研究論文

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DIGITAL DIVIDE IN PHILIPPINE SCHOOLS*

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要　約：教育分野における ICT の導入は，フィリピンの教育者たちの熱望によるものであり，アロヨ大統領や上院議員たちにも支持されており，2001 年には，閣僚レベルで ICT 形成と実行を司る管理組織を作り上げた．このような政策主導の下，2002 年には学校カリキュラムにおけるコンピュータ活用とプログラミングの統合を狙った法案が上院レベルでも承認されてきた．本稿では，このような背景の下，オレタ上院議員が立ち上げた，全ての教育管理者の ICT 利用を目指す TAO プロジェクトについて議論を行う．

Key words：ICT, Teacher education, Project CARES, Project TAO

Goals on ICT Use in Education

The education planners in the Philippines believe in the principle that education processes should take advantage of technology development, which includes the application of ICT in teaching and learning wherever appropriate (Abcede 2002). A Philippine Education Technology Master Plan was formulated which aims to deliver *quality education for all through the use of ICT and other innovative technologies.* To achieve this goal, the Department of Education (Dep Ed) is currently implementing an ICT Plan for Basic Education, which includes the following:

- provision of physical infrastructure and necessary technical support to make ICT accessible and useful to students, teachers, administrators and school support staff,
- developing teachers' competencies in using ICT and developing ICT-based instructional materials,
- ensuring access to the latest developments in ICT and supporting research and developments

Curricular Changes to Support ICT in Education

In 2002, Dep Ed started to implement the Basic Education Curriculum (BEC) with subjects reorganized into five learning areas – Filipino, English, Science, Mathematics, and Makabayan. Social Studies, Physical Education, Health and Music, and Technology and Home Economics, which were separate subjects before, were fused together in *Makabayan* (means patriotic). Values Education is integrated in all learning areas. The new curriculum specified that "ICT be made an integral part of all the learning areas, whenever the hardware and software are available" (Tinio 2002). The action areas for ICT-integration in the basic education system include:

- school computerization
- teacher training
- IT curriculum development
- multimedia content development,
- financing and
- monitoring and evaluation

Dep Ed laid down the policies on the use of ICT in Education:

- Technology must be studied as a separate subject, and then applied to other learning areas as a tool for learning how to learn.
- Teaching-learning must not be textbook-driven but should include the application of ICT, whenever appropriate.

- An education modernization program will equip schools with facilities, equipment, materials and skills, and introduce new learning and delivery systems, capitalizing on recent technological developments.

At the elementary level, ICT is introduced as a subject Home Economics and Livelihood Education (HELE) and at the secondary level, as Technology and Home Economics (THE). ICT materials (commercial or teacher-produced) are to be integrated in the subject to supplement instructions (Abcede 2002).

Investments on ICT

In 1996, Dep Ed (then known as Department of Education, Culture and Sports or DECS) launched its first computerization program, followed by a second one in 2000. As of school year 2000 – 2001, 1,571 high schools (32.6 % of the existing high schools at the time) have received computers through various assistance programs of the government and private sectors.

Currently, Dep Ed is implementing the "PCs for Public Schools" Program which aimed to provide a package of 20 computers and five networked printers in 1000 high schools. Since 1996, Dep Ed has provided an annual appropriation for the procurement of computer hardware, software, and courseware for teacher training. In 2002, P 155 millions or U.S. $ 3.1 millions was allocated for this purpose.

Dep Ed continued investment in ICT for Education has been criticized by some sectors as having the effect of reducing the allocations for more traditional learning tools. There is also a continuing debate over the differential efficacy of ICT intervention across subject areas, student characteristics, teacher roles, and levels of access to technology, among others (Rodrigo 2001). Notwithstanding all these criticisms, both public and private initiatives on computerization and connectivity continue. Dep Ed is currently undertaking Project LINK which focuses on providing schools access to the INTERNET and teacher training on the use of INTERNET for research and distance learning. The cost of connectivity is to be shouldered by local businesses and while operation and maintenance costs will be undertaken by the city and municipal governments.

As an example of private initiatives, Connect Ed, a loose consortium of corporate foundations, non-profit organizations, IT vendors and private IT providers provided to 100 public high schools an IT package consisting of PCs, teacher training, and connectivity assistance, i.e., the provision of a local area network and free access to Internet for one year. The consortium also solicits PC donations for schools from private firms.

ICT Readiness of Philippine Schools

The digital divide which exists between the developed north and developing south countries is very much talked about. Within a country, however, a virtual division could also exist between urban and rural schools. And as shown by recent researches on ICT usage in Philippine schools, a digital divide also exists between schools within the same educational system. (The Philippines is divided into 17 political regions. Each region is composed of several neighboring provinces and cities.)

A study conducted by SEAMEO-INNOTECH called Project CARES under Project TAO assessed ICT-readiness of public and private schools in the country. The survey "Profile

Table 1 Computers in Philippine Public Schools

Program	Assistance Package Per school	Number of Schools
1996 DECS Computerization Program (1)	7 PCs	661
2000 DECS Computerization Program (2)	10 PCs	280
DOST Science & Technology –Oriented Schools	15 PCs	110
DOST Computer Literacy Program	10 PCs	70
Private Sector Donations		200 -250

on Information and Communication Technology Capabilities of Elementary and Secondary Schools in the Philippines, 2000 – 2001" targeted all of the country's elementary and secondary schools, both public and private based on Dep Ed Year 1999 – 2000 list of 46,440 schools. About 78.31 % or 36,368 schools responded to the survey representing 84.9 % of public schools and 35.48 % of private schools.

Project CARES Findings

Unlike traditional learning tools, ICT infusion in education requires certain infrastructure to be in place. Thus, the survey used the availability of electricity, computers, landline telephone, and Internet access as primary indicators for ICT-readiness of schools. Table 2 shows the big contrast between the urban centers of Luzon and the rural southern island of Mindanao. The national average shows that about 2/3 of the schools have electricity and that the National Capital Region (NCR) has the highest electrification rate with the industrial Region III (composed of provinces closest to Manila) ranking second. This is also true for the availability of other structural indicators. Regions IV and I (both in Luzon) compete for the third highest rank in terms of density of these indicators. The lowest electrification rate is found in the conflict-ridden Autonomous Region of Muslim Mindanao (ARMM) at 37.9 %, followed by the Cordillera Autonomous Region (CAR) in the mountainous area of Luzon at 43.3 %. A perusal of Table 2 will show that NCR is always at the top of the list in terms of availability of these indicators while ARMM and CAR are repeatedly at the bottom, except for availability of computers for CAR where Region IX in Mindanao and Region VIII in Central Visayas came in at the bottom ranks. A similar condition exists regarding the availability ICT-related audio-visual and multimedia equipment with few exceptions. In general in terms of ICT infrastructure and equipment, schools in urban centers of Luzon may be considered more capable of infusing ICT while this capability lessens as one goes south to the central islands and farther south to Mindanao.

It should be noted that only 14.3 % of the total number of schools surveyed have computers and only 2.0 % have Internet access, although 13.3 % have landline connections which make dial-up connections a possibility. There is also a big gap (density ratio of more than three to four times) between NCR and the second ranking region (Region III) in terms of infrastructure.

Surprisingly, the survey revealed that except in Region IV and NCR, the number of schools with computer literate staff exceeds the number of schools with computers and that one out of every seven schools has teachers/staff that are computer literate. This would indicate that teachers and staff learn and practice computer skills outside the schools.

Table 3 shows that schools with computers do not necessarily have computer peripheral devices which will allow teachers and students to maximally use computers in the classroom. Moreover, the number of schools in the south that conduct ICT-related activities exceeds the number of schools with computers, indicating a high interest on ICT and large demand for ICT training.

Table 4 shows that the most common setup for computers in schools is stand-alone. Stand-alone computers are not networked and do not allow resource sharing or intranet operations. LAN allows the school to share resources and for the students to use process-learning software in class. Only less than 10 % of the schools with computers have this kind of setup.

To summarize, at the time of the SEAMEO-INNOTECH survey (2001):

- Only 66.1 % of all elementary and secondary schools in the Philippines have electricity.
- Only 14.3 % have computers.
- Only 13.3 % have capability to access to the Internet through landline telephones.
- Only 2.0 % (about 3 % of schools with electricity) have Internet access.
- Only 42.2 % own a radio cassette, 26.8 % own TV, 17.2 % VHS players and 3.7 % VCD players thus limiting the use of educational materials available in this format.

Results of the 2003 Global Networked Readiness for Education (GNRE) evaluation study of schools in South and Central Americas, Africa, the Middle East and Asia (including the Philippines) indicate that schools with better electrical and telecommunications infrastructure tend to have higher degrees of computer-mediated learning and computer use; their students, teachers and administrators exhibit more positive attitudes towards computers (Maclay, Kirkman & Hawkins 2005). The lack of access to electricity (and telecommunications) prevents ICT for education programs from reaching rural schools.

Table 2 Availability of ICT Infrastructures and Equipment

Indicator	National average % of schools with	Regions with highest density (%) [a]		Regions with lowest density (%) [a]	
ICT Infrastructure					
Electricity	66.1	NCR III I	98.5 92.5 85.6	ARMM CAR VIII	37.9 43.3 43.4
Computers	14.3	NCR III IV	87.3 25.1 22.2	ARMM IX VIII	3.2 3.4 4.9
Internet Access	2.0	NCR III I	18.7 3.9 2.7	ARMM CAR VIII	---- 0.3 0.5
Landline telephone	13.3	NCR III IV	92.0 23.6 23.3	ARMM IX CAR	1.4 2.5 3.7
Audiovisual and Multimedia Equipment					
Radio cassette	42.2	NCR III IV	86.1 62.7 57.6	CAR VIII XII	22.6 24.1 24.7
Television	26.8	NCR III IV	94.0 44.8 37.8	IX ARMM VIII	6.4 6.5 6.8
VHS player	17.2	NCR III IV	84.1 27.4 25.9	ARMM IX VIII	2.9 4.6 5.4
Overhead Projector	7.0	NCR III IV	50.0 13.8 10.9	ARMM VIII IX	0.82 2.4 2.9
VCD player	3.7	NCR III IV	30.6 13.8 10.9	VIII XIII CAR	0.9 1.4 1.8
Multimedia projector	0.7	NCR III X	7.2 1.0 0.7	ARMM XII VIII	0 0.1 0.2
Still Camera	9.3	NCR IV III	45.9 16.0 13.8	VIII CAR VI	2.4 4.0 4.4
Video Camera	2.0	NCR III X	18.7 3.8 2.7	ARMM VIII CAR	0.3 0.4 0.6
ICT Proficiency					
Computer-Proficient Staff	18.2	NCR III I	75.5 28.7 22.4	VIII CAR IX	7.4 9.4 9.7
School Heads with ICT Training within the last 5 years	13.3 (12.5)	NCR III X	54.5 17.9 16.0	VIII VI IX	7.3 8.1 9.4

[a] as % of the schools surveyed in the region

Source : *Profile on information and communication technology capabilities of elementary and secondary schools in the Philippines (2000-2001), Executive summary. Retrieved Oct. 25, 2005 from http://www.seameo-innotech.org/resources/resources.asp.*

Table 3 Schools with Computer Peripheral Devices

Device	National Average (as % of schools with computers)	Regions with highest density (%) [b]		Regions with lowest density (%) [b]	
Computer Peripheral Devices					
Printer	83.3	IX X NCR	98.3 90.9 89.1	ARMM III IV	69.6 77.9 79.8
CD Drive	48.0	XII NCR XI	57.6 56.1 55.7	CAR VI IV	40.0 40.3 42.3
Scanner	18.6	X NCR II	34.8 26.8 25.5	ARMM VII IX	8.7 9.1 10.0
Computer Peripheral Data Output Devices					
Modem	14.7	NCR I X	23.7 17.0 15.5	ARMM CAR IX	4.3 6.7 8.3
Zip Drive	4.4	ARMM III NCR	8.7 7.9 7.2	VII IX CAR	1.0 1.7 2.2
CD Writer	5.1	II NCR III	7.4 6.8 6.5	ARMM IX XIII	0.0 1.7 2.1

[b] as percent of schools with computers in the region

Source : *Profile on information and communication technology capabilities of elementary and secondary schools in the Philippines (2000-2001), Executive summary. Retrieved Oct. 25, 2005 from* http://www.seameo-innotech.org/resources/resources.asp.

Table 4 Setup of Computers in Schools (National Trend)

Rank	Mode	As % of schools with computers
1	Stand-alone	61.6
2	Local Area Network (LAN)	7.9
3	Combination	1.9

Source : *Profile on information and communication technology capabilities of elementary and secondary schools in the Philippines (2000-2001), Executive summary. Retrieved Oct. 25, 2005 from* http://www.seameo-innotech.org/resources/resources.asp.

Table 5 Staff Priority on Use of Internet Access (National Trend)

Rank	User	As % of schools with Internet Access
1	Principal	51.4
2	Administrative Staff	51.0
3	Computer Teachers	46.7
4	Students enrolled in computer subjects	39.5
5	Department Heads	35.3
6	Other teachers	35.1
7	Other students	19.4

Source : *Profile on information and communication technology capabilities of elementary and secondary schools in the Philippines (2000-2001), Executive summary. Retrieved Oct. 25, 2005 from http://www.seameo-innotech.org/resources/resources.asp.*

Table 6 Allocation of Computers in Schools with Computers

Rank	Location of Computers	As % of schools with computers
1	Principal's office	33.4
2	Computer laboratory	29.9
3	Administration office	20.3
4	Faculty room	20.3
5	Learning resource center or library	11.8
6	Classroom	3.7
7	Others	3.0

Source : *Profile on information and communication technology capabilities of elementary and secondary schools in the Philippines (2000-2001), Executive summary. Retrieved Oct. 25, 2005 from http://www.seameo-innotech.org/resources/resources.asp.*

Real Time ICT Usage in Philippine Schools

Table 5 shows staff priority on use of Internet access as percentage of schools with Internet access. Table 6 shows where the computers are located in schools. A perusal of the two data tables reveals that the highest priority is given to the principal for administrative work, followed by the computer teachers and the students enrolled in computer subjects. Other teachers (35.1 %) and other students (19.4 %) have the least priority for Internet access. This finding further indicates that ICT use as tools in teaching/learning in the classrooms is not yet widely practiced even in schools with computers. Thus, the gap between vision and implementation is still very wide.

The Foundation for Information Technology Education and Development (FI-TED) conducted a nationwide but more focused study from November 2001 to January 2002 (Tinio 2002). Their findings further reveal the extent and nature of ICT usage in Philippine public high schools.

Their sample consisted of 100 (out of 661) school-beneficiaries of the 1996 DECS computerization program. These school beneficiaries have complied with the following criteria:

- a high-performing school (based on NSAT)
- has a full-pledged administrator
- receives a share of national government budget for education
- offers Business Technology (Computer education) as specialization in 3rd and 4th years
- has electricity and air-conditioned room to house the computer package and
- recommended by the DECS Division and Regional Offices.

FIT-ED findings:

- *Goals of ICT-Use* – The prevailing notion of technology

use is focused on the acquisition of technology skills and still embedded in traditional pedagogy. The three goals considered most important are (1) to prepare students for future jobs (2) to improve students' achievement and (3) to make learning interesting. To promote active learning strategies, to encourage more cooperative and project-based learning and to individualize student-learning experiences although not considered unimportant received lower mean rankings.

- *Type of computer skills students should acquire after 4th year* – Basic skills such as operating a computer, word processing, and making illustrations with graphical programs are the top three choices. Least preference is given to sending, searching and using electronic forms of information and communicating via e-mail with teachers and other students.
- *Electric service* – Regularity of electric service remains an issue for 11 % of the schools. Limited power supply (ranging from 3 hours to 13 hours per day) and power outages (from once a month to too frequent to count) are experienced by these schools.
- *Telephone connection* – More than half of the schools (55 %) have no fixed telephone lines because none is available in their area (41 %), they cannot afford it (10 %) or for both reasons (2 %).
- *Student-to-computer and teacher-to-computer ratio* – Only 98 of the 100 schools have working computers. Only 95 allow the teachers and students to use the computers. Teacher-to-computer mean ratio is 9:1 for schools that allow their teachers to use the computers. Student-to-computer ratio ranges from 12:1 to 1,098:1 (mean ratio 267:1).
- *Internet connections* – Only 13 % of the schools have access to the Internet but only for limited time and not exclusively for educational purposes. Of these schools, nine allow teachers and eight allow students to go on-line. Three schools dedicate Internet time to administrative tasks and one school uses it exclusively for educational purposes. For 44 % of the schools, only one computer can go online and only for a limited time. For the rest, the number of computers connected to the Internet ranges from 2 to 35. The mean student-to-computer with Internet connection ratio is 1,763:1 (std = 2 190).
- *Time on-line* – This ranges from 1.5 to 160 hours (average) per month. Bandwidth or the speed with which data can be transmitted through the network is a limiting factor. All but one school have a dial-up connection at 56 kbps.
- *Use of Internet for educational purposes* – Only less than 10 % of the teachers in 75 % of the schools have used the Internet for educational purposes. The corresponding figure (57.1 % of the schools) for students is a bit better.
- *Educational activities on the Internet* – The teachers top three answers in decreasing order of usage - doing research, using e-mail or bulletin board to exchange ideas with peers and subject matter experts, disseminating information via the Internet; For students in decreasing order - doing research, communicating via e-mail with teachers/experts/peers within or outside the schools for learning purposes, communicating via e-mail with teachers/experts/peers from other schools within or outside the country for learning purposes. Designing and maintaining a website is the least practiced.
- *Subject-specific use of the Internet* – In decreasing order THE; Science & Technology; Mathematics; English; Social Studies; Filipino; Multidisciplinary projects; PE, Health and Music; Values Education and RHGP. (THE is the subject where computer use is mandated. The availability of more educational software in the other three subjects could explain this finding.)
- *Educational software available* – In decreasing order, the four top subject areas are Mathematics, Science and Technology, English, and THE
- *Type of software present in schools* – Top three answers are word processing, spreadsheet and presentation software.
- *Teachers' ICT competencies (basic computer and Internet-related skills)* – In 21 (out of 100) schools less than 25 % of the teachers have knowledge of computer fundamentals; corresponding figure for Internet-related skills is 83 schools. In 48 schools, more than 50 % of the teachers have basic computer skills; corresponding figure for Internet-related skills is only 5 schools. For schools with access to the Internet (13 %), only 15.4 % have teachers who know how to use the Internet.
- *Teachers' knowledge of subject-specific applications* – Only 14 schools have more than half of their teachers knowing how to use subject-specific software. The rest has less than half of their teachers possessing this kind of skills.
- *Teachers ICT Training* – Only 30 % of the schools had more than 50 % of their teachers having undergone ICT-related training since the schools received the computer package.
- *Technical support* – In majority of schools (75.5 %), the

computer coordinator is a member of the faculty with a heavy teaching load. About a quarter has a full time coordinator who may have a small teaching load.

- *Top ten major obstacles to ICT Use for teaching and learning:* In decreasing order –
  - Lack of enough computers
  - Lack of enough technical support for operating and maintaining ICT resources
  - Lack of teacher training opportunities
  - Lack of space for computers
  - Lack of funds for operations (maintenance of equipment, purchase of supplies and electricity
  - Insufficient peripherals
  - Teachers' lack of knowledge/skills in using the computers and the Internet for instructional purposes
  - Insufficient staff to supervise students using computers/Internet
  - Lack of time for teachers to explore use of computers and Internet
  - Not enough copies of software for educational use
- *Areas of ICT use in schools needing support* :
  - Information on how to use ICT to support the curriculum
  - Use of ICT for administrative work
  - Developing the information-handling skills of students and teachers
  - Guidance over ICT capabilities prescribed at the national, regional and division levels
  - Use of ICT for both underachieving and gifted students
  - Use of ICT for pupils with sensorial or physical disabilities

Abcede (2002) identified the key problem areas in implementation of ICT in basic education. These are:

- Teachers' fear of technology
- School principals' closed mindset to and non-appreciation of ICT in education
- Constraints on the annual education budget
- Maintenance and sustainability and
- limited availability of education software

These findings on ICT readiness and usage in Philippine secondary schools corroborate the findings made by the GNRE team, that "ICTs are still new to education in developing countries… while computers are available in one form or another in the schools surveyed, they are still not well-integrated into most core learning processes" (Maclay, Kirkman & Hawkins 2005).

ICT Infusion in Teacher Education

SEAMEO-INNOTECH in collaboration with the Philippine Association for Teacher Education (PAFTE) conducted a research survey under Project WITTY (Who Are Teaching Our Teachers Today and Tomorrow?) in 2003 to determine the status of pre-service education in the Philippines. There are 967 teacher education institutions (TEIs) in the country. The 266 TEIs that responded to the survey represented 27.5 % of the total TEIs (17.4 % private and 10.1 % public). Part of Project WITTY study determined the ICT readiness of the TEIs. Table 7 shows a sampling of the data on ICT preparedness of TEIs surveyed in terms of facilities and equipment available.

The data reveal a disparity among different TEIs in different regions in terms of availability of ICT-related facilities and equipment. This is similar to what exists in basic education. What is surprising are the results for NCR which do not follow the trend observed for basic education where this region is always top in terms of these indicators.

Faculty access to computers is still a problem for more than a quarter of the TEIs respondents. The figure is even higher for students' access (more than 30 %). This goes to show that there are TEIs that allow their teachers to use computers but not their students. Internet access is available to a little over one half of the TEIs (56.39 % for faculty and 51. 5 % for students). Multimedia projector which is needed for multimedia presentations for tutorial lessons is available to only 44.7 % of the faculty and 32.7 % of the students. It is not surprising that computer printers are present in more schools for faculty and students use. A printer costs much less than a projector.

Teacher Training on ICT

The infusion of ICT in education in the Philippines has only a short history. Based on the survey, only one out of five teacher educators obtained their degrees after 1990. Thus, for the majority of teacher educators the only way they could gain ICT and Internet-related skills is through training seminars or personal efforts. The Project WITTY survey however, showed that attendance in ICT Training seminars is lower in the list of preference of the teacher educators, coming after (in decreasing order) (1) major subject/area of specialization, (2) research, (3) curriculum and (4) management and administration. Only

Table 7 Data on ICT Preparedness of Teacher Education Institutions

Indicator	Percentage of TEIs (national average)	Regions with highest density	Regions with lowest density
Availability of electricity	84.96	Regions I Region II Region IX (100 %)	Regions IVB (60 %), Region V (70.6 %) NCR, CARAGA, Region VIII (75 %)
Landline telephones	77.44	Region VII (100 %) Region VI (95 %) Region 10 (93.3 %)	CARAGA (31.2 %) ARMM (44.4 %) Region IVB (50.0 %)
Cell phones	59.0 %	CAR (77.8 %) Region II (75 %) Region XI (72.7 %)	Region X (26.7 %) Region IX (40.0 %) Region IVA (42.9 %)
Fax machine	61.65 %	Region I (85.7 %) Region VII (81.8 %) Region XI (81.8 %)	ARMM (22.2 %) Region V (23.5 %) Region II (43.8 %)
Computers for faculty use	73.31 %	Region VIII (100 %) Region VII (95.4 %) Region II (93.8 %)	NCR (29.2 %) Region I (35.7 %) ARMM (44.4 %)
Computers for students' use	68.42%	Region X Region VIII Region II (100 %)	NCR (20.8 %) CAR (44.4 %) Region I (35.7 %)
Internet access for faculty use	56.39 %	Region II (93.8 %) Region VII (90.9 %) Region XI (81.8 %)	ARMM (11.1 %) Region IVA (14.3 %) NCR (25.0 %)
Internet access for students use	51.5 %	Region X (73.3 %) Region III (72.2 %) Region VII (68.2 %)	ARMM (11.1 %) NCR (16.7 %) Region I (28.6 %)
Multimedia projector for faculty use	44.7 %	Region XI (90.9 %) Region III (72.2 %) Region VII (63.6 %)	ARMM (11.1 %) CARAGA (18.8 %) NCR (25.0 %)
Multimedia projector for students' use	32.7 %	Region XI (72.7 %) Region III (61.1 %) Region IVA (52.4 %)	ARMM (11.1 %) Region I (14.3 %) Region V (17.6 %)
Printers for faculty use	72.56 %	Region II (93.7 %) Region VII (90.9 %) Region XI (90.9 %)	NCR (29.2 %) ARMM (44.4 %) Region XII (46.2 %)
Printers for students' use	61.28 %	Region II (93.75 %) Region X (86.7 %) Region VII (81.8 %)	NCR (20.8 %) Region V (29.4 %) ARMM (33.3 %)

Data Source: The Philippine Senate Project WITTY (2004). *Profile of teacher educators and teacher training institutions.* http://www.seameo-innotech.org/resources/resources.asp

6.91 % of the teacher educators from the TEIs surveyed have attended ICT Training seminars. This could be due to limited number of ICT training seminars offered or the fear factor that comes with age. More than half (58.46 %) of the teacher educators are 40 and above in age and 36.65 % are in the age bracket 50 and above. Learning a new technology could be considered a formidable task, as one gets older.

Teacher Educators ICT Skills

The inadequate training opportunities availed of by the teacher educators could partly explain their limited capability to manipulate particular software. ICT-skills of teacher educators in decreasing order follow:

- Word processing (63.3 %)
- Internet browsing (33.9 %)
- Spreadsheet (13.8 %)

Their knowledge of other computer software is quite negligible.

TEIs Use of Computers in Teaching

More than one half of the teacher trainers (52.4 %) confirmed that they use the computers in teaching. CARAGA (97.6 %), NCR (85.8 %) and Region X (65.6 %) have the highest number of teacher educators using computers in teaching. Regions with the lowest percentages in this respect are ARMM (23.9 %), Region VIII (27.9 %) and Region I (38.4 %). Comparison of these data with Table 7 goes to show that it does not follow that TEIs well-endowed with ICT-related facilities and equipment will ensure its use in teaching. The cases of NCR and CARAGA seems to indicate that even with limited ICT resources in schools, teacher educators who are convinced of its efficacy would use their own resources to apply ICT in their classroom.

How the computers are used in the classroom in decreasing order is as follows:

1. Asking the students to surf the Internet (32.5 %)
2. Surfing the Internet for reference (30.7 %)
3. Power point presentations (22.0 %)
4. For testing (20.2%)
5. For recording (20.0 %)
6. Computer-aided instructions (13.3 %)

Inclusion of Computers in Teaching Programs

About 78.6 % of the TEIs have included computers in their teaching programs. About 10.1 % of the deans interviewed categorically indicated that they will not include computers in teaching indicating a closed mindset. More than 70 % of the TEIs offer computer courses as separate subjects and as basic requirements to finish the education courses. A little over 1/5 of the TEIs integrate computer courses with professional teaching courses. Some 10 % of the TEIs offer computer courses as an elective and less than 10 % offer these as special programs.

Private Initiatives and International Cooperation

There are several private initiatives to donate computers and provide ICT training for teachers in the Philippines. These are particularly important since the government cannot do it alone. Several ICT projects in education are sponsored by IT business corporations such as INTEL Teach to the Future, Microsoft Philippines Partners in Learning (PIL) program, Philippine Long Distance Telephone (PLDT) Group of Companies' Smart Schools Program and CBCP World to name a few. INTEL Teach to the Future Program provides training for teachers on basic computer skills and the use of these skills in integrating technology tools and resources in their lesson plans. Microsoft Philippines PIL program provides information and communications technology skills training, tailored curriculum development, technical support, and research funds and resources to students and teachers. Their Philippine project is focused in the Visayas. PLDT's SMART School Program is aimed at providing public school teachers with Internet access through the PLDT group's wide range of communications solutions, access to online content, and teacher training. It is heartening to note that consumer-oriented companies like Coca-Cola have joined the ICT in Education bandwagon through their Edventure program. This program provided 14 public high schools in Metro Manila and Central Visayas Internet laboratories with 10-21 computers and a comprehensive training package for teachers, school administrators, and laboratory managers. CBCP World (www.cbcpworld.com) is an Internet service provider catering to Catholic schools nationwide. CBCPWorld is now moving into content development to further equip educators and schools with software applications that can be used in their daily work.

This writer has been involved in several school-funded ICT-related training programs for private school teachers, dubbed "Teachers Interactive Educational Resources (TIER)" Training Program. The training is a team based, mentoring style of training teachers who wish to design and develop multi-media curriculum projects using localized content. The training is provided on request by Net.Effect (an IT company) through a team of education specialists and multimedia specialists. It has been successful in terms of the satisfaction and use of the teachers' outputs in their classes. The support given by the school administrators in providing the infrastructure and manpower (electricity, computer room, computers, Internet access, funds for teacher training, and technical support for hardware maintenance) proved to be a crucial factor in the successful infusion of ICT in private schools.

An example of international cooperation in promoting ICT in education is the USAID Computer Literacy and Internet Connection (CLIC) Program. In partnership with the private sector (i.e., Makati Business Club and the Ayala Foundation) and other donors (Japan and Australia), USAID has introduced computer and Internet education in 175 schools in the ARMM and other conflict-affected areas of Mindanao and plans to reach an additional 200 to 300 high schools over

the next two years. About 180,000 students and 5,000 teachers have benefited so far.

The Road Ahead

Teachers and teacher educators who have experienced using ICT in teaching-learning situations are convinced of the power of ICT in improving teaching/learning in the classroom. For example, so much information can be condensed in a 20 – 30 minute time frame with the use of multimedia. Systems that are too abstract, time-bound, too dangerous in real time or too large to be studied in the classroom lend themselves beautifully to ICT lessons. For the teachers in developing countries, ICT is a great equalizer. Information from different sources that are non-existent to them before are now easily accessible in a virtual library in just a click of the mouse. Knowledge of ICT also empowers the teachers to plan, design, and develop their own instructional materials. The initial effort may be daunting but in the long run it pays off.

Students who have been exposed to ICT develop a better sense of responsibility for their own learning as they seek current information from the Internet and process them. Their communication skills are improved as they process gathered information and communicate their learning to their teachers and other students. Higher order thinking skills can be developed in students through ICT-based instructions. Although one may argue that the more time spent on the computer removes the students from their social environment and thus lessens their social skills, this can be easily overcome by group projects or assignments.

ICT is seen as a tool for equalizing opportunities for both teachers and students throughout the country. The Philippines is still far off from reaching its pronounced goal of ICT infusion in majority of schools because of problems in infrastructure, manpower, teacher training, and closed mindset of school administrators and even teachers. A digital divide exists between different regions and even within a region at all levels of education in the Philippine educational system. The loose integration of ICT in the classroom and the continued existence of a virtual division between different schools could further widen the opportunity gaps between students of well-endowed and less-endowed schools.

Bridging the digital gap within an educational system will need not only concerted efforts of the local community (parents, administrators, and teachers) and educational planners at the national level, but also international cooperation at the regional and international level.

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