of ICTs in the teaching/learning process that should stipulate, among other things:

- ✦ Development of computer literacy of TVET teachers and students;

- ✦ Development and introduction of educational standards for information science teaching at TVET institutions;

- ✦ Creation of ICT-based distance learning systems, e-textbooks and computer training systems including those for teacher professional development and retraining;

- ✦ Development of information consulting and career-oriented activities.

2. Necessity to ensure strict control and monitoring of international projects and plans related to ICT use (a Supervisory Council may be created as an independent structure for this purpose).

3. Developing the possibility of using ICTs not only in the teaching/learning process but also for the conversion into electronic form of most state services, including financial accounting, and the accreditation and certification of EI.

4. Inclusion of the issues on ICT development, introduction and use at all TVET EI in all long-term strategic and programme documents developed within the TVET system.

5. Developing the possibility of using ICTs to improve the situation in the labour market: establishing ties with employers, studying and analyzing staffing requirements, providing new jobs forecast to assist in employment of TVET graduates.

6. Studying the experience of ICT use in the teaching/learning process of other structures in RK, as well as international experience in this area.

Conclusion

The history of ICT use in the TVET system in Belarus, Kazakhstan, Russia and Ukraine is at least 10 years old. As a result, a base has currently been established for the further sustainable development of ICT use in TVET. In Armenia, Azerbaijan, Kyrgyzstan, Moldova, Tajikistan and Uzbekistan significant steps have been taken towards the development of ICT use in TVET only in recent years. In these countries, initiatives to expand ICT use in the TVET system are being developed and implemented, but there are a number of objective problems impeding the modernization process.

The authorities in all the countries under analysis understand the need and prospects for ICT development, and have identified informatization as one of the most important national priorities. However, the main danger lies in the fact that all the planned initiatives, which have been comprehensively outlined in detail in documents may never get off the ground due to insufficient and unstable financing.

E-Learning resources, as multimedia interactive resources that affect all the stages of the educational process (acquisition of information, practical classes, certification), are widely used only in Kazakhstan and Russia; however, Belarus and Ukraine have enough experience and all the prerequisites required to switch over from using CD-based teaching resources and individual audio-visual materials on the Internet to a fuller use of e-Learning resources such as virtual laboratories, professional simulators, systems for adequate assessment of knowledge, skills and competencies. In Armenia, Kyrgyzstan, Tajikistan and Uzbekistan the development and introduction of eLMs at TVET institutions are very limited (still at the planning stage). Azerbaijan and Moldova are at an intermediate level, having been developing and using ICTs at TVET institutions on a gradual basis since 2008.

In Armenia, Azerbaijan, Kyrgyzstan and Moldova, the question of the introduction of a DLS at TVET institutions had not even been raised until recently; DLS is still only at the development stage, DLS initiatives are not always structured. Meanwhile, in Belarus and Russia there is already some available know-how in this area, the first results have been achieved, and the obstacles to the wide usage of this form of teaching and planned measures to resolve them have been analyzed.

Almost all the countries studied are taking great effort to enhance TVET teachers' ICT competencies (in Tajikistan the teacher competencies development system is still at the development stage). In most of the countries studied, the development of teacher computer skills is achieved through international cooperation with partners from technologically more developed countries. However, in Belarus and Russia there are also intrastate programmes in this area; and thanks to these the number of TVET teachers has multiplied during recent years.


In recent years, the level of ICT use both in the teaching/learning process and in TVET school management has increased. In Belarus, Russia and Ukraine there are systems in place to forecast demand for specialists, enabling TVET institutions to quickly respond to changes in the market in terms of the need for staff training. In Azerbaijan, close co-operation between local companies and TVET institutions for the joint training of specialists needed in the labour market is becoming standard practice. However, in Armenia, Kyrgyzstan, Moldova, Tajikistan and Uzbekistan ICTs are still not sufficiently included in the learning process at TVET institutions.

In Azerbaijan, Belarus and Ukraine the governments are taking steps to equalize the equipping of TVET institutions, although the figures for the development of progressive technologies (virtual simulators, simulation software) are still very low. In Kyrgyzstan and Moldova the equipping of TVET institutions, which is carried out mainly at the expense of private sponsors and international projects, is at a lower level; consequently, EI in these countries cannot turn-out enough specialists skilled in ICTs, in spite of the demand in the labour market.

In Belarus and Russia real steps have been taken to improve interaction between the public, government, TVET institutions and business through the use of ICTs: many services are already available in virtual form and information on TVET institutions' activities can be obtained on the relevant sites and portals. Azerbaijan has started the gradual conversion of state services into electronic form, while in Armenia, Kyrgyzstan, Moldova and Uzbekistan it is still at the planning phase.

So, by analyzing the information provided by national experts on the use of ICTs in TVET and its prospects, we can say that Belarus, Kazakhstan, Russia and Ukraine are ahead of the other countries in all the parameters considered. Of course, in these countries many issues still remain unresolved but there is an understanding of the potential for the development of ICTs in TVET, and recognition of existing problems, and as a result ways are being developed to resolve them. Most of the major initiatives involving the use of ICTs in TVET in Armenia, Azerbaijan, Kyrgyzstan, Moldova, Tajikistan and Uzbekistan are still at the development stage. In almost all the countries this is due to financial and economic problems, technological backwardness, lack of qualified personnel and experience in solving similar problems (in Azerbaijan – this is explained by lack of experience and qualified personnel in this field, and to a certain extent by technological lag).

Resuming the analysis of the current situation in the countries studied, comparing it with UNESCO priorities and summarizing the recommendations made by national experts we can make a list of recommendations that are relevant to any state that has set itself an objective of



building a functioning information society with the informatization of all its spheres (including education) in the near future:

1. Development of modern educational technologies, taking advantage of electronic (digital) learning resources and ICTs and providing access to them.

2. Creating conditions for a gradual transition to a new level of education based on ICTs; implementation of knowledge acquisition opportunities both within the national education system and the world educational environment.

3. Adoption of special programmes to provide TVET institutions with informatization and communications equipment, the development of minimum requirements for the configuration of hardware supplied from the point of view of equalizing conditions for the provision of ICT-based educational programmes.

4. Creation of e-Learning resources making it possible to learn a profession or professional skills not only at educational institutions but also informally; creation of a system for the recognition of knowledge and skills acquired informally.

5. Introduction and development of ICTs to ensure equal access to quality education for all participants of the educational process. Particular attention should be paid to students with special needs.

6. Enabling the implementation of students' individual educational paths based on the introduction and use of ICTs; differentiation of educational materials based on the individual student, to increase the effectiveness of knowledge assimilation and to reveal the potential of every person.

7. Introduction of distance technology in TVET, expanding access to this technology, especially for students with special needs.

8. Development of education quality assurance technology, including by providing teachers and students with online access to modern educational technology, scientific and methodological materials and sources of knowledge as well as organizing effective feedback between participants of the educational process, government bodies and research communities.

9. Introducing ICTs and innovative educational technologies in TVET, taking into account a necessity to develop

and use open educational resources as well as different software/technology platforms, tools and IT solutions, conforming to international standards, "green" and environmentally-friendly requirements and level of ICT "maturity" of TVET institutions.

10. Widespread introduction of information technology for the storage, development and effective use of the scientific and educational potential of the country (digital libraries, electronic databases, reference systems and methodological support, etc.).

11. Professional development of teachers in ICTs in accordance with existing international standards, and the development of special recommendations and training courses targeted at special groups within the educational process - administration, general education and engineering teachers, teachers in professional disciplines.

12. Identifying (with help from IT companies and potential employers) requirements for ICT competency of TVET teachers on the basis of the UNESCO ICT Competency Framework for Teachers (ICT CFT). Development of mechanisms of certification of teachers' ICT competencies, including instruments of multilevel testing.

13. Development of technological tools to analyze and forecast demand for specialists in sectors of the economy, to organize professional development and retraining, as well as to develop information systems to monitor the effectiveness of investment in education and science.

14. Elaboration of a framework of cooperation with potential employers in the context of ICT use in TVET.

15. Paying special attention to ICT use in TVET to train qualified and skilled personnel for high-tech sectors of economy.

16. Increasing international cooperation in the field of educational ICTs (joint contests, competitions, projects).

17. Improving the regulatory framework and creating legal mechanisms for the development of the TVET system in an information society.

18. Elaboration of mechanisms for popularization and improvement of competitiveness of TVET institutions through using effective incentive systems, rebranding, reputational management and PR; supporting competitiveness of TVET institutions of different patterns of ownership to improve quality of education.

Follow up to the Project

From the project results as well as from the discussions with all relevant stakeholders it becomes evident that intensive and systematic development of the TVET sector through full-scale ICT use is a prerequisite for effective and sustainable development of education, economy and human capital of CIS countries. It is recommended that the governments of the countries concerned regard the present report as a benchmark and a roadmap for their future initiatives and programmes in this field.

National experts suggested that in this endeavour the governments need to be assisted by appropriately appointed and widely recognized (both in the academic and professional communities) resource and information centres providing knowledge and best practices in the field of ICTs and TVET. In particular, they have made suggestions to:

1. Appoint the UNESCO Institute for Information Technologies in Education as a main Resource Centre and Coordinator of the CIS Regional UNEVOC Network, providing its members with technical, informational and analytical support in introducing ICTs in TVET in CIS.

2. Recommend the Republican Institute for Vocational Education (RIPO), the Republic of Belarus, as a Resource Centre in the field of TVET teachers' professional development.

3. Recommend the Institute of Innovative Technologies and Education Content of the Ministry of Education,

Science, Youth and Sports of Ukraine as a Resource Center in the field of ICT use in TVET.

To further promote ICT use in education and revitalize and improve the TVET system, the UNESCO IITE identified several areas for future interventions:

1. Creation of a community of practice of national experts working in the field of ICTs in TVET to exchange experience and elaborate methodological recommendations on ICT use in TVET (on the basis of the UNESCO IITE website).

2. Further activities will be initiated to support the creation and smooth operation of the CIS Regional UNEVOC Network.

3. In the course of the project, close partnership has been established with the Republican Institute for Vocational Education (RIPO), which by the decision of the CIS Council of Heads of Government was nominated as a basic organization for TVET teacher training and professional development in CIS. Plans for future cooperation directly follow up on the recommendations elaborated in the course of the present project, and include the development of a multilevel competency model of TVET teachers and other pedagogical staff on the basis of the UNESCO ICT CFT. This model will later be used as a foundation for elaboration of standards and mechanisms for TVET teacher ICT competencies certification.

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