

# ICT Capacity and Human Resource Development in Island Economies

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## Abstract

*There is significant potential for Information Communication Technology (ICT) to play a major role in assisting economic and social development. However, the technology, infrastructure, plans, and policies must be sustained and supported by people that have ICT skills, knowledge, and abilities. There are many facets in ICT capacity development in Island economies that this paper will touch upon: What are the best strategies for a country to develop a robust ICT skilled workforce at all levels which include the user, operator, administrator, and policy maker? What level of ICT education and training is needed? What are some of the challenges in delivering ICT education and training programs? What are some strategies for the design, development, and delivery of these programs? What are some examples of ICT capacity development programs in the Pacific Islands region? (PHD 2007 Vol 14 No 1 pp 103-106)*

## What level of ICT education and training is needed?

There is a severe need for skilled ICT human resources at all levels in the Pacific Islands region.<sup>1</sup> This need includes the users in the public (e.g., educators and health care providers) and private sector; those that design, develop, implement, operate, and manage networks and systems, and those that are responsible for policy decisions and regulation of the ICT sector. The development of the skills, knowledge, and abilities in these diverse areas involves many different disciplines and programs.

For the users, education and training should be focused on the incorporation and application of ICT services in their work. This may involve both technical training on how to use a software program, the internet, or a video teleconference VTC service. It may also include application of theories and practices in their specific area of interest. For example, while an educator may be taught how to use a computer eCourse Management System, they also may need to learn about distance learning theory and practice. It is necessary to learn how to use the technology as an effective tool to assist in achieving improved learning outcomes.

Technician or operator training also varies. The type of training fits into categories such as: telecommunication systems and networks, end-user equipment (hardware), and computer systems (software). Even within these categories there are many different types of systems

and software programs (e.g., Cisco routers, Oracle database, and Microsoft applications) that may require very specific professional education and training certificate programs.

There are fewer structured education and training programs for policy and decision makers. Policy related courses may cover general public policy and administration but specific telecommunication policy courses and those relevant in the Pacific Islands are very few.

Developing local human resources will decrease the reliance on expensive foreign ICT consultants, increase ICT related jobs and markets, and improve institutional efficiencies through the use of ICT systems and services.

## What are some of the challenges in delivering ICT education and training programs?

The challenges include:

- Local academic institutions are often not prepared to offer needed courses. There may not be the resources or staff to adequately develop these programs and courses.
- Sending students off-island is costly. The cost includes: the training program, air fare, and daily per diem for accommodations, meals, and transportation. It also includes the employee's time away from the job.
- Sending students off-island may disrupt their work and family life.
- The cost and availability of off-island travel for extended periods of time limits the number of trainees that are sent for training.

- Often the students do not pass the certification exams at the end of the technical training programs. This failure may be due to different teaching and learning styles and the fact that for many students English is a second language. Instructors may speak too quickly and use jargon that is difficult to understand. Students may not be accustomed to taking tests. Finally, the course material may require prerequisite technical knowledge in order for the students to grasp, in the short amount of time allocated for the training program, the material presented.
- Students receive training abroad in an environment where there are technical resources, equipment, etc. that are not available in their countries. This foreign environment makes it difficult to anticipate and troubleshoot technical problems when back in their home environment.
- If a foreign trainer conducts on-island training sessions, it is often not for an extended period of time. Although more local people can be trained, often the allocated amount of time is not long enough for student skill building. For example, a one-week computer training course might first require keyboarding. This cannot be learned in a short period of time and requires on-going practice.
- Brain drain is a difficult problem to resolve. Once people are trained, they become a scarce commodity and are difficult to keep employed locally because of more lucrative job offers in competing markets.

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#### **What are some strategies for the design, development and, delivery of these programs?**

There are several strategies for overcoming some of these challenges, maximize resources, improve learning outcomes, and enhance sustainability of education and training programs. Some strategies include:

- Establishing collaborative partnerships
- Paying employees to learn on their own time
- Developing e-Learning programs
- Supporting multipurpose networks: Sharing resources
- Utilizing open source software
- Adapting training programs to local teaching, learning styles, and pedagogy
- Developing approaches to knowledge management
- Developing and mentoring a core team

#### **Establishing Collaborative Partnerships**

Strategic partnerships for collaboration provide

opportunities for sharing and optimizing limited resources. Colleges and public school systems may collaborate to establish a program on computer literacy for teachers. The telecommunication carrier may work with private sector ICT departments to pool resources for bringing in outside expertise for training in a particular subject. Similarly, an organization might work with others in the region with comparable training needs.

#### **Paying Employees to Learn on Their Own Time**

Providing educational stipends for and allowing employees to attend capacity development programs during off-hours and on weekends is cost-effective. The organization benefits by supporting employees who are willing to advance their ICT skills by taking classes on their own time to learn skills that will, in turn, assist the organization.

#### **Developing e-Learning Programs**

There are many modes of e-Learning. The variations include: completely on-line where the students and teacher never meet face-to-face, a combination of face-to-face and on-line, and interactive VTC plus on-line support for supplemental learning and resource management (handouts, presentations, reading assignments, etc.).

The benefits of utilizing ICT to deliver ICT education and training are many. The use of ICT provides a real world lab for students to understand some of the benefits of ICT and how technical systems and services function.

e-Learning enables wider distribution of programs to many students. It provides students with the flexibility of attending courses without leaving their home and/or work. This permits students to enroll and participate in long-term programs.

Cost becomes an issue to overcome when delivering e-Learning programs. These programs are more time consuming for the instructor to develop and telecommunication costs for quality services may be prohibitive. The use of public service telecommunication networks and/or networks that utilize information technology for VTC is recommended because there is no basic per minute fee. In the Pacific Islands, programs such as Pan Pacific Education and Communications Experiments by Satellite (PEACESAT) or the University of the South Pacific Network (USPNet) through Australia Research and Education Network (AARNet) are other options for e-Learning support infrastructure.

### Supporting Multipurpose Networks

Part of optimizing limited resources and developing collaborative partnerships includes the shared use of technical networks and services. This collaboration might include cost-sharing monthly recurring costs and sharing the use of facilities and equipment. Partnerships may be within one sector or between multiple sectors (e.g., health, education, and emergency management, etc.).

### Utilizing Open Source Software

The use of open source software such as Moodle (an eCourse management system similar to WebCT® or Blackboard®) is usually just as functional as commercial systems, is easy to use, and has no licensing fees. Without licensing fees, organizations are permitted to share systems and share the cost of a server and maintenance.

### Adapting Training Programs to Local Teaching and Learning Styles

It is important that the pedagogy is appropriate for the local culture and environment.<sup>2</sup> If available, language and cultural interpreters are useful. If not, the instructor should be mindful to present the material in a way that is understood by the students to whom English may be their second, third, or fourth language. Using local environments and situations are imperative.

### Developing Approaches to Knowledge Management

Storing information from courses in a way that is easily managed is beneficial to both the instructor and student. Students are able to review lessons on their own time and when necessary.

Instructors may elect to share learning objects such as PowerPoint® presentations and hand-outs. The objects can be reused in other courses.

### Developing and Mentoring a Core Team

Initially, it is very useful to start off with a small core team that is designated and willing to learn all the different components of ICT. The team will work with technology and policy stakeholders to establish partnerships among agencies, train the trainers, become the liaison with management and leaders, and monitor the always changing local ICT capacity development needs.

### What are some examples of ICT capacity development programs in the Pacific Islands region?

Here are a few examples of programs that the University of Hawai'i (UH) Telecommunications and Information Policy Group (TIPG) and PEACESAT have developed in collaboration with Pacific Island partnering agencies.

#### Pacific ICT Academy (PICTA)

PICTA (<http://picta.ecdc.as>) was established in 2005 in American Samoa through a partnership between the American Samoa Community College (ASCC), Department of Education, Pacific eCommerce Development Corporation and the University of Hawai'i TIPG. The purpose of PICTA is to provide training in Cisco networking, Microsoft and Oracle applications for both academic credit and preparatory sessions for professional certification tests.

The program was specifically designed to address the need for developing a skilled cohort of ICT professionals in American Samoa to support the many advanced telecommunications networks that have been developed

in recent years. It was also designed in an attempt to meet the challenges of ineffective investment in short off-island intensive professional certificate training courses, such as the Cisco certification classes. Often pass rates were low due to the need for increased foundational work, short time to learn and digest a lot of new and in-depth material with no local adaptation or facilitators.

The PICTA program was offered over a one-year period and held daily from 8:00 AM to 12 Noon, Monday through Friday, with mandatory weekend laboratories.<sup>2</sup> UH TIPG instructors provided the training

to participants at ASCC through interactive video teleconferences. At ASCC there were local on-site facilitators to coordinate the overall course administration and provide additional student support. Many students were sponsored by their employers (government agencies, as well as private sector) with the understanding that they would retain their employment for a period of two years. Due to retention issues, the participants were obligated to reimburse the full cost (USD\$20,00) of the training program (USD\$20,000) to the company, if they did not meet this requirement.

Of the 21 registered students, 19 successfully completed the program. The feedback has been very positive regarding the increased quality of technical support

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and response time for troubleshooting and resolving problems. The first PICTA cohort was comprised of ICT staff from educational institutions and government agencies that have formed informal networks for continued information sharing and support.

### **Telecommunications & Information Resource Management (TIRM)**

UH TIPG/PEACESAT administers the TIRM graduate certificate program (<http://tirm.tipg.net>). The hybrid program uses VTC and on-line delivery. Recently, students have participated from American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia (Pohnpei), Republic of the Marshall Islands (Majuro), Republic of Palau, and Hawai'i. The Sasakawa Pacific Islands Nation Fund has awarded a grant to support participants from each U.S.-Affiliated Pacific Island jurisdiction for 3 years. The first cohort to include policy makers, administrators, and technical support staff will begin in August 2006. There are a total of five 3-credit courses required for this graduate certificate. The courses are: Telecommunication Systems and Networks (COM 681); Telecommunication and Information Services (COM 682); Information Research and Development Methods (COM 683); Telecommunication Planning and Management (COM 684), and Seminar (COM 680). Moodle is used to organize course materials, teaching/learning objects, assignments, and on-line quizzes. The UH TIPG is considering the development of a health informatics-focused TIRM course because of the need and demand for this type of training in Hawai'i and the Pacific Island jurisdictions.

### **ICT Policy Awareness Workshops**

In 2006, the Pacific Island Digital Opportunities Program of the Sasakawa Pacific Islands Nations Fund supported the UH TIPG, in conducting ICT Policy Awareness workshops in the Federated States of Micronesia and the Republic of the Marshall Islands. The workshops were geared toward policy makers and ICT stakeholders in education, health, and other public sectors. The workshops covered topics such as basic telecom terms and concepts, policy reform and liberalization, and ICT regulatory frameworks. Several interested participants became candidates of the TIRM graduate certificate program for continued and ongoing telecommunications policy training.

### **Instructional Technologies (ED 240) and Distance Learning Practice and Theory (ED 250)**

The American Samoa Community College (ASCC), American Samoa Department of Education (AS DOE), Pacific eCDC, and UH TIPG/PEACESAT deliver two courses specifically geared toward computer literacy and e-Learning capacity development. These courses are Instructional Technologies (ED 240) and Distance Learning Practice & Theory (ED 250).<sup>3</sup> Students that complete these courses receive ASCC credits. The courses, which develop the capacity of local teachers to effectively utilize and incorporate educational technology in instruction, have been designated as requirements for the teacher certification program of the AS DOE. More than 355 teachers have been trained in eight sessions. Outcomes of these trainings include teachers creating Microsoft PowerPoint slide presentations for classroom instruction and implementation of distance learning classes in algebra and physics.

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### **Discussion**

There are many important issues in designing and delivering cost effective and efficient education and training. e-Learning opportunities are increasing. But, there is a challenge in the Pacific Islands to access affordable telecommunication networks and services. The goal of affordable services alone is quite involved since it requires policy and social change. ICT capacity development is needed at all levels throughout the Pacific Islands region in parallel with the development of e-Learning programs. This development is needed across both public and private sectors. Some of the strategies outlined in this paper are observations derived from successful and failed ICT capacity programs in the region.

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