

INTRODUCTION

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In the beginning globalization is fully believed to be able to lead to greater economic development in the sense of greater market scale, which in turn will increase the gross national product. So people believed that poor countries or third world countries will develop faster, thus the economic gap between the rich developed countries and the third world countries will diminished.

However, facts show the contrary. It is true that the gross national product of countries will increase, but the gap between the income of the rich and poor countries is also getting wider.

The main reason for this gap is the extra-ordinary growth of information as a result of the development of communications and information technologies in northern developed countries which have full control of these technologies. This information boom enables multinational companies to compete with changes in market demands, new products and new technologies, which in turn can boost the economy of a country, increase its efficiency and win global dominance.

On the other hand, in third world countries which are also known as southern hemisphere countries, they have difficulties to seek, to receive, to process and to produce information. The lack of appropriate information at the right time will result in low productivity, low quality research works, and waste of time to pursue information and even to do research which actually had been done by others or in other countries.

Indonesia as a third world country has a great concern over this deficiency and believe that the digital divide should be reduced so that there will be an economic recovery. The Indonesian government is determined to utilize the information technology effectively to support efforts to increase the national competitiveness. This aspiration is reflected in the Indonesian

Presidential Decree Number 50 year 2000 about the establishment of the Coordination Team of Telemathics of Indonesia. This team consists of all the ministers in the cabinet including the Minister of Education. Its tasks are among others to define the government policy in the area of telemathics; to decide the phases and priorities of development in the area of telemathics and its uses in Indonesia; to monitor and control the implementation of telemathics in Indonesia; and to report the development of telemathics in Indonesia to the President.

The government realizes that the success of the development and utilization of telemathics depends mostly on the infrastructure which can provide easy access, and also ensure availability of information and subjects. To meet these three provisions, a competent human resources is a necessity. That is why the preparation of qualified human resources is given priority, because it requires hard work and takes time. Meanwhile, we also know that scarcity of and low quality human resources in the area of Information and Communications Technologies can delay mastery of communication and information technology.

As such, the government through the Minister of Efficiency of State Apparatus as Head of the Coordination Team of Telemathics of Indonesia in his letter number 133/M.PAN/5/2001 had drawn up a Five-Year Action Plan for the Development and Implementation of Information and Communication Technologies (ICT) in Indonesia. This plan among others includes a plan for the implementation of the use of telemathics in the area of education starting from 2001 until 2005, which includes:

- Develop collaboration between ICT industry and ICT educational institutions through training and R & D collaboration, and found a network for skill and capacity development
- Develop and implement Curricula of ICT
- Use ICTs as an essential part of the curricula and learning tools in schools/universities and training centers
- Establish distance education programs including participation in Global Development Learning and other networks
- Facilitate the use of internet for more efficient teaching and learning

From this action plan we can see that the emphasis of human resources quality improvement is especially geared on the provision and expansion of education of human resources in ICT area. Besides that, utilization of ICT for education and learning purposes, as an effort to fill digital divide, which in turn is hoped to be able to improve the national competitiveness to revive the economy is another emphase.

As mentioned above, the success of utilization of ICT is among others depends on the infrastructure which includes the telecommunication network, the availability of internet facilities and the use of internet.

In general the development of ICT in Indonesia nowadays is less encouraging compared to the developed countries, or even compared to neighboring countries such as Singapore, Malaysia, Thailand and others.

To give a general picture of the ICT condition in Indonesia let us consider the data quoted from the Center for Research and Application of Information and Electronic Technologies of the Office for the Research and Application of Technologies, 2001 as follows.

A. Public Telephone Lines for 203,456,005 populace

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|-----------------------------------|-----------|
| 1. The number of Telephone kiosks | 228,862 |
| 2. The number of Telephone booths | 345,307 |
| 3. Telephone patrons | 6,304,798 |

B. Internet

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| 1. Internet Service Providers | 40 |
| 2. General Access Speed rate of ISPs | 15 KBPS |
| 3. Patrons of ISPs | 511,000 with 1,980,000 users (< 1% of Indonesian population) |
| 4. The Internet users comprise of 42% for commerce, 30% for higher education, 21% for government, 6% for research institutions, and 1% for non-government offices. | |

5. The users of Internet based on their professions can be divided as follows: students 39%, workers 22%, managers 17%, assistant managers 5%, professionals 5%, directors 4%, entrepreneurs 3%, and others 5%.
6. The users of Internet based on their educational backgrounds are as follows, elementary school/junior high school 2%, high school 41%, college graduates 9%, undergraduates 43%, and graduates 5%.

A. ICT Education

In the development of human resources through ICT education, there are two objectives which are desired to meet the need for skilled human resources: those who can use ICT products (ICT users) and those who can produce ICT products (ICT producers).

Some ICT education which have been done and are still being done in Indonesia are among others:

1. *Formal Education*

a. *Vocational School program in Information Technology*

Through this program it is anticipated to get skilled manpower at the basic level in ICT, who can fill the position of ICT operator, technical support, help desk and web designer.

b. *Diploma program in ICT*

This program is anticipated to produce semi-skilled manpower to meet the need for skilled ICT manpower for industry.

c. *Undergraduate program in ICT*

This program is expected to produce ICT programmers, software engineers, analysts and designers.

d. *Graduate program in ICT*

Through this program it is expected to provide manpower with more specialized skills in the areas of ICT engineering.

2. *Non-formal Education (out-of-school)*

Besides ICT educational programs through formal educational institutions/schools in various levels, in Indonesia there are many out of school educational efforts which teach various areas of ICT skills, which covers certain areas for example preparing manpower for responsibilities as network technicians, computer technicians, programmers, graphic artists, animators, operators, Web designers, etc. Some of these non-formal educational institutions or ICT training centers are organized in partnership with foreign ICT training center, while others are totally motorized by local experts.

3. *ICT Literacy*

a. *Development of softwares in the Indonesian language*

One of the obstacles to the use of computer for the Indonesian society is their low mastery of English, so that they are reluctant to use computer. To overcome this obstacle and to support efforts to make the populace ICT literates, the government had issued the Presidential Decree Number 2/2001 about the Utilization of Computer with Application Programs in Indonesian Language through the development of application programs in Indonesian language based on an open source platform, LINUX. Until 2002 two programs have been developed called WinBI (Windows in Indonesian Language) and Kantaya (Virtual Office) by the Office for the Research and Application of Technologies.

b. *APEC Cyber Education Network (ACEN)*

In general, this network which is being coordinated by the Office of Educational Research and Development of the Ministry of National Education is aimed to decrease and lessen the gap between the skills of high school teachers in Indonesia and their colleagues in APEC countries in using ICT in multimedia-based education.

c. *ICT training in schools*

The Directorate of Vocational Education has started this program since 2001. Its objective is to train teachers and students in using information technology especially the internet. For this activity the Directorate of Vocational Education cooperates with the Network of School Information, a community of Vocational Schools which are internet users. This network provides the training.

d. *Socialization of computer-assisted learning media in High Schools*

In September 2002 the Directorate of Secondary Education conducted a training program on the use of computer-assisted learning media in cooperation with the Center for Information and Communication Technology for Education (Pustekom). This program was conducted in face-to-face interaction involving 800 high school teachers from 200 schools in 20 provinces.

e. *Millenium Internet Roadshow 2001 (MIR 2001) program*

This program was initiated by some private companies in 2001. Its objective is to enhance the general public's awareness and to disperse knowledge on ICT. This program was conducted by Association of Indonesian Internet Service Providers which gets full support from other parties such as mass media, local government, Network of School Information, etcetera. In 2001 this roadshow had reached 15 provinces.

f. *Healthy Internet*

There are indications that internet users in Indonesia comprising mostly of youths, especially use it to get access of negative information such as pornography, racial issues, etcetera. To make community of internet users avoid such negative contents, some private parties motored by ICT Watch (an NGO organization), Association of Indonesian Internet Service Providers and Network of School Information had done a campaign called Healthy Internet. This activity consists of campaigns, training and distribution of information through print materials.

B. ICT for Education

As mentioned above, to improve the quality of human resources, the government had used ICT to expand the educational opportunity, to improve the quality and relevance of education, and to increase the efficiency of the educational system.

Until this year, various efforts to use ICT in education are among others:

1. E-learning

Starting from 2002, the Center for Information and Communication Technology for Education (Pustekkom) in cooperation with the Directorate of Secondary Education, and the Directorate of Vocational Education are developing an e-learning program called "e-dukasi". The objective of this program is to improve the quality of education at high school and vocational school levels through the use of internet. Besides the two directorates, the Center also gets support from the Indonesian Telephone Company (PT Telkom), the Office for the Research and Application of Technologies, Association of Indonesian Internet Service Providers, Network of School Information, Detik.com, and ICT Watch.

At this preliminary stage, learning materials are being developed for the following subjects: Mathematics, Physics, Chemistry, Biology, Electronics, and Information Technology.

2. Online Courses

Some private universities have provided lectures through the internet for some courses. One such institution is Petra Christian University of Surabaya.

3. Online Tutorials

One use of information technology for education at higher education is for tutorial purpose for institutions of distance education. One institution that has made use of tutorial via internet is the Indonesian Open University.

4. Joint Research

As a medium which provides for collaboration through the use of information technology, a joint research program has been conducted. This collaboration involves five universities of higher learning, i.e. the Bandung Institute of Technology (ITB), Bogor Institute of Farming (IPB), University of Gadjah Mada and University of Diponegoro.

5. Electronic Library

Nowadays, there is a network of electronic library called Indonesian Digital Library Network which is a network of electronic libraries from the ITB central library (Digital Library), the Post-Graduate Study Library of ITB, the Research Institute of ITB, Eastern Indonesia Universities Development Project (the CIDA project), University of Brawijaya Malang Central Library, University of Muhammadiyah Malang Library, University of Islamic Religion Library (supported by McGill University Canada) and The Central Data Bank of the Institution of Science of Indonesia (LIPI), Jakarta.

Indonesian Digital Library Network is meant to support efforts to improve the quality of university graduates, to increase sharing of information among institutions of higher learning and research institutions in Indonesia.

6. Computer Assisted Instruction (CAI)

This is an off-line instruction program so it does not depend on access to the internet. The Center for Information and Communication Technology for Education (Pustekom) have developed computer assisted instruction learning materials for various subject matters and courses. These are interactive learning materials which students can learn on his/her own with minimal assistance from the teacher/lecturer.

A. Issues Concerning Education

1. *Preparation of New Legislation Draft on National Education System*

At present the government (cq. The Ministry of Education) and the Indonesian Legislative Assembly Preparation of New Legislation Draft on National Education System. The draft also includes arrangement on ICT education and ICT for education.

2. *ICT Curriculum for general school*

With the development of a new curriculum for elementary and secondary schools which is competency -based, this year the government is doing some limited try-outs in certain schools. This curriculum also include ICT education which will be taught since elementary school, junior high school and senior high school and vocational school. Hopefully by teaching ICT from the very beginning, Indonesia will have enough qualified ICT manpower.

3. *Preparation of ICT teachers for general school.*

To implement the competency-based curriculum especially in correlation with ICT teaching in schools, the government need to do various activities to prepare the teachers who will teach in schools.

4. *Increasing the role of non-formal education*

Non-degree education to train skilled manpower in ICT needs to be encouraged. Because non-formal education has a significant role, even a decisive role, to help prepare skilled non-degree educated manpower in ICT in the future.

5. *Inducing the local government to do its role*

With the newly implemented decentralization system of administration, where the local government has autonomy to self-administer in their province, the success of provision and development of ICT skilled human resource will be determined by the role of the local government. As such, the central government through the Office for the Research and Application of Technologies and the concerned Ministry had done and are doing a series of activities to induce the local government in socializing, utilizing and providing ICT trained human resources.

6. *Promoting private sector participation*

The role of the private sector in ICT mastery is very important. Either its role in developing ICT resources and its infrastructure, or in developing human resources, the private sector has a very important role. They have done a lot. However, the government needs to collaborate with the private sector to take greater role to promote ICT education.

B. Problems faced

1. *Economic Crisis*

No wonder the biggest obstacle faced by Indonesia regarding ICT is the economic crisis. This condition forces the government to prioritize on short term programs to help improve the economy of the general population through social security net, aids to poor students to decrease drop-out rate, improvement of teacher's welfare, etc.

As such the government has to postpone various programs that had been planned including the program to support ICT development, Nusantara 21 etc.

The despondent economy also makes the people's spending capacity shrunk, so they prioritize their spending on primary needs such as food and clothing, so that the need to use ICT to get access to information become the last choice.

2. *Infrastructure*

Another obstacle to the development of ICT is the poor condition of the infrastructure, in terms of quantity and also quality. Of course this poor condition affects the ease to get access to information. In connection with the availability of infrastructure it makes access to information costly, which in turn makes the use of ICT low.

3. *General public awareness and knowledge of ICT low*

The public ICT literacy is still very low. What concerned us most is that ICT literacy among students and teachers are also low, especially those that live in the perimeters or remote areas.