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Iran's National ICT Education Plan: an Overview of the Possibilities, Problems and the Programs

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Abstract:

This paper examines the status of the first and most significant national ICT educational plan based on the recent Iran's National ICT Agenda (INICTA). The plan intends to make a significant change in direction of teaching and learning practices, especially in schools. One of the key objectives of the plan is to promote the average level of skills for using ICT in schools, universities and state organizations. The paper describes several ICT educational projects which have been initiated by Ministry of Education, Ministry of Science, Research and Technology and other organizations for development of digital and computing skills. The paper also discusses ICT opportunities and challenges for education in Iran and concludes that effective use of ICT in education seeks fundamental change and reform in the existing traditional educational systems and methods.

1. Introduction

1.1. Country Background Information

Currently, with a population of 68 million and a growth rate of 1.08 percent[1], and domestic production as measured by GDP of $115 billion, Iran is the second most populous country with the second-largest economy in the Middle East. The country has the distinction of being the second-largest OPEC oil producer, and has the world's second-largest reserves of gas[2]. The literacy rate is more than 79 percent and education is compulsory through high school. There are currently approximately 18 million students in the school, and about 1.7 million in the universities[3]. Moreover, about than 2.3 million staff are working in the governmental organizations, such as ministries, universities and other state institutions[4]. According to the World Bank Report, Iran has placed

emphasis on human development and social protection with good progress to-date. For example, from the early 1970s to 2001 primary school enrollment rates increased from 60 to 90 percent and the portion of the population living under the poverty line decreased significantly from 47 percent in 1978 to 16 percent in 1999. From the early 1980s to 2001, the population growth rate declined from 3.7 percent to 1.4 percent, and the fertility rate fell from 6.8 to 2.6[2]. Of particular note is the closing of the gender gap in education, where enrollment rates for boys and girls show considerable increase of women participation in the higher educational systems. For instance, from the early 1998 to 2003 women entrance rates in the universities increased from 52 to 65 percent. While there are several evidences on improvement of human development indicators, Iran's most crucial social challenge is to reduce poverty, which is still high at 16 percent (2003 est.), and high unemployment at 15 percent[5]-[6].

1.2. ICT Infrastructure & Access

As a result of heavy investment in the telecommunication system since 1995, the number of telephone lines, cellular phone, and radio and television stations has grown. Many villages have been brought into the net; the number of main lines in the urban systems has approximately doubled; and thousands of mobile cellular subscribers are being served. It is estimated that the number of telephone lines and mobile phones respectively from 13.2 million and 3.4 million in the current year would reach to 20 million and 5 million lines in the next year. There has been a considerable increase in number of Internet users in the recent years. According to national statistics, from early 2000 to 2003, number of Internet users increased from 200,000 to more than 5.2 million[7]. There were also 7 personal computers in use per 100 people in 2001[8].

Regarding such growth in investing on human resources and ICT infrastructure, the government has stressed the importance of improving more access to novel technologies and using ICT potential in private and state sectors, through allocation of about 550 million dollars initiating budget for the advancement of ICT in Iran during the first phase of the Iran's National ICT Agenda (2002-2004).

2. Iran's National ICT Agenda (INICTA)

About five years ago, Information and Communication Technologies looked like a vital tool for economic and social development in Iran, but no priority and national plan were defined by the government in this regard. Some organizations had their own ICT master plans, but they were old and out dated with the limited specific budget allocation at national level. Several authorities with different and sometimes overlapping responsibilities were involved in ICT application.

The rapid development in ICT and the recent trend of globalization and their influences in different social and economic systems are motivating issues for the Iranian government to cope comprehensively with such technological issues. Thus, Iran's National ICT Agenda (INICTA) was initiated by the government. The aim of INICTA, known as TAKFA or Extension of Application of Information and Communication Technologies in Iran, is to develop and maintain an advanced technological environment in order to support and enhance the education, research, and learning, service, and administrative activities all over the country. At the beginning of 1998, national ICT development study began by the formation of the Supreme Council of ICT (SCICT) under the president's own leadership. At the beginning of 2002, the parliament allocated a national and centralized budget for INICTA. Currently, the plan has more than 40 major projects and 110 subprojects that covers all major aspects of the ICT applications in the country.

The first phase of INICTA is going to implement within a three years period, 2002-2004. The total ICT development budget for INICTA for the first phase (2002-2004) is about 550 million dollars9 which is in fact the first most significant investment on ICT development in the history of Iran*. Since, ministries and other state organization are allowed to spend 2% of their total budget in ICT projects, it is expected that growing ICT related projects will be implemented in the near future.

The INICTA seeks similar purposes as we can also see in the several international ICT programs initiated for developing countries, such as United Nations Information and Communication Technologies Task Force[10], UNESCO Asia and Pacific Regional Bureau for Education[11], World Bank initiative[12] and World Summit on Information Society[13] which were planed to promote the confidence and technological competence of

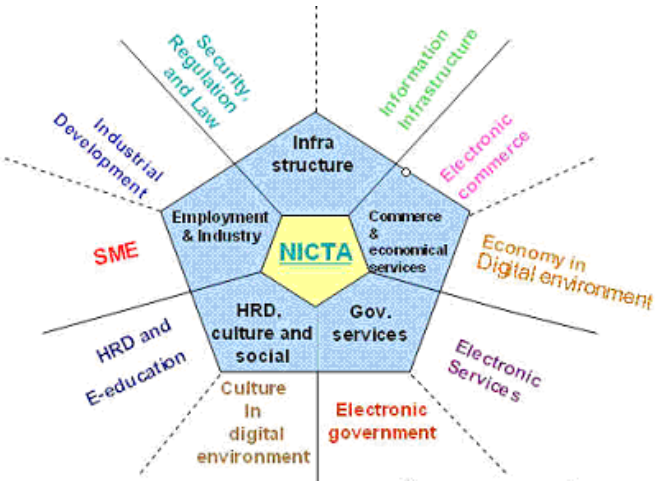
* The budget for the NICTA is allocated by the parliament at the beginning of every fiscal year (ending in March). Consequently, for the first three years period of NICTA, $82, $235 and $235 million budget has respectively been allocated, totally as $550 million. The above budget includes 2 percent of total allocated funds to the state organizations for ICT development.

developing countries. In such circumstance, the on going Iran's ICT plan aims to make a significant change in "digital divide" in Iran and to bridge the already widening gap between the developed and developing world.

2.1. INICTA Objectives & Strategic Plan

National ICT Agency (NICTA) is responsible for supervising and managing Iran's National ICT Agenda in the country. The structure and sectors of NICTA are illustrated in Figure 1. Although, NICTA is a core body to manage ICT initiatives, it has not established strategies and policies and guidelines for using ICT in Iran. This task has fallen to the Supreme Council of Information & Communication Technology (SCICT), the highest decision making body established in 1998 in the area of ICT policy making in Iran, under a direct order from the President.

Figure 1. Structure of NICTA



INICTA mission is to foster the development of economic, social and cultural situation in Iran by achieving the following objectives (Those most relevant to the educational purposes are highlighted by asterisks):

- Creation of infrastructure of Iran's information and communication technology (network, law and security);
- Compilation and application of comprehensive system of information and communication technology;
- Development of productive and beneficial employment;
- Promotion of average level of skills in information and communication technology (individual and institutional)*;
- Implementing of flagship projects;
- Increase in the economic and financial capabilities;
- Promotion of private sector's participation in ICT market;
- Groundwork for entry into the international market of ICT;

According to the plan, all ICT related projects should be implemented the private sectors and state organizations are responsible for supervision of the operations. At the same time, the international consultants and contractors can be involved in the projects. Currently, about 2000 projects are officially submitted to the SCICT with total value of about $310 million.

The following plans were recognized as the priorities for the first phase of ICT operational plans in 2002-2003 (for detail information see appendix A; those most relevant to the educational purposes are highlighted by asterisks):

- Plan for electronic government (system, virtual network, law and security);

- Plan for promotion of ICT application in education (including schools and universities) and expansion of digital skills of Iran's manpower (including state organizations)*;
- Plan for expansion of ICT application in higher education, health, treatment and medical education*;
- Plan for expansion of ICT application in development of social services;
- Plan for expansion of ICT application in economy, commerce and trade;
- Plan for expansion of ICT application in culture and art, strengthening Persian script and language in the digital environment;
- Plan for expanding active SME (Small and Medium size Enterprise) in ICT by creating growth centers and ICT parks;

Moreover, the creation of six virtual networks, as described below, shall be given priority (Those most relevant to the educational purposes are highlighted by asterisks).

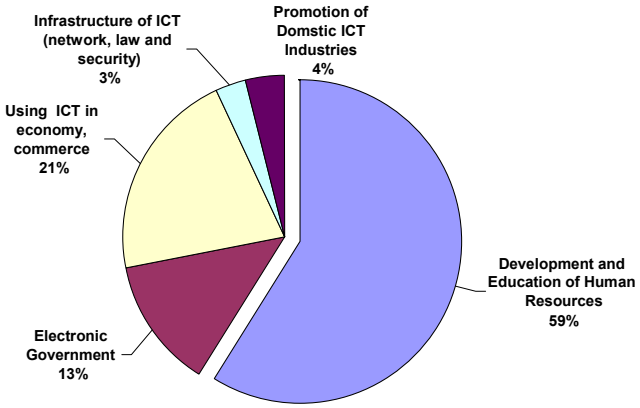
- State Network (government bodies);
- Science Network (universities and research institutes)*;
- Growth Network (Ministry of Education's schools)*;
- Trade and banking network (banks, guilds and economic users;
- Health, treatment and medical education network (hospitals, pharmacies, and medical universities)*;
- Police network;

3. Iran's ICT Plan for Development and Education of Human Resources

Many studies have emphasized that the use of ICT has a considerable effect on teaching and learning processes such as less directive and more student-centered teaching, increased interest in teaching, increased planning and collaboration with colleagues and greater participation in school. The results of a number of empirical researches on achievements related to the use of ICT in education are well highlighted in the related literatures[14]. Thus, it is natural that in the Iran's national ICT plan a significant emphasize has been drawn to support and enhance the educational processes in schools, universities and governmental organizations, known as Development of Human Resources and Education Program (highlighted before by asterisks).

Figure 2 shows the percentage of distribution of financial credits in 2002. As shown, about 60% of credit is related to development and education of human resources using ICT in Iran[15].

Figure 2. Distribution of financial credits on Iran's National ICT Agenda in 2002



The governmental partners in Iranian education include Ministry of Education, Ministry of Science, Research and Technology and Iran's National Radio and TV Broadcasting. Therefore, in this paper the key ICT educational projects of the above organizations will be described.

3.1. ICT Training Program of the Working Staff in the Governmental Organizations

In 2003, one important ICT agenda was approved by the highest authority in administrative affairs in Iran in order to promote and improve services of governmental organizations based on information and communication technologies. This is known as e-government program in Iran. It is obvious the first natural step towards e-government is training of staff in ministries, universities and other types of state organizations. It is estimated that more than 70 percent of employees are digitally unskilled persons[16]. Hence, the program intends to acquire all Iranian staff (which are about 2 million) - regardless of their role and previous levels of training and/or experience - with seven fundamental digital and computing skills in order to be effective in their ICT-based working environment and services. The program covers the following ICT courses:

1.	ICT fundamental concepts and applications	12 hours
2.	Using computers and operating systems	8 hours
3.	Using word processor software	26 hours
4.	Using spreadsheet software	26 hours
5.	Creating and designing databases	26 hours
6.	Using presentation software	20 hours
7.	Using Internet and e-mail	12 hours
	Total hours for acquiring ICT skills	**130 hours**

The plan emphasizes that all staff working in state organizations should acquire the above skills within 4 years, starting from 2003. Practically, several institutions have already finished the training process of their staff and many have begun the training programs. Furthermore, the plan lets organizations to define and launch their own advanced ICT programs based on the specific educational needs of the staff, for instance for academic staff in universities. Participation of staff in the training programs is compulsory[17].

3.2. Ministry of Education ICT Programs

The Ministry of Education has several key educational plans to develop ICT applications in primary, secondary and high schools. In this case, the ministry is the most important organization which has the majority of the ICT educational projects in the Iran's national ICT plan.

So far, 6,500 schools have computer sites (33%) and by 2006 all of the rest will as well. Moreover about 1200 (10%) schools have been connected to the Internet (Picture 1). About 70,000 teachers (8%) have participated in ICT related workshops and courses. The Growth Network (www.roshd.ir) is the Ministry's plan for establishing ICT facilities in schools. Guidelines for the Growth Network include research and development, putting hardware and Internet connectivity in place, developing educational materials and providing training for people in the educational sectors. The following ongoing projects are among the most important programs that suppose to make a significant change in direction of teaching and learning practice in the Iranian schools:

- ***The development of country's national schools network (The Growth Network)***
  - Connecting 1200 equipped schools to the network in the national level (about 10 percent);
  - Accessibility to Internet in schools via The Growth Network (www.roshd.ir), an educational, scientific and cultural information network servicing to all schools in different geographical locations;

- Making e-mail addresses for students/teachers to facilitate educational communications;
- Sharing scientific and educational information, produced by teachers and students all over the country;

- ***Equipping schools and educational centers with computers***
  - Equipping more than 6500 high schools/ polytechnic schools with ICT facilities (about 33 percent);
  - Creating centers for IT skill assessment (test centers) and holding testing sessions;
- ***ICT training of teachers and educational staff***
  - ICT training of 70,000 teachers and administrative staffs (about 8 percent);
  - Training of 100 teachers and experts for producing educational contents;
  - Executing the e-learning pilot plan in 3 teacher training centers;
- ***Producing electronic contents***
  - Compiling and publishing e-textbooks and e-magazines for students and teachers;
  - Establishing structure and content of a test bed for schools in the digital environment;
- ***Development of electronic school***
  - Feasibility study on development of an electronic school in the country;

Picture 1. Computer labs in some Iranian schools which have recently equipped with computers and Internet connections based on the Iran's ICT plan for development of digital and computing skills in the schools.

3.3. Ministry of Science, Research and Technology ICT Educational Programs

Ministry of Science, Research and Technology **(**MSRT) is responsible for management and planning of higher education of Iran. Training of expertise in all levels from first degree to Doctorate is organized under supervision of this ministry. MSRT has some national educational plans to develop ICT applications in universities and higher education. The following programs are among the most important ICT educational plans in the MSRT[5]:

- ***Development of Iran's National Scientific Network:*** The main aim of this ongoing national project is to facilitate and to promote information exchange among universities and research centers on the web. Currently, the network covers about 300 universities and scientific institutions in Iran[18] (Picture 2).
- ***Development of virtual universities in Iran:*** Virtual University can be considered as an online and innovative replacement of the conventional delivery models and methods of education for all levels of academic and professions. The purpose of this project is to develop the required strategies, policies, organizations, management systems, learning models, and hardware and software technologies to establish virtual universities in Iran.
- ***Compiling and publishing academic multimedia courseware:*** the purpose of this project is to provide content of the academic textbooks in the electronic format through added-values of multimedia publishing.

Picture 2. computer lab in the University of Mazandaran (left) and University of Science & Technology (right) for training computing skills to students.

3.4. Iran National TV Broadcasting ICT Educational Programs

The Iran National TV Education Channel, which offers many programs about ICT and related subjects ranging from how to use computers and operating systems to application software such as word processors, spreadsheets, Internet browsers and so on. The National Education Channel is very popular among young generation, since it covers most lessons in the primary, secondary and high schools as well as some university courses. It seems that the Education Channel is an effective method to teach ICT related skills in a low cost and easy manner all over the country, especially in the rural areas which suffer from accessing educational facilities. The main aim of the Channel is to create equal educational opportunities for all Iranian people[19].There are also several radio stations, such as Youth Station; Culture Station, which offer educational programs, but not mainly on ICT related subjects.

3.5. ICT Training Programs in the Private Sectors

Private computer training labs have a significant role in teaching ICT related skills to the public. There are about 1,200 private computer labs in Iran which are active in ICT education. Most of the ICT training programs of the working staff in the governmental organizations (as described in the section 3.1) are managed by these private sectors. In fact, they can be considered as the heart of the most ICT educational programs in Iran.

3.6. Other ICT Projects Related to Educational Activities

Although, Ministry of Education and Ministry Science, Research and Technology both are responsible for key educational activities respectively in schools and universities, there are many projects belonging to other ministries, and organizations which can have a considerable impact on teaching and learning process in Iran. Those most relevant to the education are the following:

- *Schoolnet: Community of the Iranian Schools*, established with the support of the Science and Arts Foundation (SAF) and Sharif University of Technology, intends to provide basic ICT training courses, Internet connection and educational resources in the schools[20];
- Development of *Pardis Technology Park*, located in near Tehran, to provide a range of ICT training and educational services[21];
- Launching mobile ICT training stations in the small cities and rural areas for public;
- Development of medical as well as cultural digital libraries for educational purposes;
- Design and development of 800 Islamic multimedia educational titles;
- Database of the Iranian culture (art, music, film, cultural heritage and etc);
- Machine translation software from Farsi to other languages and vice versa;
- ICT training of the Iranian housekeeping women initiated by women institutions;
- Deign and development of more than 20 educational databases on various subject areas from Iranian woven carpet and ancient works to bibliographic and multimedia database;

4. ICT Opportunities and Challenges for Education in Iran

In addition to potential opportunities ICT offers for education, it can also impose some challenges. In the following the main opportunities and challenges of Iran's ICT program in the education will be expressed:

4.1. Iran's ICT Opportunities for Education

- Promotion of the access of students in the schools and universities to the computers and the Internet;
- Improving efficiency and effectiveness of the educational system and using benefits of ICT's added-values in schools, universities and state organizations;
- Increasing and accelerating domestic and international investment rates in production of educational e-contents and software;
- Providing easier, faster and more efficient services to the students by applying computerized systems in the schools and universities;
- Promotion of computing and digital skills of teachers and academic staff through improved national educational and training programs;
- Enhancing educational networks among schools and universities via networks;

4.2. Iran's ICT Challenges for Education

- Lack of appropriate telecommunication infrastructure for connecting schools to the Internet/Intranet, especially in the rural areas;
- Lack of Farsi (Persian) educational software and script problems for using operating systems and Internet by the students;
- Anxiety about using Internet and that it may be used to access information that are inappropriate in terms of Islamic and cultural values of the Iranian students;
- Barriers for extension of the culture of using ICT for teaching and learning processes; in Iran's already predominately traditional classroom paradigm;
- Shortage of basic educational facilities in schools and universities for ICT education such as computer labs and IT centers;
- Relatively less distinct programs and plans to develop ICT at the primary and secondary levels;
- Lack of ICT educational standards in the private sectors' computer training institutes which generally provide ICT training to the schools and universities;
- Shortage of trained and skilled teachers to develop and manage ICT teaching in schools;
- Poor planning in identifying and defining priorities in using ICT in education which could have been done through detailed feasibility studies;

5. Conclusions

It is a fact that Iran, a developing country, is taking major steps towards ICT education based on the recent national ICT agenda. However, understanding the use of ICT in education goes beyond buying computers, launching computer labs and connecting educational institutions to the Internet and expecting that things will automatically improve. It seems that the successful use of ICT in education in Iran depends mainly on changing the existing vision about the concept of the "education" itself. In other words, educational policy-makers need to ensure that a program for promoting ICT use in schools and universities results in technologies being used not to extend or repeat the previous traditional classroom model, which has currently dominated on Iran's educational structure. Therefore, it seems that using ICT in education seeks fundamental reform and change in traditional instructional programs. The main question is that how the new digital skills would co-exist with conventional educational paradigm. It is widely accepted that transmission of novel technologies to the developing countries, seeks changes in the existing models and infrastructures and this is similar in the case of ICT education in Iran. In fact, duplicating strategies from other developed countries without any consideration about cultural adaptations of technologies might be less effective and successful.

The Iran's ICT educational plans need to ensure that not to exclude some groups from education - for reasons of poverty, or geographical isolation. Besides, there is a need to establish a center to observe and evaluate the function of computer teaching and learning processes. Although, like other national programs in the developing countries, Iran's National ICT Agenda is facing several challenges towards ICT education, it seems that the current challenges are less dependent on financial problems and more on identifying and assessing the real educational needs nation wide. The first phase of INICTA is going to finish at the end of 2004; while there is a lack of evaluation of the efficiency and effectiveness of current e-learning and ICT

education activities. Thus, one of the most important tasks is to measure the performance and impacts of educational projects in the near future to weigh up the advantages and disadvantages of the plan for the forthcoming phases.

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Appendix A

Properties of NICTA in 3 layers of activities. In the inner first and the most important layer there are 4 major areas including human resource development, financial resources, restructuring and connectivity