WORKFORCE DEVELOPMENT FOR
Implementing Infrastructure Projects
25–31 October 2006
Phnom Penh, Cambodia
WORKFORCE DEVELOPMENT FOR
Implementing Infrastructure Projects
25-31 October 2006
Phnom Penh, Cambodia

Asian Development Bank Institute
Workshop Coordinators
Jeoung-Keun Lee, Director, Capacity Building and Training
Asian Development Bank Institute (ADBI)
Pramod Shrestha, Community-Based Skills Training Advisor, Education Sector Development Project II (EDSP II): ADB Loan No. 2122-CAM (SF), Ministry of Labor and Vocation Training, Cambodia

Workshop Rapporteurs
Carol Elliott
Marylin Dixon

Published by ADBI, 2007
ISBN: 978-4-89974-017-9

ADBI encourages the use of the material presented herein, with appropriate credit given to ADBI.

Please address inquiries for copies to:
Librarian
Asian Development Bank Institute
Kasumigaseki Building 8F
3-2-5 Kasumigaseki
Chiyoda-ku, Tokyo 100-6008
Japan

This report is available on the ADBI website (www.adbi.org) for free downloading.

The views expressed in this report are the views of the authors and do not necessarily reflect the views or policies of the Asian Development Bank (ADB), ADBI, or its Board of Directors, or the governments they represent. ADBI does not guarantee the accuracy of the data included in this report and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.
The Asian Development Bank Institute, in collaboration with the Ministry of Labor and Vocational Training of Cambodia and the Colombo Plan Staff College for Technician Education in the Philippines, conducted a workshop called Workforce Development for Implementing Infrastructure Projects in Phnom Penh from 25–31 October 2006. The objective of the workshop was to update skills and knowledge of technical teachers to effectively meet the demands of learners and employers in the knowledge-based economy. The workshop also had the goal of sharing new instructional technologies that will increase learners’ retention and skill acquisition, along with policies for workforce development.

In order to achieve the objectives of the workshop, the participants discussed the following: (i) workforce development policies and strategies in selected countries, (ii) issues and challenges of developing the workforce in a knowledge-based economy, (iii) monitoring of labor market demands, (iv) emerging competencies of technical teachers, (v) qualifications of technical teachers, (vi) enhancement of employability of school graduates, (vii) new instructional technologies for workforce development, and (ix) innovative assessment strategies of workers.

Recognition and esteem are given to the highly informative and well-organized presentation materials of the resource speakers as well as to the equally professional and remarkably participative delegates. The combined knowledge, competence and inspiring involvement of all these people made this program a great success. I would like to take this opportunity to extend my thanks to the participants of the workshop who devoted their time fully and enthusiastically. I also thank our speakers for their excellent presentations and our facilitators for organizing the workshop.

Pramod B. Shrestha
Community-Based Skills Training Advisor
Education Sector Development Project II (ESDP II):
ADB Loan No. 2122-CAM (SF)
Ministry of Labor and Vocational Training
Cambodia
# Table of Contents

Abbreviations vii  
Executive Summary ix  
Phnom Penh Declaration 2006 x  
Framework for Action xi  
Introduction xiv  

Workshop Proceedings 1  
Labor Market Changes and Roles of Technical Education and Vocational Training 1  
1. Role of Technical Education and Vocational Training (TEVT) in the Global Knowledge Economy 1  
2. TEVT and Gross National Happiness (GNH) 4  
3. World Trends and Implications for Sustainable Human Resource Development 6  
4. Developing Entrepreneurship in TEVT 11  

Theories and Practices of Teacher and Curriculum Development 15  
5. Learning Theories in TEVT 15  
6. Overview of Training Methods 19  
7. How to Become an Effective and Efficient Technical Teacher: New Roles and Responsibilities 22  
8. Mentoring Techniques in Technical Teacher Training 24  
9. Qualifications of Professional Technical Teachers 26  
10. Curriculum Development in Technical Education and Vocational Training 29  
11. Coordinating Training Programs 33  
12. Non-Technical Skills for Technical Teachers 37  
13. Individualized Instruction in Technical Education and Vocational Training 41  
14. Quality Management in TEVT 45  

Performance Evaluation and Quality Control 48  
15. Research and Evaluation Strategies in Workforce Development 48  
16. Total Quality Journey at TEVT Institutions: Where Are We Going? 52  
17. Competency-Based Training in TEVT 55  
18. Quality Assured Technical Teacher Training Program: A Strategic Model 59  
19. Occupational Standards and Accreditation in TEVT 63  

Emerging Instructional Technologies 67  
20. New Paradigms for Technical Teacher Training 67  
21. Role of Information Technology in Teacher Training 69  
22. Integration of ICT in Technical Teacher Training 70  
23. Ubiquitous Teaching and Learning System 74  
24. Overview of Learning Content Management Systems (LCMS) 78
## WORKFORCE DEVELOPMENT FOR IMPLEMENTING INFRASTRUCTURE PROJECTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. Emerging Competencies for Technical Teachers in Knowledge Economy</td>
<td>81</td>
</tr>
<tr>
<td>26. Online Simulations for Use in TEVT</td>
<td>86</td>
</tr>
<tr>
<td>27. Workforce Mobility with Computer-Supported Cooperative Works</td>
<td>88</td>
</tr>
<tr>
<td><strong>Conducive Policies and Strategy Reforms</strong></td>
<td></td>
</tr>
<tr>
<td>28. TEVT Reforms in the Philippines</td>
<td>92</td>
</tr>
<tr>
<td>29. Workforce Development Policies of Bhutan</td>
<td>95</td>
</tr>
<tr>
<td>30. TEVT Reforms in Pakistan</td>
<td>97</td>
</tr>
<tr>
<td>31. Vocational Education and Training Policies</td>
<td>101</td>
</tr>
<tr>
<td>32. Workforce Development and Vocational Education and Training in Lao People’s Democratic Republic</td>
<td>102</td>
</tr>
<tr>
<td>33. TEVT Reforms in Sri Lanka</td>
<td>106</td>
</tr>
<tr>
<td><strong>Appendixes</strong></td>
<td></td>
</tr>
<tr>
<td>Remarks</td>
<td>109</td>
</tr>
<tr>
<td>Schedule of Activities</td>
<td>114</td>
</tr>
<tr>
<td>Directory</td>
<td>118</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>ADBI</td>
<td>Asian Development Bank Institute</td>
</tr>
<tr>
<td>AMT</td>
<td>achievement motivation training</td>
</tr>
<tr>
<td>AVA</td>
<td>audio visual aid</td>
</tr>
<tr>
<td>BPR</td>
<td>business process reengineering</td>
</tr>
<tr>
<td>BSC</td>
<td>Balanced Scorecard System</td>
</tr>
<tr>
<td>BVQF</td>
<td>Bhutan Vocational Qualifications Framework</td>
</tr>
<tr>
<td>CAL</td>
<td>computer-assisted learning</td>
</tr>
<tr>
<td>CARICOM</td>
<td>Caribbean Community</td>
</tr>
<tr>
<td>CBT</td>
<td>Capacity Building and Training</td>
</tr>
<tr>
<td>CBST</td>
<td>competency-based training</td>
</tr>
<tr>
<td>CMC</td>
<td>computer-mediated communication</td>
</tr>
<tr>
<td>CMS</td>
<td>content management system</td>
</tr>
<tr>
<td>CPSC</td>
<td>Colombo Plan Staff College for Technician Education</td>
</tr>
<tr>
<td>CSCW</td>
<td>computer-supported cooperative work</td>
</tr>
<tr>
<td>DACUM</td>
<td>develop a curriculum</td>
</tr>
<tr>
<td>e-TLS</td>
<td>electronic teaching and learning system</td>
</tr>
<tr>
<td>EMIS</td>
<td>educational management information system</td>
</tr>
<tr>
<td>EMS</td>
<td>electronic meeting system</td>
</tr>
<tr>
<td>GDP</td>
<td>gross domestic product</td>
</tr>
<tr>
<td>GEM</td>
<td>global entrepreneurship monitoring</td>
</tr>
<tr>
<td>GNH</td>
<td>gross national happiness</td>
</tr>
<tr>
<td>HDI</td>
<td>human development index</td>
</tr>
<tr>
<td>HOT</td>
<td>higher order thinking</td>
</tr>
<tr>
<td>HRD</td>
<td>human resource department</td>
</tr>
<tr>
<td>ICT</td>
<td>information and communications technology</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>IPOO</td>
<td>input process output outcome</td>
</tr>
<tr>
<td>ISD</td>
<td>instructional systems development</td>
</tr>
<tr>
<td>LCMS</td>
<td>learning content management system</td>
</tr>
<tr>
<td>m-TLS</td>
<td>mobile teaching and learning system</td>
</tr>
<tr>
<td>MACS</td>
<td>massive array cellular system</td>
</tr>
<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MoLHR</td>
<td>Ministry of Labour and Human Resources</td>
</tr>
<tr>
<td>MTPDP</td>
<td>Medium Term Philippines Development Plan</td>
</tr>
<tr>
<td>NCCE</td>
<td>National Coordinating Council on Education</td>
</tr>
<tr>
<td>NCVER</td>
<td>National Center for Vocational Education Research</td>
</tr>
<tr>
<td>NEP</td>
<td>National Employment Plan</td>
</tr>
<tr>
<td>NTEC</td>
<td>non-teacher education certified</td>
</tr>
<tr>
<td>NTESDP</td>
<td>National Technical Education and Skills Development Plan</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>NTTTC</td>
<td>National Technical Teacher Training College</td>
</tr>
<tr>
<td>OJT</td>
<td>on the job training</td>
</tr>
<tr>
<td>PNG</td>
<td>Papua New Guinea</td>
</tr>
<tr>
<td>PRC</td>
<td>People’s Republic of China</td>
</tr>
<tr>
<td>RFID</td>
<td>radio frequency identification</td>
</tr>
<tr>
<td>RPL</td>
<td>recognition of prior learning</td>
</tr>
<tr>
<td>SCANS</td>
<td>Secretary’s Commission on Achieving Necessary Skills</td>
</tr>
<tr>
<td>SD</td>
<td>sustainable development</td>
</tr>
<tr>
<td>SKA</td>
<td>knowledge, skills, and/or attitudes</td>
</tr>
<tr>
<td>SME</td>
<td>small or medium enterprise</td>
</tr>
<tr>
<td>SSI</td>
<td>small scale industry</td>
</tr>
</tbody>
</table>
Executive Summary

Workforce development is no longer seen as the realm of educational institutions. It is increasingly viewed in terms of a broader system, involving businesses, educational institutions, individuals and government agencies. Driven by the rapidly changing and highly competitive global economy that puts a premium on skilled workers, many countries are taking steps to better align their workforce and economic development programs. In pursuing this alignment, countries are confronted with the challenge of two systems that operate very differently. Workforce development programs are targeted at individuals and supervised by education or labor ministries. Economic development is focused on business with different policy and funding structures.

With the emergence of the knowledge-based economy, it became evident that economic development requires a skilled, innovative and flexible workforce. The severe skills gaps observed in many developing countries showed that workforce development is about much more than assisting the unemployed and school dropouts. It is essential to produce a workforce with the skills and knowledge that employers need if they are to succeed in a rapidly changing and highly competitive global economy.

When economic and workforce development are well-aligned, economic development officials work closely with their counterparts in workforce development to ensure that both long-term planning and current recruitment and expansion efforts take into account the skills of the workforce. Similarly, workforce development professionals work closely with economic development officials and employers to ensure that their training and job placement efforts are designed to meet the skill needs of the industries for implementing large and complex infrastructure projects.

Economic development depends on national productivity, which requires a workforce with proper skills, knowledge, and work ethics to match the needs of employers. This is a huge task; many weaknesses exist in the workforce development systems in many countries. In order to provide a high quality learning experience to students and workers, teaching staff need to be properly trained and to update their skills regularly to respond to the changing labor market and new technologies. This is necessary to ensure that the quality of teaching and learning is uniformly excellent across the sector, with workforce development programs that are well tailored to the needs of individual learners and employers.
Recommendation 1: Technical education and vocational training (TEVT) in the developing countries in the twenty-first century should ensure learner-centered innovative and flexible approaches in developing and establishing sustainable TEVT systems.

Recommendation 2: Preparation for quality-assured technical teachers should be given highest priority in any reform process in the TEVT sector in the emerging knowledge society.

Recommendation 3: Continuing technical and vocational education and training programs through the distance learning mode should be promoted for the benefit of those disadvantaged by distance and location, such as individuals in rural communities, to reduce the digital divide.

Recommendation 4: ADBI should start distance education initiatives in the member countries for training pre/in-service technical teachers.

Recommendation 5: The status and prestige of TEVT teachers must be enhanced in the eyes of the community and the media.

Recommendation 6: Clearly defined and more imaginative strategies to identify, attract, train and retain good teachers must be in place in any TEVT reform initiatives.

Recommendation 7: ADBI, in close cooperation with member countries and specialized agencies, should develop international guiding principles on the planning and implementation of teacher training programs (in the TEVT sector) based on defined competency standards.

Recommendation 8: Colombo Plan Staff College for Technician Education (CPSC), based in Manila, plays a very important and catalytic role in promoting international cooperation in the TEVT sector. Cambodia should be an active member of the Staff College.

Recommendation 9: For wider dissemination of the results of this important meeting, ADBI should develop CD-ROMs. Distance learning courses in some of the topics should be offered as soon as possible.

Recommendation 10: In order to enhance the status and professionalism of technical human resources in Cambodia, a technological university should be established in Cambodia.

Recommendation 11: Include formal and informal education in mainstream education for workforce development.
Framework for Action

- The challenges facing technical education and vocational training (TEVT) in the developing countries in the twenty-first century demand learner-centered innovative and flexible approaches including a reoriented curriculum to take account of new subjects and issues such as technology, the environment, languages and cultures, emerging trends in information and communication technology (ICT), entrepreneurship, and the requirements of rapidly growing service industries.

- In any TEVT reform initiatives, full use should be made of contemporary educational technology, particularly the Internet, interactive multimedia materials, audiovisual aids and mass media, to enhance the reach, cost effectiveness, quality and richness of programs, especially in the promotion of self-learning.

- Preparation for technical teachers should be given highest priority in any reform process in the TEVT sector. Teachers are essential and central players in promoting quality education and training, whether in training centers or in more flexible training programs; they are advocates for and catalysts of change. No TEVT reform is likely to succeed without the effective and efficient participation and ownership of teachers. All teacher training programs should be designed with the following objectives in mind:

  - to maintain standards of education and professional preparation in effect for the teaching profession as a whole and to contribute to raising these overall standards;
  - to develop in future teachers the ability to teach both the theoretical and the practical aspects of their field, with special emphasis on the need to use, whenever possible, information and communication technology;
  - to develop in future teachers the responsibility for keeping up to date with trends in their field, as well as with the related work opportunities;
  - to develop in future teachers the ability to guide learners with special needs;
  - to ensure that future teachers are equipped, by means of supplementary training, to teach other subjects related to their primary subject;
  - to ensure that teachers have access to training and ongoing professional development and support, including through open and distance learning; and
  - to develop in future teachers the ability to accept professional responsibilities and be accountable to both learners and communities.
Adequate provision should be made for research and for updating pedagogical skills of teachers, through appropriate staff development programs encouraging constant innovation in curriculum and teaching and learning methods and through ensuring appropriate professional and financial status, and for excellence in research and teaching.

In order to ensure clearly defined and more imaginative strategies to identify, attract, train and retain good teachers, any TEVT reforms should address the new role and responsibilities of teachers in preparing students for an emerging knowledge-based and technology-driven economy. Teachers must be able to understand diversity in learning styles and in the physical and intellectual development of students, and to create stimulating, participatory teaching and learning environments.

As teacher training programs in developing countries are not generally linked to the development of applied teaching and learning competencies, national and international agencies involved in TEVT reforms in the Asia-Pacific region should develop international guiding principles on the planning and implementation of teacher training programs (in the TEVT sector) based on defined competency standards. These international guiding principles would be intended to assist member countries engaged in difficult restructuring of their teacher recruitment and teacher education systems in the TEVT sector. Member countries should have national competency standards for technical teaching that should include (but should not be limited to) the following important elements:

- assist teachers to improve their work organization and their workplace performance by encouraging them to reflect critically on their own practice, individually and collaboratively;
- inform professional development to support improvements to teaching (boost teachers’ self esteem and their commitment to teaching by enhancing their awareness of the nature of their teaching competence);
- underpin a national approach to improving technical teacher education programs, including curriculum and pedagogy; and
- possibly form the basis for a nationally consistent approach to registration and probation.

The professional preparation of all technical and vocational teachers should include (but should not be limited to) the following elements in pre-service training and in-service upgrading programs:

- educational theory in general and particularly as it applies to technical and vocational education;
- educational psychology and sociology relevant to the subjects/fields to be taught by the future teachers;
- classroom management, special teaching methods appropriate to the subjects/fields of the future teachers and methods of evaluating/assessing the students’ work;
• training in the choice and use of contemporary teaching techniques and aids, including information/communication technologies;

• training in how to create and produce appropriate teaching materials, including modular and computer-aided instructional materials, whenever such materials are in short supply;

• a period of supervised practice teaching before appointment to a post;

• an introduction to educational and occupational guidance methods as well as to educational administration;

• planning the instructional environment of practical classes and laboratories and managing/maintaining these facilities; and

• a sound training in safety, with emphasis on teaching safe working practice and setting a good working example.

There is significant scope for member countries in the Asia-Pacific region to share their experience in technical and vocational education. There is a need for mutual cooperative assistance between all countries, regardless of their state of development. Provision should be made at the national, regional and international levels for the regular exchange, making use of contemporary information and communication technologies, of information, documentation, and materials obtained from research and development, in particular:

• publications concerning comparative education, psychological and pedagogical problems affecting general and technical and vocational education, and current trends;

• information and documentation concerning curriculum development, methods and materials, study opportunities abroad, and employment opportunities, including human resource requirements, working conditions and social benefits;

• ideas, innovations and new teaching/learning/training materials; and

• mass media programs of an informational or pedagogical character.
Introduction
Dr. Jeoung-Keun Lee, Director, Capacity Building and Training, Asian Development Bank Institute, Tokyo

Welcome to all participants and speakers. During the course of the workshop there will be 18 resource speakers, all of whom have 60 minute sessions that will include time for participant questions and a general discussion.

Objectives:
1. Identify essential competencies of technical teachers
2. Review new developments of pre and in-service teacher training
3. Examine new instructional technologies
4. Share innovative practices in training of trainers

Daily Themes:
1. Labor market changes and roles of technical education and vocational training
2. Theories and practices of teacher and curriculum development
3. Emerging instructional technologies
4. Performance evaluation and quality control
5. Conducive policies and strategy reforms

Outputs:
1. New ideas to improve your program
2. New methods of training teachers
3. New policies and strategies
4. New contact to consult with
5. Lecture CD-ROMs

Chairpersons:
1. Wednesday, 25 October: Dr. Thamrongsak Moenjak
2. Thursday, 26 October: Prof. Pramod Shrestha
3. Friday, 27 October: Dr. Agni Prasad Kafle
4. Saturday, 28 October: Prof. Shyamal Majumdar
5. Monday, 30 October: DG Man-Gon Park
6. Tuesday, 31 October: Dr. Thamrongsak Moenjak

Participant Expectations:
Two participants were asked what their expectations of the workshop were:
1. Updating of technical and non technical teacher trainers of Cambodia
2. New methodology and technology to train teachers
**Definition of Technical Education and Vocational Training (TEVT)**

**Vocational education and training** includes specialized training activities designed to provide the knowledge, skills, and attitudes required for efficient and effective performance of an occupation or groups of occupations. It is a prescribed body of studies constituting a curriculum or series of competencies which equips people with employable skills (European Training Foundation, 1997).

**Technical education** is education designed to produce competent workers in mechanical, industrial arts, and other applied sciences at upper level and middle level workforce in technical studies and vocational skill training from technical schools, technical vocational training centers, and university campuses. It is education enabling trainees to perform the required practical skills for occupations and jobs based on science and technology training (European Training Foundation, 1997).

**Technical education and vocational training** is an integration of education and training involving the transfer of psychomotor, affective and cognitive skills in learning and teaching which enables workers in the vertical and horizontal mobility in jobs or occupation adopting the new changes of technology. Such education and training is given on a long term regular basis or as short term job oriented training (Asian Development Bank, 1990). The system and networking of all technical education and vocational training institutions and stakeholders develop and maintain the system (European Training Foundation, 1997).

**UNESCO and ILO** states that TEVT is a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life.
Labor Market Changes and Roles of Technical Education and Vocational Training

Role of Technical Education and Vocational Training (TEVT) in the Global Knowledge Economy
Dr. Mark Cully, General Manager, National Center for Vocational Education Research (NCVER), Australia

Introduction

Globalization is recognized everywhere and can be considered to have three phases: (i) the mobility of capital, (ii) the mobility of goods (and increasingly, services), and (iii) the mobility of people. Each of these phases poses distinct challenges for TEVT, in terms of adapting to (a) economic restructuring, as nations adjust to their areas of comparative advantage; (b) competition in education markets as citizens seek the best educational opportunities and foreign education providers enter the market; and (c) the entry and exit of skills embodied in people due to migration flows.

Openness of Economies

The Australian economy only recently became an open one in 1983 when the economy was deregulated and tariff protection was gradually reduced. As a result, the percentage of imports and exports as a proportion of GDP rose slowly between 1960 and 1980, and then accelerated from the mid-1980s onwards. These now contribute almost 50% of GDP.

The free flow of capital and goods has allowed employers the option to switch investments from one region of the world to another in search of greater returns. For example, Toyota has relocated many of its Australian production plants to the People’s Republic of China or elsewhere in Southeast Asia. Similarly, call centers and backroom processing for financial services have moved to India. This has resulted in many Australians finding themselves redundant, having to acquire new skills to regain employment. This has been the fate of many workers in the
textiles, clothing and footwear industry, and there is continuing uncertainty surrounding the long-term economic viability of a domestic automotive manufacturing industry.

**Growing Importance of Training**

Primary and secondary industries (i.e., agriculture, manufacturing, mining, construction) have shrunk and now account for only a quarter of total employment, whereas fifty years ago, they made up about half. Since then, there has been a huge growth in the service sector, both business-to-business and personal services.

Australia does not have a formal manpower planning policy. Consequently, it has a flexible labor market. Four million people out of 10 million change jobs each year and consequently training and re-skilling of people is extremely important.

In order to produce more effective training programs, industry is now closely involved in determining the course content and curricula through the development of industry-designed “training packages.” Industry specifies the skills needed, rather than the teaching methodology or subject content.

These training packages are not curriculum documents, although there may be associated materials or training resources. Their essence is the specification of competencies required by employees to operate effectively in the workplace. The packages are composed of units of competency. Apprenticeships and traineeships are carried out using such training packages. Inevitably, new technology has had an enormous impact in many industries. This includes computer-aided design and just-in-time management of inventories, as well as a range of new and enhanced telecommunication services that has required whole new skill sets to be acquired by workers.

For governments in many countries, a knowledge economy has become a unifying goal with which to frame overall policy direction, including in the area of education and training. The European Union, for example, set itself a goal in its 2000 council meeting in Lisbon to become, by 2010, “the most competitive and dynamic knowledge-based economy in the world,” with lifelong learning being seen as one of the means of realizing this goal.

This change, from focusing on information to a knowledge economy, essentially symbolized a shift in focus from the information and communication industries as a driver of economic growth to one where information and communication technologies would be increasingly deployed across all areas of industry.

Robert Reich, the Secretary of Labor under President Bill Clinton, divided the workforce into three groups: routine producers, in-person service providers, and symbolic analysts. The latter sector includes engineers, lawyers, journalists, and academics; it has seen huge growth over the past decade.
Globalization of Training Markets

Of all OECD countries, Australia has the highest proportion of foreign students studying in higher education: one in five. The main countries from which students come to Australia are the People’s Republic of China (PRC), India, New Zealand, and South Korea. This pattern is now emerging in TEVT, with students coming from PRC, Thailand, Indonesia, Korea, and Japan.

The globalization of training markets is being driven by entrepreneurial providers, both public and private, and only a small proportion of it is tied to foreign aid programs. The first driver is industry, which wants to develop specific skills and competencies in the workforce. The second source is from students themselves, who are primarily interested in obtaining degree level qualifications from an English speaking country or at least getting on that pathway.

Although in numerical terms, serving an overseas market is currently a very small fraction of total TEVT activity in Australia, its rapid growth has drawn attention from regulators in Australia who are responsible for quality assurance (i.e., registration and accreditation of training providers and courses) in Australia’s TEVT system. They are concerned to ensure that Australia’s reputation—its “brand” —for high quality training delivery remains untarnished. A transnational quality strategy has been put in place to manage this. A key issue is whether Australian quality assurance arrangements are sufficiently adaptive to overseas markets (and, indeed, whether they should be at all).

Another way in which globalization is intruding on the territory of TEVT in Australia is through the movement of people. Australia has long been a settlement country with a high intake of migrants. One in four of current Australian were born overseas. Since the end of World War II around 6 million people have migrated to Australia. Prior to the 1970s, under the white Australia policy, immigration was restricted to people from European countries, with immigrants arriving predominantly from the United Kingdom and Ireland; significant numbers also came from Yugoslavia, Greece, and Italy.

In the most recent year for which data is available (2004–05), most migrants came from the United Kingdom, PRC, India, South Africa, the Philippines, and Malaysia. One of the factors driving this composition is that foreign citizens newly graduating with a higher education or TEVT qualification (at certificate level III or higher) can now apply for immigrant status without leaving Australia or gaining relevant work experience. The age profile of the immigrants is younger than that of the Australian population, and is younger still for skilled migrants; 60% of them are under 35 years.

Since the mid-1980s, when Australia began to restructure its economy to meet the challenges of globalization, the immigration policy focused on skilled workers. Skilled workers are selected on the basis of points allocated for criteria including age, knowledge of English, recognized skills, and work experience in a list of skilled occupations.

In addition to permanent migration, Australia also allows short-term migrants under the temporary 457 visa (also known as the business long-stay visa). This enables people from overseas to work in Australia for a notional period of four years. The 457 visa is essentially an employer-demand driven visa. There is no cap on the number issued each year nor is there any annual government target. Although these visas are generally perceived as a means of mitigating skilled labor shortages in Australia, they are not restricted to fields in which shortages exist; employers can sponsor skilled migrants in any field they choose.

The number of 457 visas granted in 2005–06 was projected to be around 40,000, representing an increase of over 40% over the previous year. If realized, this would be about the same as the number of skilled visas expected under the permanent migration program. Based on the trends of recent years, more temporary skilled 457 visas may be granted than skilled permanent visas in future years.
The discussion thus far has focused on migration, but emigration is also an important issue in Australia. It has been estimated that at least 750,000 Australians are living overseas on a long-term or permanent basis. These are predominantly young, highly educated professionals. This is sometimes referred to as “brain drain,” although in more recent times it has been spoken of as a “brain circulation,” recognizing that Australia is a net importer of skills, and also that many expatriates do return home to Australia with more advanced skills than when they left.

The number of tradespersons employed in Australia grew by more than 150,000 in the ten years up to 2006. Over (approximately) the same period, the net number of people migrating as tradespersons rose by 45,500, or 30% of the new jobs created. Similarly, the net gain in the number of professionals was 168,900, equal to 29% of the new jobs created in the past decade.

Now unemployment is under 5%—the lowest in thirty years—and this is an important driver in economic growth. Employer groups have been advocating a larger skilled intake as a response to skill shortages. They have also been pressuring government to expedite migration processes. Some have also called for the use of temporary guest worker programs as a means of alleviating overall labor shortages in some regional parts of Australia.

The impact of globalization on national TEVT systems is complex. It is also shown to be country contingent, depending on the nation’s economic and social development and its prevailing economic and educational institutions.

In the question and discussion session, participants discussed the difference between the role of industrialists and educationalists regarding TEVT. The industrialists decide on the skill levels and competencies and may provide supporting materials. The educationalists, however, must decide how and what to teach to produce those required skills.

Australia’s model for TEVT funding was also discussed. The country has a mixed model of private and public training institutions. The Government purchases training rather than delivering it. The private sector can also compete for finance; here most of the money goes into apprenticeships. Regarding the importance of skilled development and entrepreneurship for TEVT, Australia seeks to provide people with employable skills rather than seeking to develop entrepreneurs. Training is available in skills such as bookkeeping to help those who want to establish their own enterprises.

TEVT and Gross National Happiness (GNH)

Dr. Tshering Tobgay, Director, Department of Human Resources, Ministry of Labor and Human Resources, Bhutan

Introduction

Bhutan is a landlocked Himalayan country with an area pf 38,000 sq km and a population of only 634,000. It has a very low population for its size and the majority of the population is very young. The country has been Buddhist since the 8th century. From 1616 to 1907 it was a theocracy ruled by monks. In 1907 it became a hereditary monarchy. Bhutan also has a number of factors that make it unusual. It has never been colonized and had a policy of “self-imposed isolation” since 1961 with rapid reform and planned development.

Although the philosophy of gross national happiness (GNH) has only recently become well known to the rest of the world, it was introduced in the 1970s by the king as an alternative to the more conventional measures of GDP and GNP. GNH seeks to

“balance traditional with modern, material gain with spiritual and emotional development and finally commodity wealth with quality of life.”
Aspects of Gross National Happiness

The philosophy of GNH has been incorporated in the planning of all programs. It is based on individual development, sanctity of life, respect for nature, social harmony, the importance of compromise, and compassion. It is built upon four pillars, the first of which is sometimes separated into two, and has been the guiding philosophy of Bhutan for the last few decades. The pillars are (i) social and economic development, (ii) preservation and promotion of culture, (iii) conservation of the environment, and (iv) good governance.

Currently two-thirds of the population is dependent upon subsistence farming. However, a policy of social services invests 30% of government revenue to provide free education, free health care, and agricultural subsidies. As a result, life expectancy has increased from 46 years (in 1985) to almost 70 years and primary school enrollment has increased from 12% (in 1985) to 81%

In terms of economic development, Bhutan has a GDP of Nu.32 billion, with a growth rate on average of 7% per year. The GDP per capita is Nu.45,000 and the main industries are agriculture, hydro-power, construction, and tourism.

In addition to economic development, however, GNH is concerned with the preservation and promotion of culture. Bhutan is the only Mahayana Buddhist nation in the world and the values and beliefs of its citizens are shaped by Buddhism. It has a culture of traditional dress, art and craft, architecture, institutions, ceremony, and languages. Like people in many other Asian countries, the Bhutanese place strong value on the family structure and relationships. Culture is regarded as being important for national identity. It also cushions against the negative effects of globalization.

Conservation of the environment is also fundamental to GNH. Bhutan has a fragile Himalayan ecology and is considered to be one of ten global biodiversity hotspots. Of its land, 72% is under forest cover and 30% comprises protected parks providing a safe habitat for flora and fauna.

The final pillar of GNH is good governance, which is needed to sustain development. In recent years the legislative, executive, and judiciary institutions were strengthened and a policy of progressive and continual decentralization has been operating since 1981. In 1998 executive powers were devolved from the king to an elected council of ministers, in 2002 a constitution was drafted, and in 2008 Bhutan will become a constitutional democracy.

How does this GNH approach make people happier? It cannot be proven. How do you measure happiness? It is a philosophy and different people will have different views.

Gross national happiness is delivered through providing a sense of security and a sense of identity at both a national and an individual level. National security results from the absence of a fear of invasion due to its mountainous terrain and lack of natural resources; individual security results from the legal framework, which allows individuals freedom of expression and the right to own property. National identity results from the maintenance of Bhutan’s traditions, beliefs, and values; individual identity and sense of purpose come from a person’s work, vocation, or profession.

Directions for TEVT in Bhutan

TEVT can contribute to GNH by developing a workforce that has a sense of security that comes from being sufficiently trained and skilled; has a sense of identity due to assurance that occupations are sufficiently attractive for the workers to identify with, and has a sense of purpose based on understanding of how the occupation contributes to the well being of self, society, and nation.
In addition, TEVT should contribute to the wholesome development of the worker. Whilst recognizing the importance of economic growth and especially the contribution of the individual, it should reinforce the importance of being mindful of and accepting of development needs of society. Furthermore, it should strengthen the worker’s respect for culture, the environment, and democracy. TEVT should be a platform for:

- Social development
- Economic growth
- Cultural promotion
- Environmental awareness
- Good governance

In the question and discussion session, it was mentioned that the Ministry of Labor is currently responsible for TEVT, the duty having been transferred from the Ministry of Education. It was also reiterated that if training is delivered well, trainees will be confident in their ability to find and retain work; in work, they will be able to work more effectively and thus achieve a high level of satisfaction.

World Trends and Implications for Sustainable Human Resource Development

Dr. Man-Gon Park, Director General and CEO, Colombo Plan Staff College for Technician Education (CPSC), Republic of Korea

Introduction

The adoption of the United Nations Millennium Development Goals (MDG) worldwide has made a significant impact on world trends with inequality, imbalance, and disparity vis-à-vis demography, economic size, ICT divide, unemployment, brain drain syndrome, and other pressing problems in labor market systems.

Researchers the world over are busy creating technologies that will change the way we conduct business and live our lives. These are completely new technologies that could soon transform computing, medicine, manufacturing, transportation, and our energy infrastructure. Technology Review, the oldest technology magazine in the world, owned by the Massachusetts Institute of Technology (MIT), has identified ten emerging technologies that, when adopted, will revolutionize the world into a flawless one.

In addition to the changing labor market and challenges of globalization, these technological trends impact evolution in the workforce, and consequently the workplace as well. As workers are now heading from standard to non-standard employment, agricultural to service sectors, and toward hypertext jobs, there is a need to readjust the existing resources and reformulate strategies so that the workers can seize the opportunities offered by the emerging trends. Without such adjustments, organizations will either collapse or will keep working inefficiently, gradually becoming obsolete.

However, this is not simple. Global disparity in education as well as in economy, country-to-country imbalances in demography and technology, and inequality in gender, race, and family economic status remain conspicuous. There is divergence in the capacity of human resources in the various regions of the world to produce goods and services. Some workers in the first and second world countries are adept with sophisticated technological
gadgets, while their counterparts in the developing countries can hardly cope. Industrialized countries are in trouble with an alarming ratio of aging population, while developing countries are experiencing youth bulge syndrome. If nothing is done, this condition will aggravate the widening human resource gap, thus perpetuating instead of arresting the vicious cycle of poverty for the third world economies.

The widening inequality of opportunities, wealth, and empowerment continue hounding the world yielding a negative impact in the pursuit of sustainable HRD. In spite of the significant achievements made during the past years, these disparities, imbalances and inequalities are still obstructive of development and need serious consideration.

**Demographic Trends**

The World Bank (2003) reported that over 1 billion children under the age of 15 years require improved primary and secondary services; 400 million children between the ages of 17 and 24 require tertiary, vocational education and skills development. In rural areas, the ratio of non-attendance in school, adult illiteracy, and gender inequality in education are high.

The increasing ratio of retirees in the developed countries will strain social services, pensions, and health systems. Governments will seek to address the problem through such means as delaying retirement age, supporting small and medium enterprises for retirees, encouraging greater participation in the work force by women, and relying on migrant workers.

International migration is caused by several push and pull factors: widespread unemployment, lack of farmland, famine, or war at home; or booming economy, favorable immigration laws, or free agricultural land in the area to which the migrant is moving. One of the offshoots of international migration is the brain drain-brain gain syndrome in the migrant’s sending and recipient countries.

**Human Development Index**

The Human Development Index (HDI) is a summary composite index that measures a country’s average achievements in three basic aspects of human development: longevity, knowledge, and a decent standard of living. Longevity is measured by life expectancy at birth; knowledge is measured by a combination of the adult literacy rate and the combined primary, secondary, and tertiary gross enrollment ratio; and standard of living is measured by GDP per capita (PPP US$).

<table>
<thead>
<tr>
<th>Country</th>
<th>2001</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Japan</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Singapore</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Rep. of Korea</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Brunei</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Russian Fed.</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Malaysia</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Western Samoa</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Thailand</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Fiji</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Philippines</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Maldives</td>
<td>13</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>2001</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Iran</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Indonesia</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Vietnam</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Mongolia</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>India</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Cambodia</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Myanmar (Burma)</td>
<td>22</td>
<td>23</td>
</tr>
<tr>
<td>Palau New Guinea</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Bhutan</td>
<td>27</td>
<td>25</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>Nepal</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>Pakistan</td>
<td>25</td>
<td>28</td>
</tr>
</tbody>
</table>
Population Growth

The growth of the world population is gradually increasing and it is forecast that there will be 8 billion people by 2020, with 56% of people in the Asia-Pacific region. The world population is also aging; in 2000 only 7% of people were over 60 but it is predicted that in 2050 over 15% or 1.5 billion people will be over 60 years of age.

These and other recognized measurements of growth clearly show that poverty is not being reduced; unemployment rates are high all over the world. TEVT planners need to carefully consider future needs. The technology divide is also growing rapidly. This marginalizes developing countries and makes it hard for them to attain sustainable development.

![Telescoping the Population of the World by 2020](image)

Source: Central Intelligence Agency, Long Term Global Demographic Trends, 2001

Workforce Mobility

Mobilization of workforce across national borders is fast becoming not only a natural phenomenon, but can be seen as something good for the world. The movement of people and knowledge/technology is seen as the real driver and cause of globalization, generating institutional and social changes that are taking place within and beyond national borders. However, the TEVT workforce is faced with a lot of problems due to disparity of skills and competencies versus the optimum qualifications required. Therefore it is a growing demand to make standardization and harmonization of TEVT systems through accreditation and certification.

Technological Environmental Changes

Considered to be the driving force in the transformation of civilization, technology has revolutionized every facet of human life. Technologies that would sustain development follow.

- Ubiquitous Technology. Mark Weiser defined ubiquitous technology as a technology that is invisible, real, pervasive and transparent. It is invisible because it uses reduced-size chips and other computing devices and provides access to computing capability over a broadband network through lightweight...
devices. It is a technology that “disappears,” inserting various kinds of sensors (system-on-chip) into the environment (city, home, office, warehouse etc) and objects (matter, product, animals and plants etc). The technology is ubiquitous, networked, wireless, and mobile and of ultra-high speed (Park 2006).

- New Technologies. Creating and pursuing new trends with technology evolution such as (1) 6T (IT, BT, NT, ET, CT & ST); (2) Digital Cocooning; (3) Insperience (Indoor + Experience); (4) Web Identity (Avata, MiniHome, and so on); (5) Consumption Curator; (6) Ubitizen (Ubiquitous + Citizen); (7) DMB (Digital Multimedia Broadcasting); (8) TPS (Triple Play Service: Internet+Tel+Broadcat); (9) Grid Computing; and (10) Ubiquitous Technology (Park 2005).

### Ten Emerging Technologies that Will Change the World

<table>
<thead>
<tr>
<th>No</th>
<th>Emerging Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wireless Sensor Networks, small monitoring devices (motes) to monitor the environment, the machines and even people, and send reports wirelessly</td>
</tr>
<tr>
<td>2</td>
<td>Injectable Tissue Engineering, a technology of injecting joints with specially designed mixtures of polymers, cells, and growth stimulators that solidify and form healthy tissue</td>
</tr>
<tr>
<td>3</td>
<td>Nano Solar Cells, use of nanotechnology to produce a photovoltaic material that can be spread like plastic wrap or paint</td>
</tr>
<tr>
<td>4</td>
<td>Mechatronics, the intersection of mechanics, electronics and computing, is being explored to make possible the generation of simpler, more economical, reliable and versatile systems</td>
</tr>
<tr>
<td>5</td>
<td>Grid Computing, a technology that links almost anything: databases, simulation and visualization tools, even the number-crunching power of computers</td>
</tr>
<tr>
<td>6</td>
<td>Molecular Imaging, a technique that lets researchers watch genes, proteins, and other molecules at work in the body, is now becoming more and more popular</td>
</tr>
<tr>
<td>7</td>
<td>Nanoimprint Lithography, a method of fabricating nanometer scale patterns by mechanical deformation of imprint resist and subsequent processes</td>
</tr>
<tr>
<td>8</td>
<td>Software Assurance, tools to produce error-free software</td>
</tr>
<tr>
<td>9</td>
<td>Glycomics, a field aimed at understanding the roles of carbohydrates in cell communication; could lead to therapeutic approaches for treatment of human disease</td>
</tr>
<tr>
<td>10</td>
<td>Quantum Cryptography, a tool in fortifying the security of electronic communications</td>
</tr>
</tbody>
</table>

Source: Technology Trends 2003
Labor Market Demands with Workforce Mobility

Many countries have undergone major programs of structural adjustment in order to provide the skills demanded by enterprises and the economy. Reforms were instituted to respond to the changing economic environment because of isolation from market forces, rigid centralization, and limited institutional autonomy. In Chile, South Africa, and Australia, reforms were built on principles of reduced public involvement in training provision, partnership in governance, and increased reliance on market mechanisms.

In order to improve employability, three schemes are suggested for implementation. The first is to establish linkages between schools and industries. This can be done by industrial-educational cooperation, market-oriented educational programs, and competition among colleges with an open educational market. The second is to secure government support to guarantee the autonomy of the educational affairs for colleges, provide alleviation of re-training costs for industries, and offer employment security service. The third scheme is to develop active individual attitudes in order to attain self-realization through lifelong vocation, and sustain personal competitiveness.

Shaping the Future of TEVT

Hyperjobs to Adjust to Labor Market. Work, the workforce, and the workplace need to evolve in accordance with the changing demographics. In this hyper-human economy, people need to adjust themselves to non-automatable skills if they wish to remain marketable and productive.

u-Learning as e-Learning Plus m-Learning. ICT has improved rapidly and computers have become more extensively used. Educational technologists introduced e-learning in the mid-1990s. This was a major breakthrough leading to better management of education.

Industry-Institution Linkages. To produce competent human resources for TEVT, and consequently attain sustainability, closer and more coordinated partnership with industries should be established.

Conclusion

In workforce mobility, the sorry state of un-accredited TEVT institutions, un-equivalent qualification systems, un-unified accreditation and certification systems, and un-recognized qualifications cause problems that threaten the improvement of TEVT systems: hazards in workforce mobilization across borders, discrepancy in labor markets, no standard skills, and no harmony in qualification systems.

Many countries have undergone major programs of structural adjustment in order to produce the skills demanded by enterprises and the economy. Reforms have included in the adoption of standard skills; regional vocational qualification frameworks; internationalization of education; universalization of curricular programs, accreditation, and certification; improvement of labor market information systems; enhancing international networks for stronger collaboration and cooperation; providing employment support systems in the form of WorkNet and CareerNet network systems; and employability improvement. Indeed, TEVT has a gigantic role to play in facing the challenges posed by the mentioned global trends toward sustainable human resource development with changes in the technological environment.
In the question and discussion session, the presenter explained that the impact of technology on human resource development is two way, and that the technology revolution will provide over 70% of our jobs in 20 years. Our ways of working will change and some jobs will become obsolete.

Developing Entrepreneurship in TEVT
Dr. Tariq Mahmood, Faculty Consultant, Colombo Plan Staff College for Technician Education (CPSC), Pakistan

Introduction

Entrepreneurship is important, as is illustrated by the fact that it was introduced in early 1700, almost three centuries ago. With a growing population, job scarcity, competitive markets, globalization, and the direct relationship of entrepreneurship with economic growth, the value of self employment and generating entrepreneurial activities is growing even more important. The countries that have taken steps by launching several programs to encourage entrepreneurial spirit in rural women and youth have progressed well in entrepreneurship development. The results have been positive for the economic growth in these countries. In order to understand how entrepreneurship can be developed in TEVT it is necessary to understand the demographic trends and the potential of entrepreneurial activities in rural areas focusing on women and youth. We will look at the different level of entrepreneurship in different countries and examine the differences among three countries: Pakistan, which has low entrepreneurial activity; India, with a medium level of entrepreneurial activity; and Thailand, one of the top ten entrepreneurial countries in the world.

World Demographics & Statistics

Examination of World Bank indicators has provided statistical information that demonstrates the following trends.

- There is a decreasing population in developed countries but an increasing population in the less developed parts of the world.
- Less developed countries have a much younger population than do western countries. Roughly one-third of the population in less developed countries is under age 15. In many sub-Saharan African countries, this proportion rises to nearly one-half of the population. In contrast, less than one-fifth of the population in more developed countries is under 15.
- Overall, the population of males and females are equal, but there is a significantly higher percentage of women in the higher age groups due to the greater longevity of women.
- Although the female population equals that of the males, a much smaller proportion of the female population is active economically. This is most extreme in Pakistan, where the number of economically active women is just over a third that of economically active men.
Developed countries are urbanizing rapidly but 40–60% of the population in less developed countries lives in rural areas. In Cambodia 50% of the population lives in rural areas.

The unemployment rate for young people is higher in developing countries than it is in developed countries. It has also grown in the developing countries since 1993, whereas in the developed countries it has decreased.

ICT use is growing rapidly in the developing world; it is fast catching up with the developed countries. Increase in technology means that people can work comfortably and collaboratively at home, which can particularly help women. Economic development in Korea over the past 30 years is a good example of how technology has grown.

Entrepreneurs

There are several definitions of entrepreneurship. The main characteristics include self employment, bearing uncertainty/risk, carrying out new combinations, responding to change, exploiting opportunities, performing fundamental managerial functions, being an innovator who implements change, creating a new process or product, bringing a vision to life, and accepting challenges.

In order to understand the attributes of the entrepreneurs, they have been grouped as opportunity-based entrepreneurs and necessity-based entrepreneurs. The opportunity-based entrepreneurs are those who avail the opportunity through ideas coming to them by proper planning and necessary action. The necessity-based entrepreneurs are those who start their business on the basis of the need to become self earning. The majority of the necessity-based entrepreneurs are women from rural areas. An entrepreneur must possess a range of skills and abilities. These skills include marketing, accounting and finance, literacy, investing, understanding market economics, legal knowledge, and communication.

The opportunity identification process is composed of two stages: (i) having or getting a promising idea that occurs through personal experience, social needs, social assets, or change and (ii) converting the idea through careful planning by scanning the operating environments and developing an appropriate business model.

Creativity is a major tool for the survival of an entrepreneur. It not only gives one an edge for recognizing needs and generating business and marketing ideas, but it helps in solving problems. Creativity often starts with the need to solve a problem through a series of stages,
(GEM) conceptual model provides a sound framework to understand the impact of entrepreneurship activities upon national economic growth. The social, cultural, and political conditions of any country provide the context, which then is helped by the national and entrepreneurial activity. The GEM model takes a comprehensive approach and considers the economic contribution of all businesses within the country, including the newer and smaller firms as well as established firms, and also takes into account the opportunities arising from the entrepreneurial work of the country. This conceptual model helps assess the level of the country’s entrepreneurship.

As previously mentioned, there are two kinds of entrepreneurship: opportunity-based and necessity-based. Opportunity-based entrepreneurship is more common than necessity-based and has a higher ratio of males than females. There is little difference between the genders for necessity-based entrepreneurship.

Two-thirds of the world’s illiterate people are women. Illiteracy influences both their chances in the regular labor market and their potential for starting a business. Unsurprisingly, a much higher proportion of women in developing countries who have received secondary education opt for business than those who have not received that level of education. This illustrates the importance of education. The majority of the entrepreneurs fall into the 25 to 45 age group.

Also another interesting factor in the success of entrepreneurs is that the majority of women entrepreneurs are those who have been employed. These women may get an idea or are inspired to start their own businesses during their experience at work; they have a better chance of finding the opportunities and sources through interaction with other people and agencies.

Pakistan

The number of rural women working in Pakistan is three times higher than the number of working urban women; the unemployment rate for females in urban areas is correspondingly almost three times higher than that in rural areas.

Among males in urban and rural areas there is not a similar difference with expansion of workforce mobility within the rural and urban communities.

The majority of urban women need to be encouraged to take paid employment or develop entrepreneurial activities. This helps explain why Pakistan stands at the bottom in entrepreneurial activities as compared to other countries.
If we look at the structure and TEVT capacity we find that there are only around ten small and medium enterprise (SME) promoting agencies in Pakistan. Among these, only one agency is for women. The capacity of the TEVT system is also exceptionally low for training youths below 15 years.

**India**

The government policies and programs for SMES are designed and coordinated by the Ministry of Small Scale Industries (SSI). The ministry operates through three organizations attached to it. One of these organizations helps the ministry to implement policies and programs for promoting small scale industries. There is also a public sector organization that provides a variety of services to small scale units, such as purchase of machines, marketing both within and outside the country, supplies to the government and public sector organizations, procurement of raw materials and supplies, and training in industrial trades.

With this well structured system India’s entrepreneurial activity has been growing steadily over the past five years. In parts of India there are have been impediments to entrepreneurship. These include lack of education and training, cultural and social norms, barriers to entry, and lack of financial support, but overall the positive has outweighed the negative.

**Thailand**

Over the last twenty years the economy of Thailand has been growing steadily. In correlation with this overall growth, the number of start-up businesses more than trebled within ten years, reaching 37,988 in 1995. In 2001 the figure was 31,757 (the drop being due to the 1997 financial crisis), but it is anticipated that this number has been exceeded considerably in 2005-06.

The main reason for Thailand’s success is that there so many Thai ethnic Chinese whose cultural and religious values support entrepreneurship development. This has influenced the attitude throughout Thailand and women are now accepted in the workforce, with 62% of the female population working. Finally, the government provides support through financial institutions, policies, and regulations.

**Conclusion**

Examining the situations in these three countries allows us to conclude that for entrepreneurship to be stimulated in a country, it is essential that it is introduced as a subject in TEVT, which provides programs for developing special skills and competencies. Providing finance in terms of grants or loans is essential. Finally, a culture that allows and encourages the formation of cottage industries and small and medium sized business is also vital. The diagram below shows a four-stage model of developing entrepreneurship in TEVT.
The conclusion is that the sustainable entrepreneurial package is dependent upon three major stakeholders: the TEVT institutions, the financial institutions, and NGOs or other agencies. The triangular coordination and cooperation is essential, as is a supporting local culture.

While we may not be able to start people out on the same footing, we can through competitive market economies, entrepreneurship, public education, charity, and a little bit of compassion provide any person who wants to take hold of it the opportunity to break the cycle of poverty and make something of themselves. It is up to that person to take the initiative. It is up to us to spread the word that this possibility is there.

In the question and discussion session, participants discussed the specific actions needed to encourage women entrepreneurs. Definite programs must be provided to facilitate them to start entrepreneurial businesses. They should be approached with a complete package and financial support. Regarding the provision of credit to women who do lack collateral due to financial dependence on their husbands, there needs to be some system of micro-credit. The need for this in developing countries is greater than that in developed countries. One example is Bangladesh, illustrated by the work of Nobel Peace Prize winner Muhammad Yunus.

Theories and Practices of Teacher and Curriculum Development

Learning Theories in TEVT
Dr. Ligaya Valmonte, Professor, Don Marino Marcos Memorial State University, Philippines

Introduction

When we talk of learning, we think of a teacher holding a rod, asking her pupils to memorize parts of a machine, recite the multiplication tables, or conjugate verbs. Learning, however, is not as passive as it may seem. It is a dynamic action causing a relatively permanent change in behavior that occurs as a result of prior experience.

Learning is both a formal and non-formal process and a product. It is a process when the person interacts with the effective environment to produce a stable change in behavior. As a product, it produces a change in behavior, which can be recognized and seen. It is the acquisition of competencies in terms of knowledge, skills, and values to improve the self and the world. Learning involves four important pre-requisites: the learner, the environment, interaction, and behavioral change.
Learning Domains

Learning domains are categories of learning outcomes. They are a tool for understanding how people think, feel and act. The following presents the three domains of learning: cognitive (knowledge), psychomotor (skills), and affective (attitudes).

The cognitive domain exhibits a person’s intellectual abilities such as comprehending information, organizing ideas, and evaluating information and actions. The cognitive domain is the core learning domain.

The affective domain may be the least understood learning domain. It addresses a learner’s emotions towards learning experiences. A learner’s attitudes, interest, attention, awareness, and values are demonstrated by affective behaviors. The affective domain is critical for learning. Its six hierarchical stages are as follows: receiving (willing to listen); responding (willing to participate); valuing (willing to be involved); organizing (willing to be an advocate); and characterization (willing to change one’s behavior, lifestyle, or way of life).

The psychomotor domain refers to the use of basic motor skills, coordination, and physical movement. These physical behaviors are learned through repetitive practice. A learner’s ability to perform these skills is based on precision, speed, distance, and technique.

Theories of Learning

Theories of learning explain how the learner acquires new and more knowledge, skills, and attitudes to make better and more adequate reactions, responses, and adjustments to new situations and conditions. Many famous studies and papers have been written on learning theories such as those by Kohler, Gestalt, Piaget, and including Right Brain vs. Left Brain, Humanistic, and Social Learning theories. These theories are briefly defined below.

Behaviorism concentrates on the study of overt behaviors that can be observed and measured.
Connectionism, the stimulus-response theory, is based on the association between the stimulus and the response. Developed by Thorndike, this theory explains that for every stimulus, there is a corresponding response and connection.

Classical Conditioning is the type of learning made famous by Pavlov’s experiments with dogs. The dogs learned to associate the sound of a bell with the presentation of food. As far as their immediate physiological responses were concerned, the sound of the bell became equivalent to the presentation of the food.

Behavioral or Operant Conditioning occurs when a response to a stimulus is reinforced. Basically, operant conditioning is a simple feedback system: If a reward or reinforcement follows the response to a stimulus, then the response becomes more probable in the future. Behaviorism is relatively simple to understand because it relies only on observable behavior. Its positive and negative reinforcement techniques can be very effective—both in animals and in treatments for human disorders such as autism and antisocial behavior. Behaviorism is often used by teachers, who reward or punish learner behaviors.

Cognitivism is based on the thought process behind the behavior. Here, changes in behavior are observed, but only as an indicator to what is going on in the learner’s head.

Kohler’s Theory believes that information processing, mental representations, predictions, and expectations are central to the cognitive interpretation of learning.

Gestalt Theory emphasizes higher-order cognitive processes in the midst of behaviorism. It focuses on grouping, primarily determined by (1) proximity, (2) similarity, (3) closure, and (4) simplicity.

Piaget’s Theory of Cognitive Development is based on the idea that the developing child builds cognitive structures—in other words, mental “maps,” schemes, or networked concepts for understanding and responding to physical experiences within the child’s environment.

The cognitive theory asserts that learning results from inferences, expectations, and making connections. Instead of acquiring habits, learners acquire plans and strategies, and prior knowledge is important. Some key principles of learning associated with cognitive psychology are: good organization, clear structure, perception, prior knowledge, individual differences, and reinforcement.

Constructivism is a learning theory which holds that knowledge is not transmitted unchanged from teacher to learner, but instead that learning is an active process of recreating knowledge. It is based on the premise that we all construct our own perspective of the world, based on individual experiences and schema. Each of us generates our own “rules” and “mental models,” which we use to make sense of our experiences. Learning, therefore, is simply the process of adjusting our mental models to accommodate new experiences. There are several guiding principles of constructivism: (1) Learning is a search for meaning; (2) Meaning requires understanding wholes as well as parts; (3) In order to teach well, we must understand the mental models that learners use to perceive the world and the assumptions they make to support those models; and (4) The purpose of learning is for an individual to construct his or her own meaning, not just memorize the “right” answers and regurgitate someone else’s meaning.
Right Brain vs. Left Brain suggests that the two different sides of the brain control two different “modes” of thinking. It also suggests that each of us prefers one mode over the other. Experimentation has shown that the two different sides, or hemispheres, of the brain are responsible for different manners of thinking.

Humanistic Theory, popularized by Abraham Maslow and Carl Rogers, is primarily concerned with the human potential for growth. Perhaps the best known example is Abraham Maslow’s hierarchy of needs. At the lowest level are physiological needs, while at the highest level is self-actualization. Only when the lower needs are met is it possible to fully move on to the next level. A motive at the lower level is always stronger than those at higher levels.

Social Learning Theory conceives that people learn from observing other people. These observations, made in a social setting, allow people to see the consequences of others’ behaviors. They can gain some idea of what might flow from acting in this way or that. Most human behavior is learned observationally through modeling: from observing others one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action.

Models of Learning Styles

Learning styles are approaches or techniques for approaching learning tasks, or preferred ways in which a learner processes information. Learning styles characterize a person’s typical manner of thinking, remembering, or problem-solving; they simply denote a tendency to behave in a certain manner.

The Myers-Briggs Type Indicator (MBTI) classifies learners according to their preferences on scales derived from psychologist Carl Jung’s theory of psychological types. It analyzes personality types based on four pairs of traits: (1) Introversion versus Extroversion—Introverts draw mental energy from themselves while extroverts draw energy from others; (2) Sensing versus Intuition—Sensing types rely on information perceived through the five senses while intuiting types rely more on patterns, relationships, hunches; (3) Thinking versus Feeling—Thinking types make decisions based on objective criteria while feeling types depend on personal values to decide right and wrong; (4) Judging versus Perceiving—Judging types move quickly to closure by making use of available information while perceiving types keep their options open by taking time to gather sufficient information.

Kolb’s Learning Style Model

Kolb’s Learning Style Model
learns differently. His notion that experience is the source of learning and development had a considerable impact on the development of learning models.

Kolb’s model is based on two axes (continuums). The first focuses on our approach to a task (whether we prefer to do or watch) and the second focuses on what our emotional response to the task is (whether we prefer to think or feel). The theory sets out four preferences, which are also possible different learning methods: (1) doing (active experimentation), (2) watching (reflective observation), (3) feeling (concrete experience), and (4) thinking (abstract conceptualization). Consequently, it is important to reflect the need for these different styles by offering learning in a variety of different ways to ensure all preferences are covered.

Multiple Intelligences is a theory that suggests that there are eight different types of intelligence, each giving rise to different learning styles. Gardner (1983) claimed that everyone is intelligent but in different ways because of this concept of multiple intelligences. Learners can be encouraged to select learning methods that match their intelligence profile.

Principles of Learning

The principles of learning significantly influence knowledge acquisition, skill enhancement, and competence development when applied to both classroom settings and communities. Knowing how learners learn has helped us design the model we propose to facilitate transfer. Our eight learning components are adapted from Peter Ewell: Active Involvement, Patterns and Connections, Informal Learning, Direct Experience, Compelling Situation, Frequent Feedback, Enjoyable Setting, and Reflection.

Conclusion

Learning is the acquisition of knowledge, skills, and values to improve the self and the world. Learning happens to a learner interacting with the social and physical stimuli in an environment (person, event, or object), causing a change in behavior.

The outcomes of learning are categorized into cognitive (intellectual abilities), psychomotor (motor skills, coordination, and physical movement) and affective (emotions, attitudes, interest, and values) domains.

Overview of Training Methods

Mr. L. W. Sunil Kularatne, Capacity Building and Training Consultant, Sri Lanka

“Find people you can trust, then train them and then trust them”

What is Training?

The two terms “training” and “learning” are frequently used in education systems. In psychology, learning is defined as “changing one’s behavior through experience.”

Training involves learning, but not all learning is training; learning is a life-long process. Training emphasizes the development of skills; learning is for a definite purpose (a certain level of knowledge may be a prerequisite to learning more). Training is a purposely structured process that leads to individual achievement of a performance that is mutually desired by the individual, dependent upon the acquisition of knowledge, skills, and attitudes, and not
dependent on environmental or motivational-incentive factors. Some knowledge in the area in which one is to be trained may be needed before training can begin.

From an institutional or company point of view training can be defined as a formal procedure to facilitate learning. As a result of it, a change is expected in behavior or performance to achieve targets, goals, or objectives set in the institution/company. In other words, training is an investment by the company for obtaining more efficient service from the workers. This, improved performance is a “must” as a result of training.

*Training is the formal procedures which a company utilizes to facilitate learning so that the resultant behavior contributes to the attainment of the company’s goals and objectives.*

(William Mcgee)

*Training is defined as learning that is provided in order to improve performance on the present job*

(Nadler, 1984)

**Training in Organizations**

Training has come to be of vital importance to business and is used in organizations to increase skills, knowledge, and/or attitudes (SKA) to improve human performance and to improve organizational results. It can be expensive. Therefore most organizationally sponsored training programs or courses have the following characteristics in common. They are short in length, are implemented by an organization for organizational goals, and often involve trainees who are motivated to be effective members of the organization.

Training should not be used as a reward, a disciplinary measure, a vacation substitute, or the solution to all problems.

Training should be considered once the desired organizational results are clear, if performance problems have been identified. However organizations should not consider training when the organization is not clear about desired results, performance problems have not been identified, or the expectations of changes in performance are not shared by the individual. There are many different levels of training, including:

- Vocational Training (Trade level)
- Technical Education (Technical level)
- Training Terms
- Pre-Service Training
- In-Service Training
- Formal Training
- Informal Training
- Apprenticeship Training
- On the Job Training (OJT)

A human resource department (HRD) is concerned with all aspects of the employees, such as pay, benefits, equal opportunity, and training. HRD training has been defined as an organized learning experience, conducted in a definite time period, to increase the possibility of improving job performance and growth (Nadler, 1984).
Training, Development, and Education

Training is the acquisition of skills or technology that permits employees to perform their present job to meet specified standards. Education has a different purpose: that of training people to do a different job. It is often given to people who have been identified as being on promotion table, being considered for a new job either lateral or upwards, or to increase their potential. Development, with still a different focus, is training people to acquire new horizons, technologies, or viewpoints. It enables leaders to guide their organizations on to new horizons by being proactive rather than reactive.

Instructional Systems Development

Instructional systems development (ISD) was used in the 1960s in the United States Armed Services. Its purpose was to make a system for the instructional design process. Eventually, it emerged as a widely accepted approach to design training programs. It covers the stages of analysis, design, development, implementation, and evaluation.

In greater detail, to use this approach you must first analyze the system in order to completely understand it, and then describe the goals you wish to achieve in order to correct any shortcomings or faults within the system. Then, design a method or model to achieve your goals. Develop the model into a product (in training, this product is called courseware). Implement the courseware and evaluate it. Audit-trail throughout the five phases and in the field to ensure it is heading in the right direction and achieving the desired results.

Once these five stages are established, it becomes a continuous process. This approach has an impact on all layers of management, administration, delivery, and support of a course or program. It enhances quality and improvement.

Overview of Training Methodology

A training/teaching method can be defined as a combination of teacher and student activities supported by the best available resources to produce an atmosphere where learning can take place. This places an emphasis on teacher and student activities.

<table>
<thead>
<tr>
<th>Teacher Activities</th>
<th>Student Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explaining, writing on chalkboard, questioning, demonstrating, dictating, using an OHP, etc.</td>
<td>Answering questions, using examples, completing, experimenting, etc.</td>
</tr>
</tbody>
</table>

and teachers must identify what method is most applicable for the purpose at hand.

In technical education the most common methods could be:

- Lecture
- Demonstration
- Group discussion
- Tutorial
- Laboratory teaching
- Workshop teaching
Evaluation

Evaluation plays an important part in the total teaching and learning process. It is essential to keep standards in evaluation. Trainers and institutions use a variety of evaluation instruments to evaluate student progress. The planning and organization of evaluation should be given as much care and expertise as is given to any other element of the system. It should be based on students’ observed behavior and must be a continuous process.

The two approaches used are summative and formative. A summative test is the traditional end-of-session examination method. The test is carried out at a specially created center. Formative tests are used with “in-course” assessment methods based on students’ behavior during and as part of the training program.

It is accepted that evaluation should be done on the sample of behavior given in the standards. Evaluation should be a continuous process. The types of test instruments could be summarized as essay type, short answer, calculation, drawing and development, graphical, open book, and oral type. The evaluation should be valid, reliable, and practical to ensure the quality of the ultimate product.

In the question and discussion session, participants touched on incentives for teachers. It was noted that an important motivation is self-satisfaction in seeing their students’ results, such as skills up-grading and opportunities for career development.

How to Become an Effective and Efficient Technical Teacher: New Roles and Responsibilities

Dr. Pramod Shrestha, Professor, Dept. of Mechanical Engineering, Institute of Engineering, Tribhuvan University, Kathmandu, Nepal

Introduction

Before teaching a course, teaching preparation is extremely important and should include determining goals and objectives, producing a course outline and lesson plan, developing a grading system, establishing the teaching resources and materials, and finally deciding upon a teaching method and style.

“Teaching is a complex human activity, so is it possible to develop a formula which guarantees that it will be excellent?”

Being a teacher means building relationships. Today there is a generation gap between young people and the older generation. Young people have their own ideas, which are not always shared by adult society.

Technology connects young people to each other in a way they have never been connected before. Young people are not dependent upon their parents or traditional means for knowledge. They also define their own culture and have their own jargon and symbols. As a result teachers need to use different means to build relationships.

Teacher Characteristics

The most important characteristics for teachers to possess in order to become effective and efficient are: ability to communicate, thorough education in their subject area, understanding of how students learn, and being well-trained and knowledgeable about how to teach effectively.
These characteristics can be classified as the “hard” competencies exhibited by a good teacher. Other characteristics of a good teacher might include being stimulating, clear, well-organized, warm, approachable, prepared, helpful, enthusiastic, and fair. These can be considered to be the “soft” competencies. Teachers need to exhibit both of these competencies.

Because of rapid changes in technology and the culture of young people, technical teachers who need to build on change and create learning organizations using teamwork, cooperation, creativity, empowerment (developing a sense of ownership), and quality.

Managing Change

We also must be prepared for changes in our roles and responsibilities; it is good practice to try to implement one new rule every month. Teachers might try to establish learning organization at a very low level within their own sphere to build on students needs. This can be difficult to do without money, so the Internet and training materials from the workshop can provide a good resource starting point.

Dealing with change can be difficult but paying attention to the four C’s can help us move through the change process more constructively:

- **Challenge**: See change as a challenge.
- **Control**: Focus on the things you can still control, not what you cannot.
- **Connections**: Rely more on your connections and network for support.
- **Commitment**: Individuals commit to change when they see the bigger picture.

Adapting to change is usually a four-stage process:

**Phase 1**: Denial—The first response to a big change is often numbness. People continue to work as usual.

**Phase 2**: Resistance—Once people have moved through the numbness of denial, they begin to experience self-doubt, anger, anxiety, fear, frustration, or uncertainty because of the change.

**Phase 3**: Exploration—People focus their attention on the future and tend to draw on their creative energy to figure out ways to capitalize on the future. There is also uncertainty and chaos in this phase.

**Phase 4**: Commitment—People are ready to focus on a plan. They are prepared to learn new ways to work together.

However, change is not just perception. Change is real, so managers of change should be visionaries and creators of change. The real problem is not technical change but the human changes that often accompany technical innovations. In order to deal effectively with change, education, communication, participation, support, negotiation, and agreement are all necessary.

In the question and discussion session, Dr. Agni Prasad Kafle shared an outcome from research carried out in Nepal regarding teacher competencies, such as the hard and
Mentoring Techniques in Technical Teacher Training
Dr. Agni P. Kafle, Member Secretary, Council for Technical Education and Vocational Training, Nepal

Mentors come in all shapes and sizes. Often they are not recognized by those they help.
My mentors shaped my life through an act of kindness, support and direction.
Without mentors, I would have never begun teaching and
I never would have continued teaching.

(Riesenbreg, 1997)

What is Mentoring?

Mentoring is an old idea that has been implemented throughout history, but it is also a new approach that can be applied in various fields. A mentor is a loyal friend, a confident advisor, a trusted guru, guide, coach, role model, patron, or encourager. Mentoring is a two-way process between the mentor and the protégé.

What is a Protégé?

A protégé is a person who is both a recipient of assistance and a participant; he or she is expected to be competent, able to do things on his or her own, able to influence conditions, able to complete independent actions, and able to set standards and obtain feedback to make decisions. The teacher and learner must like each other in order for learning to take place.

What is a Mentoring Technique?

A mentoring technique, in the context of teacher development program, is a methodology in which an experienced, competent, and excellent senior teacher supports, coaches, nurtures, and guides inexperienced and less competent teachers for their professional growth and excellence. However, we can also use the skills and knowledge of young people especially in the context of new and emerging technologies.

A mentoring technique is a method applied mutually by the mentor and the protégé for effective classroom management using questioning techniques, encouraging learners to ask questions, cooperative learning, meta-cognitive practices (information processing, thinking about thinking), and high frequency and quality of teacher-student and student-student interactions.

Through the use of a mentoring technique learners can construct meaning and gain knowledge, use disciplined inquiry to construct meaning, and aim their work towards production and performances that value meaning beyond success in school.

Problems in Mentoring Techniques (Pat, 2001)

- No enthusiasm for the subject
- Reluctance to accept advice or criticism
- Poor preparation of lessons
- No real concern for learners
- Inability to control class
- Failure to interest learners
- Poor classroom management
- Poor attendance
- Lack of confidence
- Sexist or racist in attitude
- Inability to cope with unexpected problems
- Over-confidence
- Over-rigid use of lesson plans
- Lack of punctuality
- Lack of variety in learning activities
- Personal problems allowed to affect performance
- Failure to mark pupils’ work adequately and on time
- Inadequate use of resources
- Lack of understanding of national curriculum
- No use of differentiated materials
- Lack of impact of mentoring technique in learning

How Can Mentoring Contribute to Learning

When using a mentoring technique you can help learners to learn by providing counseling and moral support, coaching, providing assistance in student evaluation, and helping with curriculum and lesson planning. Mentors can also provide feedback on teaching, coach the teacher in reflection, provide ideas for dealing with troublesome learners, and provide strategies for working with the community.

Qualities of a Mentor

A good mentor is one who is committed to the teaching profession and is interested in working with teachers. The mentor exhibits skills such as counseling, listening, patience, and humor and is interested in reading and practicing mentoring skills. Mentors are close at hand to assist immediately and provide opportunities in reflective and analytical thinking about personal teaching. The mentor is also a skilled problem solver. There are many other qualities that can be attributed to a good mentor, such as:

- Dealing with differences and diversities of thoughts, styles, backgrounds, culture, and philosophy;
- Competent in planning, organizing, and managing work;
- Aware of personnel and resources;
- Capable of working with adults;
- Capable of demonstrating a wide variety of instructional skills and knowledge of curriculum;
- Possesses an understanding of learning theories, principles of human growth and development;
- Maintains a high standard of professionalism and integrity; and
- Capable of providing unconditional support to teachers.
Designing School-Based Mentoring Technique

Being aware of the school policy and support available, using effective time management, and having a trained and supportive head teacher and a trained supervisor/mentor are all issues to take into consideration when planning school-based mentoring programs.

In the question and discussion session, participants discussed how to implement mentoring techniques. Teachers mentor naturally, but they need to think about how to make it more useful. Evaluation committees should be organized, but they should not be threatening. The question of good questioning techniques was also raised. To avoid intimidating students with questions, teachers should wait for students to answer rather than moving on quickly, and they should make it clear which student is being asked the question.

Qualifications of Professional Technical Teachers

Dr. Agni P. Kafle, Member Secretary, Council for Technical Education and Vocational Training, Nepal

Introduction

Teaching is a very complex profession. It is a science because technical/vocational (tech/voc) teachers need to know the subject content as technical competencies. Teaching is an art as well because teachers must transfer their technical competencies through an artistic teaching methodology. So tech/voc teachers need both technical and artistic qualifications. Strong professional qualifications, competencies, and abilities are essential to becoming a good teacher. According to Travers and Rebore (1990), “superior intelligence, compassion, humor, respect for children [learners], and patience are necessary ingredients for good teachers.” In order to remain effective throughout life, teachers must do two things:

- Remain scholarly by continuous learning or reading and keeping abreast of the latest information in the profession.
- Seek opportunities to work with trainees and the community. Willingness to work with communities, school clubs, professionals, and related peers can develop interpersonal competencies and genuine desire to become a qualified teacher (Travers & Rebore, 1990; Tyner, 1996).

The willingness to continuously keep your own learning updated and the willingness to work with professional communities, to study to become a qualified teacher along with generic competencies such as intelligence, compassion, humor, respect, and patience for learners are also important.

Main Goals for the Development of Technical Teachers

While reviewing global literature, Austin (1986) listed four goals of professional development for beginning tech/voc teachers: (i) improve teaching performance of beginning teachers, (ii) increase retention of promising teachers, (iii) promote professional and personal growth of teachers, and (iv) satisfy the certification requirements.

Hatcher (1995) advocated that the work ethic is more important to be successful in the job. Hatcher stated that “more people fail at or lose their jobs because of personal qualities or inappropriate attitudes than insufficient knowledge or skills.”

The goals required to train teachers include improving the teaching performance of new teachers, especially when they first enter the classroom and encounter problems. Teachers
can learn or develop better when they work together as equals and support each other by sharing ideas and giving and receiving feedback. Teacher trainers also need to increase the retention rates of promising teachers along with promoting professional and personal growth to satisfy certification requirements.

A study by Lynch (1997) proposed that the following 12 qualifications were necessary for a good teacher:

- Must have knowledge of their students and human development,
- Knowledge of core general subjects and technical subjects and abilities in instruction, setting objectives if possible with students,
- Vocational teachers need to create a positive learning environment based on democratic values and a love for learning,
- Technical subjects can be difficult to teach, so if the teacher is happy he or she can make learning enjoyable for students by allowing students to participate, interact and ask questions,
- Respect diversity in order to provide equal treatment, fairness, and quality learning,
- Keep abreast of advanced knowledge of technical subjects—update ourselves,
- Use assessment tools in order to monitor learning abilities and assist in better learning, not to use as a pass or fail tool,
- Help students in workplace readiness by providing employability skills and knowledge of workplace cultures; encourage students in maintaining a multiple life role by understanding the demands of the world of work,
- Foster social development in students by providing social abilities such as self-awareness, confidence, leadership, civic values, and ethics,
- Use a reflective approach by analyzing own effectiveness and qualities,
- Collaboration between student and industry from school to work transition,
- Make contributions to colleagues and professional communities for institutional and personal development.

There are many other theories on what constitutes a good teacher. Dewy’s progressivism focuses on teachers’ abilities in identifying students’ interests, innate abilities, natural curiosity, and motivation. Prosser’s essentialism focuses on teachers’ occupational skills and the latest technical expertise, whilst Gale’s constructivism centers on teachers being prepared as facilitators and as models for diagnostic teaching.

Olson (1994) focused on competencies such as knowledge of subject matter, ability to solve problems, effective communication skills, discussion and group facilitation skills, ability to write effectively, ability to set priorities and use time effectively, and knowledge of adult learning theory.

Problems in Professional Development of Instructors

Content, teaching methodologies, and facilities are the three main elements of the teaching profession (Wright & Custer, 1998). Problems begin when teachers start feeling weak and inadequate, and lack confidence in all or one of the teaching elements. Engvall (1997) looked at teachers’ problems from a socio-economic point of view and found that teachers
are among persons of little importance, receive low pay, and have a tradition of group
dignity. Bernier and McColland (1989) looked at the teaching profession from the viewpoint
of administrative and legal processes of professional standards. They mentioned that three
legal processes, (i) accreditation of preparatory programs, (ii) licensure of professional
personnel, and (iii) standards of practice, are essential in becoming a professional.

In the case of Nepal all these processes are in the immature stage, and neither national
standards nor teaching licenses are effective yet. Camp and Heath-Camp (1992) performed
an intensive study on the problems of vocational beginning teachers at various stages of
both Non-Teacher Education Certified (NTEC) and Teacher Education Certified (TEC)
groups across the United States. The researchers identified a total of 1,777 problems
of beginning first year vocational teachers. When comparing the problems of TEC and
NTEC teachers, NTEC teachers reported a total of 1,100 problems, and TEC teachers
reported 677 problems. These problems were categorized under eight major headings:
(i) teacher’s internal feelings, (ii) pedagogy, (iii) curriculum, (iv) program, (v) students,
(vi) peers, (vii) system, and (viii) community. According to the study, the biggest or most
important problems were interactions between teachers and students and between teachers
and decision makers of the education system.

Indicating the scenario of poor communities, Traveres and Rebore (1990) mentioned
that there are several challenges even for good teachers, while poor and malnourished
learners come from the homes that do not value respect for teachers and formal education.

Teachers need to be committed to their teaching; have effective communication, discussion,
and group facilitation skills; and ensure they are experts in their technical fields in order to
solve problems and be responsible for managing and monitoring students’ learning. They
need to think systematically and learn from experience as members of learning communities.

**Professional Teaching Standards**

The National Board for Professional Teaching Standards (National Board for Professional
Teaching Standards [NBPTS], 1999) emphasized five qualification propositions for
professional standards of the general education teachers in America:

- Teachers are committed to the learning of students. Skilled teachers
  (i) can give individual attention to each and every student; (ii) can
  read the interest, abilities, and prior knowledge of the student; (iii)
  can listen to the students, and observe the performance and behavior
  of the students. Accomplished teachers avoid favoritism. The teacher’s
  overall mission is to develop the students’ self concept, character
  aspirations, and civic virtue.
- Teachers’ expertise on subject matter, factual information, and
  applicability of subject in various situations. Professional teachers,
  therefore, keep abreast of the latest development of curriculum and
  literature of the subjects they teach.
- Certified teachers are responsible for managing and monitoring their
  students’ learning (NBPTS, 1999). Professional teachers should be
  able to use time, multiple-methods, and multiple-media effectively
  and efficiently to meet their teaching goals. Meanwhile, trained
  professional teachers consider students’ individual learning style,
  learning pace, and mental abilities. Learning can be painful or it can
  be fun, depending on the knowledge, art, and the teaching ability of
  the teacher.
Accomplished teachers think systematically and learn from experience (NBPTS, 1999). Professional teachers are models of educated people and have virtues like curiosity, honesty, tolerance, fairness, creativity, risk-taking, and problem solving. They are engaged in life-long learning, which they want to inculcate in their students as well. Professionally alert teachers always strive for deep knowledge, sharp judgment, and new findings and theories.

Consider teachers as members of the learning community. Professional teachers like to work collaboratively with other professionals on instructional policy, curriculum development, and staff development. They appropriately utilize school and community resources for the benefit of future generations. Such teachers find ways to work collaboratively and creatively with parents and local communities.

Teacher Competencies in Nepal

In Nepal, no research has been found valid and up-to-date with respect to professional standards and competencies of teachers in general. However, Collum (1994) made an attempt to prepare a competency list for technical education and vocational trainers in Nepal. Since the establishment of Training Institute for Technical Instruction (TITI) in 1991, the trainers, advisors, and leaders of TITI have developed more than 140 skill cards on teaching competencies.

The 140 competencies involve skills in instruction, teaching methodology, instructional management, school management, occupation-related technology, safety precautions, and audio visual aids (AVA) material preparation. Clear and concise skill cards, research files, diskettes, and CDs have been prepared for each skill/competency. These cards and research files are documented in archives systematically. Although all the competencies look useful, the importance and priorities of competencies in relation to instructors’ professional training are still to be determined. All the competencies are listed alphabetically irrespective of importance, priority, or need (TITI, 2000).

In the question and discussion session, participants discussed the importance of seeking regular feedback from students for a teacher’s own effectiveness. Dr. Kafle stressed the importance of personal integrity and determination, especially for teachers who work in poor conditions with little or no support. Regarding systems for teachers to upgrade their own technical skills, the system in Nepal involves schools for teachers, school-based training, invitations for technical trainers to join institutions, and occupation up-grading training.

Curriculum Development in Technical Education and Vocational Training

Mr. L. W. Sunil Kularatne, CBT Consultant, Sri Lanka

Introduction

Education for work has its beginnings almost four thousand years ago and took the form of apprenticeships. Apprenticeship programs were followed in Greece, Palestine, and other countries, and followed similar patterns that remained unchanged until the 19th century. During the Industrial Revolution apprenticeship programs began to decline because industrialists found that skilled workers were better assets.
Curriculum Definition

“Curriculum” means many things to many people and has evolved over the years from narrow disjointed offerings to a comprehensive array of learning experiences. For some it denotes a course, for others an entire educational environment. It is a key element in the education process and touches everyone involved in teaching and learning. In TEVT, the curriculum focuses not only on the educational process but also on the tangible results or skills of the process. TEVT curriculum planners should have a sound understanding of the process.

A curriculum may be defined and perceived as being global in perspective and representing a broad range of educational activities and experiences. It is also known as the sum of the learning activities and experiences that a student has under the auspices or direction of the school. A definition formulated for technical education is:

A curriculum is an attempt to communicate the essential features of an educational program, preferably using specific objectives and a systematic approach to the design and management of teaching and learning. It should be capable of effective implementation by teachers in the field.

Planning a Curriculum

In the curriculum planning stage, one must establish a decision making process and then collect and assess school-related data and community-related data. When establishing curriculum content, strategies must be utilized to determine content, to make content decisions, and to develop curriculum goals and objectives. The next stage is to implement the curriculum through identifying and selecting materials, to develop materials, to initiate competency-based education, and to evaluate the curriculum.

Curriculum vs. Instruction

It is important to examine the difference between a curriculum and instruction. A curriculum constitutes a broad range of student experiences in the school setting. Instruction, meanwhile, is based on planned interactions between teachers and students that result in desirable learning. The content in the curriculum is further explicated and specific strategies are designed to aid the students in learning.

There are also some shared aspects between curricula and instructional development. If a teacher is writing objectives for a lesson, this task can be considered instructional development. If a group of teachers is writing objectives for their course and this course will be used by a number of professionals, this can be defined as curriculum development. The two can often be interlinked with both unique and shared aspects.

Characteristics of TEVT Curricula

The characteristics of TEVT curricula represent a focus associated with curriculum building, maintenance, and immediate and long-term outcomes. There are several approaches to curriculum development, the main purpose of which is the preparation of persons for useful and gainful employment. A TEVT curriculum should be responsive to the changing demands of the workplace. TEVT programs take into consideration the needs and demands of the industry. In addition they must consider the needs of the learners and social and economic needs.
The result of such consideration is reducing the mismatch between the demand in the job market and the supply of the workers. Further, it should provide alternative pathways for gainful employment and for career advancement. Coordination between teachers in the school and industry is a must in this context. Teachers should have frequent industrial exposure. This would keep their skills current for better delivery of training to students.

**Purpose of the Curriculum**

Training program curricula should take into consideration the demands/needs of the industry/economic sector and the social and economic needs of the learners, and thereby reduce the mismatch between the supply of workers and the demand in the employment market. A vocational curriculum needs to be responsive to the changing demands of the workplace. It should provide alternative pathways for advancement in careers leading to gainful employment. It should produce a better system of education by unification and rationalization with greater teacher and industrial participation.

**Teacher Training System (TTS)**

The purpose of a teacher training system (TTS) is:

> “An orderly means of separating training from non-training problems in industry and business”.

(Richard Swarson, 1978)

Its five major components or phases are to analyze, design, develop, implement, and control.

**The Develop a Curriculum (DACUM) Approach**

DACUM is a technique that uses a group consultative process to identify the competencies relevant to a particular occupation. It relies on experts employed in the occupational area to determine curriculum content. DACUM is a single sheet skill profile that serves as both a curriculum plan and an evaluation instrument for occupational training programs.

The skill profile provides an independent specification of each of the behaviors or skills associated with competence in the occupation. The profile contains a rating scale and can be used as a record of achievement. The development of a DACUM profile involves using a committee of ten to twelve resource persons who are experts in a particular occupation. Once the DACUM profile has been developed, the product may serve as a basis for developing instructional content and material. This procedure has the advantage of identifying only those skills that are most relevant to the work setting. Developing this profile requires:

A Facilitator—His or her role is of crucial importance to data gathering to ensure the success of the total process. The facilitator should be confident to conduct a brainstorming session. He or she must be knowledgeable on the technique and must suppress bias. This person directs the flow of meetings and ensures coverage of specific topics.

Group Members—These should have full-time involvement in the industry. They can be sought from among industry representatives, professional institutions, employers, and employer associations.
A Venue—This should be centrally located. Self-contained hotels or conventions centers are ideal.

Curriculum Analysis

In general curriculum analysis assists in determining the feasibility of curricula. The following are three areas where curriculum analysis has something to contribute.

- Part of curriculum evaluation—According to Scriven (1967), this has three factors: goal analysis, consistency analysis, and content analysis.
- To aid implementation—Analysis will facilitate understanding of the curricula rationale, strategy, and implications. It would yield information on the nature of the resources both human and material required for effective and efficient implementation.
- To improve existing curricula—Analysis provides for the critical examination of current practices and materials in use. Analysis of the ways teachers use the same materials differently could be useful. This will lead to improved curriculum material and improved implementation. In data collection, information should be gathered for these questions: What, why, and how should we teach? How do we know we have taught?

Establishing Curriculum Content

In determining the content of a curriculum it is essential to have a good understanding of the following areas to identify strengths and constraints:

- Student
- Teachers and support staff
- Curricular arrangement
- Employment setting

The checklist below is useful before curriculum decisions are made to check to be sure that information is available about the following areas:

- Entering student characteristics
- Basic and applied skills, interest and motivation, maturity levels, special needs
- Content teachers can teach
- Provision for teaching supporting course work
- Availability of support staff
- Required vocational content coverage
- Required general content coverage
- Funds for equipment, resources, and supplies
- Minimum expected employability level
- Employment areas prepared to enter
- Learning experience best obtained
Case Study

In Sri Lanka a competency-based approach was introduced in the year 2000. To date approximately 45 trade course curricula have been prepared for the TEVT institutes. Teachers at TEVT schools have been trained both locally and overseas for the purpose of training delivery. Curricula usually include curriculum, teacher’s guide, learner’s guide, skills standards, and learning materials.

Coordinating Training Programs
Mr. L. W. Sunil Kularatne, CBT Consultant, Sri Lanka

Introduction

The saying, “Riding a buffalo across mud is easier than swimming” is pertinent to this presentation because riding and swimming are skills that can be learnt. A training course or program runs on a prepared plan. Such a plan is essential for obtaining maximum results; as training coordinators, it is our duty to have a structured system of process in place.

Training is a purposely structured process that leads to individual achievement of performance and is mutually desired by the individual and the organization. From a company perspective training is a formal procedure that a company utilizes to facilitate learning. Its resulting behavior in participants will contribute to the achievement of the company’s target.

The learner is involved in the activities to achieve some educational objectives. Training helps people to do things that they could not do before. The success of training is dependent on the acquisition of knowledge, skills, and attitudes (KSA); it is not dependent on the environment or motivational factors.

Training is about improving human performance. Therefore it is important that training designers and coordinators understand performance. They will have to realize answers for these questions: What is the current performance level? What is the expected level? Why is there a gap in performance, and what is the reason for this problem?

Problem Analysis

A problem is a discrepancy between the actual (what is) and the ideal (what should be). The problem may have one or more causes. A first reflection may identify what is an obvious symptom. Some training designers address symptoms and fail to solve the problem. Training designers have to identify the real cause. If the problem is due to lack of KSA, training can provide a solution. If the problem is not caused by a lack of KSA, training is not the answer.

Once you have identified the true causes of problems in performance, you can identify the training needs. Poor performance happens due to a variety of reasons. It may be due to some personal problem. Lack of skills may also cause poor performance, or equipment may be faulty and performance fails. Weak management may cause poor performance. After all, the cause could be one or a combination of some of these factors.

Providing training is a must if the individual does not know what to do. Maybe he or she knows what to do but does not have the skill to do it. In another case, he or she may have both the knowledge and skills but does not perform to the required standards. There may be a situation where the individual knows what to do but simply does not care to do it.
In summation, poor work performance happens due to a variety of reasons such as personal problems, faulty equipment, poor skills, poor management, or a combination of factors.

A training need is evident if:

- The individual does not know what to do,
- The individual knows what to do but does not have the skill,
- The individual has the knowledge and skills but is not performing to the required standard, or
- The individual simply does not care about work performance.

Once you have identified the need for training, you have to analyze the need in order to plan the training. It will be useful to identify the gap in current performance and the expected performance. Careful consideration is needed to decide which approach or approaches are the most suitable for analyzing the problem. The following methods and those in the table below can be used to do the analysis.

- Interviews
- Observations
- Performance tests
- Questionnaires
- Reports from supervisors

### Methods for Analyzing Performance Problems

<table>
<thead>
<tr>
<th>Assessment Method</th>
<th>Description</th>
<th>Skills/Knowledge/ Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation</td>
<td>Observes the candidate performing work requirements or a specific task</td>
<td></td>
</tr>
<tr>
<td>Written tests</td>
<td>Uses a range of different question types</td>
<td></td>
</tr>
<tr>
<td>Oral test/questioning</td>
<td>Assesses the candidate’s ability to listen, interpret, and communicate ideas about information</td>
<td></td>
</tr>
<tr>
<td>Simulation/role play/</td>
<td>A situation is created which imitates workplace arrangements</td>
<td></td>
</tr>
<tr>
<td>case study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portfolio</td>
<td>Presents a variety of evidence which addresses performance criteria (qualifications, job description, reports)</td>
<td></td>
</tr>
</tbody>
</table>

In designing training courses the next step after identifying training needs is to match them with the competency standards. For that, a very accurate description is needed of the job tasks expected in terms of work performance. The use of competency standards may be applicable.

Before making a decision, the following questions must be answered: What is the job title? What are you required to do as part of the job? What are tasks that make up each part of the job? What skills and knowledge needed? Where would you look to find the standard requirements?
The following is an overview of tasks for planning a successful training program. This includes understanding the training outcomes, i.e., the achievements that the participants will gain; deciding on the training venue; and ensuring that assessment criteria are prepared. An outline of the topics and the sequence of their delivery should be provided.

**Training Venue**

Training sessions can take place in a variety of locations and settings, which should be chosen based on the nature and requirements of the training. Settings may include classrooms, laboratories, lecture halls, locations outdoors, on the factory floor, on the job, or in a simulated environment.

The coordinator should provide the best possible place to ensure that training outcomes are achieved. It should be a real training environment. Consideration must be given to the problems that participants will face in coming for training.

The coordinator also needs to think about how the furniture is arranged, the size of the room, noise level, and so on. He or she should also consider:

- Is the location available?
- Will participants be able to easily find the training location?
- Will participants be able to easily enter the training location?
- Are there any occupational health and safety or other workplace requirements?

**Training Standards**

Training standards improve communications among managers, training developers, and trainers. They allow any training to be objectively discussed and evaluated against fixed criteria agreed by all parties involved.

Standard 1: Needs Analysis—Evidence exists of a performance discrepancy in relation to the desired behavior resulting from a lack of skills or knowledge.

Standard 2: Learning Objectives—Learning objectives that describe the desired behaviors to be exhibited during the training exist and are communicated.

Standard 3: Modeling—Examples or models of the desired behavior are provided during the training program.

Standard 4: Performance Evaluation—Evaluation of learner performance of the desired behavior to determine competence during training is conducted.

Standard 5: Post-Training Evaluation—Evidence exists that the desired behavior has persisted after training and is linked to results.
Relationships

Industry-institute relationships provide many benefits to both parties. Students get more exposure to industry. In this regard an effective process of planning and consultation is essential. It is important to involve employers in the early planning stages. The working relationship between the school coordinator of the program and the supervisor at the workplace is essential. The success of a program depends on cooperation and understanding between the school and industry. They are responsible for assisting students to complete the program. They have to guide students to have a constructive approach to working in the industry.

The two parties need to establish effective channels of communication. They should have planned periodic meetings to review progress. Both should have a mutual understanding of procedures, expectations of students in the classroom and workplace, and requirements of the program. It is essential to keep effective and efficient methods of assessment and recording of achievement. They should have a clear understanding of disciplinary procedures. A timetable is needed for course work and completion.

The institute coordinator is responsible for liaising with the supervisors on selection and placements of students. He or she will monitor students’ progress in the workplace and will inform parents of workplace procedures. The coordinator should be ready to discuss problems with the students. If a problem arises in the workplace, he or she will have to facilitate solving it through interaction with the workplace supervisor. He or she should oversee recording of assessment records.

The workplace supervisor is responsible for providing students with the introduction to the workplace and the industry. He or she will have to clarify skills and tasks required on the job. It is this person’s responsibility to train the students in the required competencies or assist other employees to do so. He or she has to assess student achievement of competencies. He or she has to continuously monitor student progress and advise students when required. The supervisor should liaise with the school to promote the effectiveness of the program. He or she has to complete assessment and reports on achievement of modules/units of competence. He or she has to be a counselor of the students.

The specific training needs of industries should be identified. There are authorized bodies to develop training packages. They can be industry-based bodies or enterprises. The developers must provide evidence of thorough consultation and support from the industry. These packages will provide nationally endorsed competency standards, assessment guidelines and qualifications for a specific industry.

Programs designed in this way will enable award of qualifications through direct assessment of competencies rather than learning outcomes. Another very important benefit of this type of package is that it encourages development and delivery of training to suit individual needs. These needs can be changing job or trade, entering a specialized area, or seeking promotion. Most of all, learning will take place in the work environment.

In the question and discussion session, the chairperson remarked that social functions are also important when planning training programs—particularly because courses tend to be very formal. Cultural events such as tea festivals or visits to historical sites provide an activity for students to bond and also learn.
Non-Technical Skills for Technical Teachers
Dr. Ligaya Valmonte, Professor, Don Marino Marcos Memorial State University, Philippines

Introduction

Teachers need to equip themselves with both technical and non-technical skills. Even though technical (hard) skills remain important, non-technical (soft) skills are crucial for good teaching. Hard skills—the specific skill sets for specific job types—are typically easy to observe, quantify, and measure. They include such things as carpentry, metal working, and animal husbandry.

Soft skills, on the other hand, are foundation personal skills that apply across the board, no matter what the specific job may be. They include such things as communications skills, value development, cooperation, leadership, and decision making skills. Unlike hard skills, soft skills are more intangible and are associated with personality.

Unfortunately teachers tend to concentrate on the hard skills, and forget that they have an equally important role of transmitting the soft skills. However, students who develop hard skills alone may still have difficulty in finding employment. Developing both social and technical abilities—with the same degree of emphasis and real-world concreteness, is the best way to equip trainees for the demands of the workplace.

Communication Skills

Communication is the process of transmitting messages from one person to another through a common system of symbols, signs, or behavior. It is essential for exchanging information, sharing ideas and opinions, gaining power and influence, developing social relationships, etc.

Effective communication is a main contributor to job success. The majority of people spend around 75% of their time in some form of communication. In spite of that, many individuals continue to struggle with communication, unable to convey their thoughts and ideas effectively. Such inability makes it nearly impossible for them to compete effectively in the workplace, and stands in the way of career progression.

The Communication Process

Communication is the process of transmitting message concerning information, thoughts, ideas or feelings from a source to a receiver. It is a process because it involves interaction between the members of an organization from top to bottom, bottom to top, and side to side. It includes five basic elements: source (or sender), message, channel, receiver, and feedback, as illustrated in the figure below.

![Communication Process Diagram]

---

**Feedback**
Types of Communication

There are at least three important types of communication: symbolic, verbal and nonverbal communication.

**Symbolic communication** includes both things like vehicles we drive and the clothes and jewelry we wear, etc. as well as more personal characteristics like age, gender, educational level, ethnic background, and cultural heritage.

**Verbal communication** is any spoken communication whether in a formal or informal context.

**Non-verbal communication** includes all body language (i.e., crossed arms, raised eyebrows, manner of sitting, foot movements, voice variations, and facial expressions). These convey significant information about the sender.

It has been said that in communication, words are 7% effective, tone of voice is 38% effective, and non-verbal clues are 55% effective.

<table>
<thead>
<tr>
<th>Effectiveness of Types of Communication</th>
<th>Barriers to Communication and Strategies to Overcome Them</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tone of Voice</strong> (34%)</td>
<td>Anything that prevents the understanding of the message is a barrier to communication. It may be caused by a number of factors which can usually be summarized as being due to physical barriers, system design faults, attitudinal barriers, or other factors. The following are social and cognitive non-technical skills that can help to overcome barriers to communication.</td>
</tr>
<tr>
<td><strong>Words</strong> (8%)</td>
<td></td>
</tr>
<tr>
<td><strong>Non-Verbal Clues</strong> (58%)</td>
<td></td>
</tr>
</tbody>
</table>

**Elements, Good and Poor Examples of Cooperation**

<table>
<thead>
<tr>
<th>Element</th>
<th>Good Practice</th>
<th>Poor Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Building and Maintaining</td>
<td>Establishes atmosphere for open communication</td>
<td>Blocks open communication</td>
</tr>
<tr>
<td></td>
<td>Encourages inputs and feedbacks from others</td>
<td>Keeps barriers</td>
</tr>
<tr>
<td></td>
<td>Does not compete with others</td>
<td>Competes with others</td>
</tr>
<tr>
<td>Consideration of Others</td>
<td>Considers suggestions of others</td>
<td>Ignores suggestions of others</td>
</tr>
<tr>
<td></td>
<td>Takes conditions of others into account</td>
<td>Does not take condition of others into account</td>
</tr>
<tr>
<td></td>
<td>Gives personal feedback</td>
<td>Shows no reaction to others</td>
</tr>
<tr>
<td>Support of Others</td>
<td>Helps others in demanding situations</td>
<td>Hesitates to help others in demanding situations</td>
</tr>
<tr>
<td></td>
<td>Offers assistance</td>
<td>Does not offer assistance</td>
</tr>
<tr>
<td>Conflict Solving</td>
<td>Keeps calm in interpersonal conflicts</td>
<td>Overreacts in interpersonal conflicts</td>
</tr>
<tr>
<td></td>
<td>Suggests conflict solutions</td>
<td>Sticks to own position without considering a compromise</td>
</tr>
<tr>
<td></td>
<td>Concentrates on what is right rather on who is wrong</td>
<td>Accuses others of making errors</td>
</tr>
</tbody>
</table>
**Cooperation** is the ability to work effectively in a team. It requires team building and maintaining, so that cooperative actions are based on a mutual agreement of teammates in a positive group climate. Such a climate is also obtained by factors like consideration/support and conflict solving skills.

**Leadership and Managerial Skills** are effective when they achieve tasks within a motivated, fully functioning team through proper coordination. Leadership responsibilities include the active and goal-directed coordination of the working activities of the technical teacher. Always a reciprocal process, leadership behavior should motivate colleagues and students to dedicate their efforts and initiative to the safe and efficient achievement of the school goals. The leader has a clear concept of the class and provides general standards and directions for the completion of the different tasks. A leader motivates, activates, and monitors others.

**Elements, Good and Poor Examples of Leadership and Managerial Skills**

<table>
<thead>
<tr>
<th>Element</th>
<th>Good Practice</th>
<th>Poor Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Authority and Assertiveness</td>
<td>takes initiative to ensure active class participation</td>
<td>hinders or withholds class involvement and participation</td>
</tr>
<tr>
<td></td>
<td>takes command if situation requires, advocates own position</td>
<td>passive, does not show initiative for decisions, own position not recognizable</td>
</tr>
<tr>
<td></td>
<td>reflects on suggestions of others</td>
<td>ignores suggestions of others</td>
</tr>
<tr>
<td></td>
<td>subscribes to standard procedures</td>
<td>No compliance to SOPs</td>
</tr>
<tr>
<td></td>
<td>intervenes if activities deviate from standards</td>
<td>Does not intervene in case of deviations</td>
</tr>
<tr>
<td>Providing and Maintaining Structure</td>
<td>with class being consulted, deviates from standards if necessary</td>
<td>Deviations are neither announced nor consulted</td>
</tr>
<tr>
<td></td>
<td>Demonstrates will to achieve top Performance</td>
<td>does not care for performance effectiveness</td>
</tr>
<tr>
<td></td>
<td>encourages participation in planning and task completion plan is clearly stated and confirmed</td>
<td>plans only for him/herself, class not involved intentions not stated or confirmed</td>
</tr>
<tr>
<td>Planning and Coordination</td>
<td>Changes plan after consultation, if necessary</td>
<td>changes plan without informing others or follows plan blindly goals and boundaries remain unclear flying “solo” without others involved</td>
</tr>
<tr>
<td></td>
<td>clearly states goals and boundaries for task completion distributes tasks, checks and corrects appropriately</td>
<td></td>
</tr>
<tr>
<td>Workload Management</td>
<td>secondary tasks are prioritized to retain sufficient resources for primary duties allots adequate time to complete tasks notifies signs of stress and fatigue</td>
<td>secondary operational tasks interfere with primary duties workload is increased through inadequate planning ignores signs of stress and fatigue</td>
</tr>
</tbody>
</table>
**Situation awareness** is the understanding of the difference between reality and perceived reality. Certain actions are useful for maintaining this awareness, as the figure below illustrates.

**Decision making** is the process of reaching a judgment or choosing an option. Unlike situation awareness, where the problem is choosing one definition from the multitude suggested, the problem for decision making is finding one. As shown in the figure below, the elements of decision making are problem definition/diagnosis, option generation, risk assessment, and outcome review.

**Values development**—Values represent aspirations and goals; the motives and purposes we seek. They include different dimensions of the human person: physical, intellectual, moral, ethical, aesthetic, socio-cultural, economic, political, and spiritual. Thus, values affect all aspects of our life. They determine the quality of responses to challenges, the decisions we make, and the directions we follow.

**Conclusion**

The teacher is challenged to be open, sincere, genuine, non-judgmental, and non-threatening so that the learners find the freedom to be themselves. This does not mean that he/she cannot disagree with the learner’s professional value. In fact, real dialogue about issues can be achieved as a result of this atmosphere of openness and honesty. Values are therefore shared rather than imposed in the context of meaningful interactions between the teacher and the learner.

The teacher is a model for the learner. However, the modeling is not one of perfection but of striving to be integrated and whole. This way, the learner is inspired to work towards ideals without denying the teacher’s existing limitations and weaknesses. This, of course, will require teachers to be willing to invest themselves in the learning process. As the learner is being enriched, the teacher learns from the learner as well, making the learning a two-way process.

Competencies deemed important to teachers have changed from era to era. However, it is now recognized that by teaching soft skills with hard skills recognizes that teachers are teaching the whole person. Hence, they should be chosen not merely for their special qualifications, but more for their interpersonal characteristics and their behavior, because one teaches more by what he is than by what he teaches.
In the question and discussion session, the chairperson commented that it was interesting to note that out of the four key qualities areas to be developed in TEVT graduates, three are non-technical.

**Individualized Instruction in Technical Education and Vocational Training**

Dr. Agni P. Kafle, Member Secretary, Council for Technical Education and Vocational Training, Nepal

**Introduction**

The most important people in the world are the students, and the most powerful people in the world are the teachers. Every individual is different in terms of aptitude, learning style, interest, and personal behavior. For centuries, while delivering lessons, teachers have been challenged by students having different learning abilities, styles, and behavior. The teacher needs to ensure that all students learn despite their different abilities and preferences.

Professional teachers encourage individualized learning for better achievements because it helps a person learn better and faster while acquiring technical knowledge, skills, and attitudes. Ultimately, individualized learning contributes towards gaining mastery of skills.

While planning individualized learning the following components must be taken into account: the learner, the teacher, the learning objectives, the learning environment, the learning resources, the curriculum, the instructional methods, the learner’s assessment, the constructivism in learning, and the proper application of individualized learning.

Until recently much more emphasis has been placed on individualized teaching rather than individualized learning. Individualized instructional methods were developed to enable students to work at their own pace, mastering one unit of content before moving to another. However, individualized learning places importance on each student’s ability for critical thinking, problem solving, and innovation in emerging technology so that the student can learn to think and intervene creatively to improve quality of life. The subject calls for pupils to become autonomous and creative problem solvers, as individuals and members of a team.

**The Learner**

In individualized learning, the learner is the focal point to maximize learning. The teacher must know the needs, abilities, and interest of the individual learner in order to involve the learner in active learning. In active learning the learner is intrinsically motivated to acquire new or change his or her knowledge, skills, and attitudes.

The teacher needs to be aware of the learning domain, which is a combination of knowledge, attitudes, and skills.

Knowledge is information stored in the mind as facts, concepts, principles, procedures, processes, and structures. These can be classified as cognitive, repetitive, and creative skills. Attitudes are internal values, feelings, beliefs, and drives—some of which can be observed. Skills also fall into two groups, some of which can be observed, such as problem solving and decision making, but there will also be other internalized skills which will be much less easily detected. It is important for the teacher to stimulate the learner to develop a good attitude as well as cognitive skills. A complete analysis of the learner’s psychological makeup will enable instruction to be tailored so that it can most effectively help the learner.

The motivated learner needs to engage in active learning, which involves making learning goals, deciding how to reach to those goals, selecting activities/practices based on identified needs/gaps, finding resources of information, and budgeting the available time for learning.
The Teacher

The teacher’s role in individualized learning is as a facilitator, learning guide, and a manager rather than a lecturer or presenter. In fact it is well documented that a student cannot concentrate for long on listening to a presenter. Even for adults the average maximum concentration time is only 20 minutes.

Within individualized learning, the major requirements of the teacher are to assess the learners’ needs; analyze the learners’ learning abilities; assess the learners’ occupational strengths, learning styles, goals, and interests; assist to develop an individual learning plan with objectives and activities for each learner; organize the learning facilities and instructional materials for each learner; guide learners through the learning process; provide coaching to solve problems; and assess learners’ performance on an individual basis. By these means it is possible to achieve competency-based learning and assessment at an individual level.

The teacher should be available as needed and should maintain a balanced interaction. The balance that teachers create between teacher- and student-centered teaching is the most important influence on how students perceive the learning situation, and ultimately how and what they learn in technology education.

Learning Objectives and Environment

Learning objectives should be set by the learner in close collaboration with the teacher. The conditions and expected standards and results are set mutually by the learner and the teacher and these can then become the norms for the assessment of the learner. In this manner the learning of the competency-based curriculum becomes self-regulated.

Individualized learning also requires a suitable learning environment, which may need to include lab facilities, equipment, supplies, and furnishing. Seating arrangements need to facilitate both small group work and individual work. In traditional teaching methods most of the students are passive, distracted, and extrinsically motivated. This results in poor performance. However, in learner-centered individualized learning students and teachers share responsibility for learning and the students become intrinsically motivated.

Learning Resources

Multiple Intelligences Require Multiple Learning Methods

Individual preferences and strengths must be identified before organizing learning resources for each student. Learners have different strengths, weaknesses, and learning styles. Some learn best through sensory channels. Some learn best by reading or viewing. Some learn best by listening. Some learn best by practice or hands-on approaches. Above all, suitable learning resources are required to fit with the learner’s strengths and abilities (see illustration below). In
labs, work and tasks can be individualized by preparing detailed instruction sheets, slides, and tape recordings. The learning resources and level of instructions must be prepared considering the maturity level and needs of the learner. These learning resources and materials should expose learners to new interests, new discoveries, and broader outlooks.

Curriculum

The curriculum should be developed to focus on workplace competencies, technical accuracy, and pedagogical soundness to develop effective technicians. The following factors should be considered in developing a relevant curriculum for TEVT:

- Content: decisions about content need based on school and community data
- Dynamic: curriculum should be responsive to changes in the workplace
- Explicit outcome: curriculum goals should be measurable
- Fully articulated: the scope and sequence of curricular concepts should be thought through
- Realistic: student experiences should be practical and fully contextualized
- Student-oriented: instructional approach should prepare students for the world of work
- Evaluation-conscious: the effectiveness of the curriculum should be continuously evaluated
- Future-oriented: the future relevance of the curriculum should be determined
- World class-focused: formal efforts must be to meet world class standards and total quality management

Instructional Methods

The teacher is expected to choose an appropriate method. The teacher’s creativity and preparedness plays a vital role in using the method to ensure learning in the classroom.

The following methods are amongst those that can be used for individualized learning: games, role-playing, simulations, case studies, brainstorming, lab work, peer instruction, independent study, library research and reading, group study, and project work. Also cooperative learning can be used effectively. This involves a group of people who are committed to working with each other and as a result, they will achieve the activity goal much more quickly than they would by working alone.

Learner’s Assessment

Learners are evaluated individually based on individual performance. One learner is not compared with another one. The assessment is done on the basis of competencies and standards set mutually by the student and the teacher. In individualized learning the learner should be concerned with individual improvement rather than comparing his or her performance against that of another student. The following steps are relevant for individualized assessment:
Progress should be made against set goals and objectives,
Continuous assessment should be done to enhance learning,
Students should be encouraged for self-evaluation of their own work and results, and
Careful records of observation and evaluation must be kept for further instruction and learning.

This last step enables the teacher to be mindful of the student’s progress and problems and to provide appropriate feedback.

Constructivism and Learning

The theory of constructivism has positive implications in individualized learning methods. In the constructivist approach teachers facilitate learners for active inquiry, and also guide and coach learners for active learning. This model of individualized learning is extremely motivating for the student because the teacher comes to be a supporter, facilitator, model, and coach.

In order to satisfy the need of the employers the newly prepared workforce must be able to cope with new management systems, production processes, and global competitiveness that require cognitive skills in critical thinking, problem solving, conflict negotiation, and high-level technical and basic academic skills.

Tips to apply individualized learning:

- Plan for all. All can learn if given adequate time and practice. All learners can achieve the expected level of performance.
- The learning plan of one learner may not be the best plan for another.
- Learners must know precisely what they are expected to achieve.
- Learners must be focused towards mastery of learning.
- Assessment tools should be used to determine the learner’s readiness to move to the next learning experience.
- Lead students to learn to take responsibility for their own work.
- Do not ask students to do all the work; the teacher also must take responsibility.
- Ensure students are interested in productivity and competence.
- Try to give students the skills they will need to be economically independent in life.
- Believe curricula should be geared to this kind of focus.
- See knowledge as enabling students to be capable of making their own way.
- Encourage practical applications.
- Ensure students like technical things and hands-on activities.
- Use measured rewards.
- Help students in job search.

In the question and discussion session, participants discussed the potential role of teachers in encouraging students to think positively. They also discussed the need to budget time spent with each student based on the total amount of time available, the student’s needs, and the number of students for whom the teacher is responsible.
Quality Management in TEVT
Dr. Tariq Mahmood, Pakistan

Introduction

The subject of management is not limited to the attributes and qualities of managers and heads of the institutions but is discussed in many aspects, including project management, knowledge management, and quality management. Quality management as such is a vast subject with best practices being carried out all over the world. These includes quality model based Deming’s 14 point, ISO certification and MBNQA. The quality management idea (once considered only in the business sector or production sector) has crept into the service sector with rising competition and globalization.

James Lewis has given a good example of management: the job of a manager is analogous to the job of a pilot. The pilot starts with a plan, visualizes where he or she is and where he or she wants to be (vision). To get to the destination is his or her mission, using the principles of a navigation guide. Any corrective measure the pilot takes is his or her controlling. All of this is exactly what managers have to do under planning exercises: develop the vision, mission, goals, and strategies of their institutions. But this not only interaction of the managers with some work plan or machinery; the actual work is to get the job done through other activities, where the roles of personnel and interpersonal skills are important.

Aspects of Managing

Organizing is establishing the internal organizational structure. It focuses on division, coordination, and control of tasks and flow of information. Organizing involves division of people, delegation of authority, division of work into different departments, span of control, and coordination.

Staffing is also an important function of management: without people, an organization cannot work. Qualified people are an asset of an organization. Staffing depends heavily upon planning and organizing so that job specifications giving the necessary knowledge and skills required and roles of the people to be recruited are clearly defined before the competent people are recruited or hired.

Directing and leading is the leadership role of the manager. This role is very important in the current changing scenario. A leader is a person who manages or introduces change as compared to a manager who simply maintains the status quo. Hence leadership is one very important aspect of management and is a quality that distinguishes successful managers from others. Directing is also influencing people’s behavior through motivation, group dynamics, leadership, and discipline. Directing is also to channel people’s behavior to the organization’s mission and objectives. Proper communication, performance appraisal, regular feedback, and maintaining discipline are the related activities that come under the directing function of the management.

Controlling is measuring and reporting actual performance of the people in the institution as well as controlling all other important matters in various departments. Controlling builds on planning, organizing, and leading when direction, targets, and an infrastructure are available; people need to be measured in terms of their output. Controlling also involves taking corrective and preventive actions. The effective control system has control at all levels:

- Flexibility
- Accuracy
Several skills can be listed that must be possessed by managers. These include communication skills, interpersonal relations, planning and goal setting, problem solving, managing conflict, motivating others, managing change, and team work skills.

Technical Skills are necessary for the management to some extent but it is not always true that a technical person would be a good manager. A technical skill is the ability to use tools, techniques, and specialized knowledge to carry out a method, process, or procedure or to monitor using technology. Much of the technology that management knows and can use well comes under this technical management skill.

Human Skills are used to build positive interpersonal relationships, solve human relations problems, build acceptance of one’s co-workers, and relate to them in a way that their behavior is consistent with the needs of the organization or institution.

Conceptual Skills involve the ability to see the organization and the institution as a whole and to solve problems in a way that benefits the entire organization. Analytical, creative and intuitive talents make up the manager’s conceptual skills.

Management Styles

There are several management styles. We normally say about one manager or head that he or she is very strict in discipline, or very strict in financial management. There are others who may be aggressive and innovative in style, some may believe in dominance, some may be more supportive. One good classification of management styles, known as DISC, depicts the following four dimensions:

- Dominance
- Influence
- Supportiveness
- Conscientiousness

Dominance Dimension shows the direct, decisive behavior of the management. This style is evident in goal achievement, acting decisively, winning, and directness.
**Influence Dimension** shows itself in optimistic, outgoing behaviors of the management. This style is evident from communication, participation, and thinking positively.

**Supportiveness Dimension** shows itself in sympathetic, cooperative behavior. This is the most common management style in most of the situations in helping others, working behind the scenes, fitting in, and preservation.

**Conscientiousness Dimension** shows itself in concerned, correct behavior: doing things right, planning ahead, thinking clearly, and privacy.

Any manager may or may not have a fixed style as discussed above. The style differs depending on the situation. Hence a close analysis of different styles adopted for different situations may provide the manager an opportunity to adopt a style best suited to the situation under consideration.

**Total Quality Management**

The total quality management concept and approach started after World War II when reconstruction of business and industry in Japan was undertaken by American experts. The names of Dr. Walter A. Shewhart, Dr. W. Edward Deming, Dr. Joseph M. Juran, and Philip Crosby, are a few who did pioneering work in the field of total quality management (TQM). Until 1980, the applications and concept of TQM remained limited to the business and industrial sectors. After 1980, it crept into the educational institutions in the United States. The educational institutions supply or provide a service, which is education; they start with raw material which is students, apply a process which among others is a teaching and learning process, and turn out a finished product which is a graduate. Hence all business ideas and strategies that aim to attain excellence, maximize resources, enhance efficiency, and ensure survival and competency in the global world become applicable in the education system. Deming’s 14 points made the basis for total quality management. Though they are industry-specific they have applied in education as well. These points are:

- Create and publish the aims and purposes of the organization
- Learn the new philosophy of quality
- Understand the purpose of inspection
- Stop awarding business based on price alone
- Improve constantly and forever the system
- Adopt modern methods of training on the job
- Teach and institute leadership
- Drive out fear, create trust, and create a climate for innovation
- Optimize the efforts of teams, groups, and staff areas
- Eliminate exhortations for the workforce
- Eliminate numerical quota for the workforce and eliminate management by objectives
- Remove barriers from the pride of workmanship
- Encourage education and self improvement
- Take action to accomplish the transformation

With the world becoming more competitive, the education sector has been under pressure to ensure quality output and provide quality services to meet the market demand. With the emergence of new theories, tools and techniques, and software technologies, the
quality concept has attained new dimensions. The quality concept penetrated educational institutions after 1985.

It starts with self assessment, self analysis, and developing a vision of the institution. The questions that need to be answered are: where do we stand now and where do we want to be? After visualizing and analyzing the current status of the institution, the step is designing and redesigning the programs of the institution. This designing and redesigning is the creation and development of processes with indication of inputs and outputs. The designing and redesigning stage is also based on the input from the stakeholders, partners, customers, etc. The input comes in the form of students, staff, employees, material, and equipment. The output is able students, new knowledge/skills, research findings, and so on.

The ISO 9000 series standards were published in 1987 and were revised in 2000 and called ISO 9001: 2000 standards. The ISO 9000 quality management standards are generic in nature and hence are applicable to all types of organizations regardless of size. There are eight quality management principles and these provide organizations with ways and means to enhance customer satisfaction by meeting customer’s needs and continually improving their performance. These principles are customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to decision making, and mutually beneficial supplier relationships.

In the question and discussion session, participants discussed the importance of looking at organizations as a whole—not on a piece-by-piece basis; if one department has a problem, this affects other departments. The discussion also touched on performance evaluation. Appraisals of top managers are important because everyone must be answerable to someone.

Performance Evaluation and Quality Control

Research and Evaluation Strategies in Workforce Development
Dr. Mark Cully, General Manager, National Center for Vocational Education Research (NCVER), Australia

Introduction

Australia finds itself for the first time in several decades facing the situation of a relatively low unemployment rate (under 5%, a rate not seen since for over 30 years) and sustained skill shortages for some professions and most of the trades. Currently the median age is 36 but this rapidly rising and life expectancy is well over 80. The government is concerned about how they are going to support the aging population with rising health costs and many people retired and so not contributing to the economy. Consequently, we want to equip people so that they can stay in workforce as long as possible.

The philosophy of workforce development in Australia differs from that in many of its neighbouring countries such as Singapore, Taipei, China, and the Republic of Korea, which follow the developmental model of skill formation. In these three countries, super-ministries were created to collate the necessary demand and supply information, and to direct the activities of education and training institutions rather than rely on the market to perform this function.

The Australian model of workforce development is quite different. Here, the onus is placed on individuals and companies to make their own decisions on skill and training requirements. In this respect, it should be noted that Australia has one of the highest
participation rates for adults in education and training among OECD countries. In Australia, workforce development is defined as “those activities which increase the capacity of individuals to participate effectively in the workforce throughout their whole working life and which increase the capacity of firms to adopt high performance work practices that support their employees to develop the full range of their potential skills and value.”

Main Features of TEVT in Australia

There is substantial public investment of around $A5 billion per year. In 2005, there were 1.6 million students in the public TEVT system and in fact, 12% of all those between 15 and 64 undertake some vocational training. As well as public institutions there are numerous private institutions, but regardless of whether training was carried out in a public or private institution, 75% of the students have had their training publicly funded.

There are now a large number of private institutions who compete with the public institutes for government training funding. The opening up of the training market has significantly changed the way the public institutions operate as they are now required to be competitive in terms of both price and quality. The reforms have fundamentally changed the orientation of providers of training away from education and toward providing a business service; TEVT is becoming considerably more client-focused.

This mixed model of public and private training has produced a flexible system with strong quality assurance and portability mechanisms. It is now an industry-led training system, using industry-developed training packages, and although there is a significant public investment in skill formation, there is now strong reliance on market mechanisms in its delivery.

To ensure that training is appropriate and effective there are two other essential elements. These are the Australia Qualifications Framework, which establishes a hierarchy of recognised skill attainment, and quality assurance arrangements so that all accredited training purchased is known to meet certain quality standards.

Manpower planning fell out of favor in the 1970’s as it was not seen to be very effective. A few years ago there was a shortage of skills in the IT industry and as a result the government was persuaded to promote IT training. Unfortunately that coincided with exactly the same time that the dot com industry collapsed. Therefore planners can get it wrong and many IT graduates are currently unemployed.

There is a relatively poor match between where people do training and where they end up being employed. Only about one in four ends up working in the same occupational area in which they undertook the training. However, where tech skills are very precise there is a much better match. All in all there are very high employment outcomes for TEVT graduates.

We believe that the best way of promoting workforce development is to:

- ensure that training institutions keep consistent but simple enrollment and attainment data and forward this on to a central agency so that participation, achievement, access, and quality can be measured,
- establish a national qualifications framework which is hierarchical and simple to understand, and
- track student destinations after they leave to monitor success and to use the data to promote any training need changes.
The National Center for Vocational Education Research (NCVER) is a private company but is owned by the Australian Government and the eight state ministries. This puts them at arm’s length from the government and so provides them with the freedom to decide in which direction to go and what research to do. Their main role is that of a statistical agency. The company’s six broad areas of activity are:

- collecting and analyzing national TEVT statistics and survey data, as the official statistical agency on Australian vocational education and training (VET);
- undertaking a strategic programme of TEVT research, including the management of a national VET research competitive grants programme;
- collecting and providing research findings on TEVT from across the world through the VOCED research database;
- publishing and communicating the results of research and data analysis;
- building links with similar international organizations to foster comparative analysis and collaborating on issues of mutual interest; and
- undertaking commercial consultancies.

NCVER can then provide the government with robust information which they can also place in the public domain, enabling the public to raise questions.

The main source of data is obtained from the student enrollment forms which all students must complete. The form was designed by this agency to ensure that all required statistics are collected.

The database grows by 12 million each year and provides highly detailed information on subjects, scores, ages, etc. As this is a complete administrative information base rather than survey results it is an extremely robust body of knowledge and can be analyzed in whatever way is required.

Surveys are also continually carried out of students after they have left. These surveys collect data on their success in obtaining employment, the course quality, etc. It provides critical information on the key course benefits and the reasons for student dropouts, etc.

Additionally, administrative collections are made of the finances of the state training authorities, of courses undertaken by school students in recognized VET qualifications, and of employers covering their satisfaction with aspects of the VET system.

A$3 million is spent each year on research. NCVER’s objective is to inform policy and practice in Australia’s TEVT sector by means of research. They commission 20–25 projects each year and then publish and disseminate the findings. They operate independently and transparently, exhibiting high quality standards and represent good value for money.

NCVER also maintain VOCED, a research literature database on TEVT research, which indexes a wide range of documents in electronic format. These include research reports including those unpublished, journal articles, government reports, and published statistics. Access to the site is free through www.voced.edu.au. In conclusion, NCVER with its three main functions of official statistical agency, manager of the TEVT research program, and maintainer of a world-class research literature database, is central to the workforce development in Australia.

In the question and discussion session, participants discussed the relationship between government-funded TEVT research institutions and the government itself. The influence
of government officials has to be managed carefully, but NCVER finds it helpful to provide ministers with briefings in advance of published reports so that they are forewarned. To get value for money in research, Dr. Cully mentioned use of a competitive tendering process and selection of the tender in a fair and transparent manner.

Regarding Australia’s high rate of TEVT participation relative to developing countries, Dr. Cully explained one reason for the higher rate is that the country has a very flexible training scheme which allows students to enroll for a particular part of a course to acquire a particular skill rather than a qualification.

<table>
<thead>
<tr>
<th>Collection/Survey</th>
<th>Description</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>VET Provider Collection</td>
<td>Administrative collection of information on students, the courses they undertake, and achievement.</td>
<td>Annual collection, dates back to 1994.</td>
</tr>
<tr>
<td>Apprenticeships and Traineeships Collection</td>
<td>Administrative collection on apprentices and trainees and their employers.</td>
<td>Quarterly, dates back to 1994 as a national collection.</td>
</tr>
<tr>
<td>Student Outcomes Survey</td>
<td>A survey of students who completed or partially completed a qualification in the preceding year, covering their views on the training they received and their current activity.</td>
<td>Annual, dates back to 1997. Previously known as TAFE Graduate Destination Survey. Renamed in 1999 as Student Outcomes Survey.</td>
</tr>
<tr>
<td>VET Finance Collection</td>
<td>Administrative collection of information on the finances of state training authorities, and Department Of Education Science and Training/ Australian National Training Authority (Commonwealth).</td>
<td>Annual, accrual reporting dates back to 1997.</td>
</tr>
<tr>
<td>VET in schools collection</td>
<td>Administrative collection of courses undertaken by school students in recognized VET qualifications, as part of a senior secondary certificate.</td>
<td>The VET in schools collection is an annual collection of training activity in a calendar year. It was collected for the first time in 2005.</td>
</tr>
<tr>
<td>Survey of Employer Use and Views of the VET System</td>
<td>A telephone survey of employers covering their satisfaction with aspects of the VET system. Surveys conducted prior to 2005 also included satisfaction with the skills of recent VET graduates.</td>
<td>Last conducted in 2005, previously in 2001 and before then on a biennial basis back to 1995. Previous surveys not comparable to 2005. The survey was called Survey of Employer Views prior to 2005.</td>
</tr>
</tbody>
</table>
Total Quality Journey at TEVT Institutions: Where Are We Going?
Dr. Pramod Shrestha, Professor, Dept. of Mechanical Engineering, Institute of Engineering, Tribhuvan University, Kathmandu, Nepal

Introduction

Quality measurement is continually changing and improving. At first it just consisted of quality control: inspection of the finished product. Then it progressed to quality assurance, where it was the process rather than the product that was examined. Finally, it developed to total quality management (TQM), where both the product and the process are jointly considered. What will the next stage be?

In TEVT the product is the trained student and quality control would relate to the accredited qualifications gained by the student. The process—or quality assurance—includes both the teaching and the examination process.

What is quality? Does a quality product have to be expensive or luxurious? Does it have to conform to specifications or does it just have to meet the customer’s requirements? Quality must be judged by reference to the customer, who buys or uses the product. It is the verdict of the customer that matters rather than some chosen criteria of the product or service. Take for example the manufacturing of cars. To the Italian market the design would be their main criterion of quality, whereas to the Swedish market it would be safety.

Consequently, quality is a relative term. Perhaps it can be best defined as

Quality = Customer Satisfaction + Continuous Improvement + System Quality

To put in place a quality-assured system in a TEVT institution, the institution must have a strategic purpose. Mainly, it will aim at achieving both customer satisfaction and internal and external effectiveness and efficiency of the institution. Quality management is about people and the peak performance is attained when individual goals coincide with organizational goals and the organizational environment.

What is important is the final outcome. For example if 100% of our students end as being fully qualified and trained teachers, but none of them teach, our outcome is zero despite the fact that our output was 100%.

Quality Management System: A System Concept (IPOO Model)

In its most basic form, any system can be portrayed as:

```
INPUT                  PROCESS                  OUTPUT
   Raw materials     Transformation     Products of the System

OUTPUT

OUTCOME

The effects of Output's

Feedback loop
```

The feedback loop serves to keep the system in a state of dynamic equilibrium with respect to its environment.
There are four stages to achieving total quality and organizations will be at one of them. The four stages are quality awareness, quality promotion, quality management, and quality empowerment.

The concept of total quality management could also be viewed as an ongoing spiral consisting of four distinct steps: diagnosis and preparation, commitment and planning, implementation, and audit and preparation for the next stage.

Quality management is all about managing people. Peak performance is attained when individual goals coincide with organizational goals and the organizational environment.

Achieving quality in an organization happens in four basic stages:

- **Quality awareness**—a few people are trying to achieve something
- **Quality promotion**—Almost everyone is trying to do things better
- **Quality management**—All improvements are aiming in the same direction
- **Quality empowerment**—Everyone involved in planned and/or voluntary self-sustaining improvement activity. Everyone knows what is required.

Many organizations are only at stages 1 or 2, although they would like to be at 3 or 4. However, total quality management is an ongoing process of continual improvement. It involves diagnosis and preparation, careful planning and checking, implementation, and finally auditing, which will result in further diagnosis and a repetition of the process.

There are five pillars of a quality system at a TEVT institution and each pillar depends upon the other four. If one is weak all are weak. These pillars are:

- **Product**—This is the focal point for the organization’s purpose and achievement.
- **Process**—Quality in the product is impossible without quality in the process.
- **Organization**—Quality in the process is impossible without the right organization.
- **Leadership**—The right organization is meaningless without an effective and efficient leadership.
- **Commitment**—Strong, bottom-up commitment is the support pillar for all the rest.
WORKFORCE DEVELOPMENT FOR IMPLEMENTING INFRASTRUCTURE PROJECTS

In order to establish a quality system you must first determine the needs and expectations of customers and other stakeholders before establishing a quality policy and quality objectives. Then the core processes and responsibilities necessary to attain the plans and objectives must be agreed and the necessary resources obtained. Next, methods of measuring the effectiveness and efficiency of each process must be resolved and applied to determine any non-conformities and eliminate their causes. Finally a process must be put in place to continually re-examine and improve the system.

We can consider the Balanced Scorecard System (BSC) developed by Kaplan and Norton in 1992. It requires that strategic objectives are translated into a set of performance indicators at the different levels of the organization. This enables long-term strategic objectives to be linked with short-term operational performance at the sub-unit level, which enables those working at the operational level to see the connection between the activities they manage and the vision, mission and strategic objectives of the organization.

The Japanese have a different concept of quality from those in the west as they place great importance on how they are “being” while they are doing something. This is witnessed frequently in the Japanese ritualistic approach to the tea ceremony, sumo wrestling, or even the presentation of a business card. As a result it would not occur to the Japanese just to “do” a total quality management technique—of course, they would also “be” quality and by contrast, the Japanese view their Western counterparts as precocious children—always chasing after the latest management technique and striving to distil it down to a recipe for “doing.” Finally, quality is not a system or a process; it is an attitude and a way of life and so we should all develop our own quality values and priorities.

The question and discussion session focused mainly on how technical institutes might be improved in Cambodia. Firstly there must be an incentive for teachers to improve and offer high-quality teaching. In order for a teacher to achieve excellence they must be continually striving to improve. Regarding the current state of technical institutes in Cambodia, Dr. Shrestha said that there are problems in terms of the teacher/learning materials. There is poor leadership from the top. This is not to say that there are no other problems in other countries but there is a systemic problem in Cambodia, particularly in not providing enough incentives for teachers. The problem lies with the management and despite aid of US$40 million being provided by the Asian Development Bank for TEVT, the improvement is almost indiscernible.
Competency-Based Training in TEVT
Dr. Ligaya Valmonte, Professor, Don Marino Marcos Memorial State University, Philippines

Introduction

A common scenario in most countries in Asia and the Pacific is the chronic mismatch between available training, student expectations, and the actual jobs. The education sector often graduates students who are overeducated in theories but undereducated in the practical and applied knowledge required for beginning-level technical occupations. Equally, these fresh graduates from baccalaureate degree programs in the engineering and sciences cannot also qualify for high-level research and development jobs. To be able to work, they take technician jobs, which do not make use of the range of scientific knowledge they have acquired and in fact, add a burden to their employers for the required additional hands-on training.

A trend in TEVT addressed to close the widening gap between the industry and education has been the move toward competency-based training (CBT). This approach to training is concerned with the development of a training package with clearly defined, concrete, measurable objectives based on pre-determined industry standards.

Competency, Training, and Competency-based Training (CBT)

Competency consists of a combination of knowledge, skills, and attitudes (KSA) executed, transferred, and applied in the workplace to achieve agreed outcomes. As observable and behavioral acts, competencies are demonstrated in a job context and, as such, are influenced by an organization’s culture and work environment.

Competencies involve successful work performance usually seen to comprise four dimensions: task skills (individual skills), task management skills (managing a number of different tasks within the job), contingency management skills (responding to irregularities and breakdowns in routine), and job or role environment skills (dealing with the responsibilities and expectations of the work environment, including working with others).

Training, on the other hand, is a process which deals primarily with transferring or obtaining the KSA to meet present or future work requirements. Training programs are classified in many ways: type, duration, objective, and specialization. They may be obtained from the formal (technical colleges), non-formal (vocational training institutions), and informal systems. Duration may vary, ranging from short-term (hours, days, weeks) to long-term (six months and longer). Training may also be classified based on objective (basic training, upgrade training, job transfer training, and retraining) or based on specialization (technical, agricultural, nursing, fisheries, health, commercial and business, home economics, etc.)

The “Iceberg” Levels of Competencies

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills</td>
<td>Procedural knowledge, either covert or observable</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Declarative knowledge, either technical or interpersonal</td>
</tr>
<tr>
<td>Cognitive Processing</td>
<td>Analytical and conceptual thinking</td>
</tr>
<tr>
<td>Perception</td>
<td>What people see and pay attention to in their environments</td>
</tr>
<tr>
<td>Self-concept</td>
<td>Attitudes, values, or self image</td>
</tr>
<tr>
<td>Motives</td>
<td>Desires or wants that direct behaviour toward certain goals and away from others</td>
</tr>
</tbody>
</table>
Levels of Competency

Competencies are constructed by levels to examine the skills, knowledge, cognition, perception, self-concepts, and motives that are possessed by people who typify success in the target job. There are five developmental levels of competencies, moving from low to high: novice, advanced beginner, competent, proficient, and expert.

Different competencies can be depicted as different levels of an iceberg, as illustrated. The first four competencies or the tip of the iceberg frequently serve as key components of competency lists because they are visible and measurable. Below the water line of the iceberg lie the competencies that are hidden and more difficult to measure and develop.

The mentioned competencies are also represented by the following body icons:

- The “heart” icon represents motives and self-concept since these basic traits strengthen what people perceive, think about, know, and do.
- The “eye” icon represents perception to symbolize selective perception by any sense: sight, hearing, taste, smell.
- The “head” icon containing a computer chip, a disk drive, and rule bases indicate, respectively, cognitive processing that represents the brain’s “CPU,” content knowledge brain “data bases” (facts); and algorithms and decision rules.
- The “hand,” “mouth,” and “eye” icons symbolize skill competencies for motor behaviors, speech, and information seeking, respectively.

Key Features of Competency-based Training

Competency-based training (CBT) is an approach to technical vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. It emphasizes how the trainee performs rather than what information he has learned. In CBT, the progress is evaluated against pre-established performance criteria or standards. Smith and Keating (1997) identified the following ten key features of the CBT system:

- Based on competency standards,
- Focus on outcomes—not on inputs,
- Involvement of industry,
- Recognition of prior learning (RPL),
- Modularized,
- Self-paced,
- Assessment based on what the trainee can do,
- Assessment criterion-referenced—not norm-referenced,
- Flexible delivery, and
- Competencies widely recognized.

Context of CBT

The concept of a CBT system is both an old and an evolving idea. It traced its roots from the task analysis approaches in the 1860s in which jobs are broken down into single tasks resulting in skill-based training. Partly based on the classical conditioning theory of Sir Ivan Pavlov, Victor della Vos of Moscow developed methods for task analysis. The concept was also based on Bobbitt’s approach of a scientific analysis of human actions to identify underlying abilities needed for high performance in the 1920’s.
Then the behaviourist approach was introduced in the 1960’s leading to single stimulus-responses in programmed instruction chains. Ten years later, cognitive learning theories replaced these programmed instruction models. During the 1970s, the “competency movement” was characterized by detailed analysis of the various behavioural aspects of tasks. Tasks were dissected into their particular component parts, resulting in long lists of fragmentized behavioural elements. At present, CBT is primarily associated with behaviourism, mastery learning, and modular teaching (Mulder, 2004).

**Benefits and Limitations of Capacity-based Training**

<table>
<thead>
<tr>
<th>Basis</th>
<th>Benefit</th>
<th>Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Skills</td>
<td>Technical, Operational</td>
<td>Little conceptual, experiential application and/or knowledge development</td>
</tr>
<tr>
<td>Situation</td>
<td>Routine, Procedural</td>
<td>Little flexibility, low adaptation, little capacity to innovate</td>
</tr>
<tr>
<td>Type of Learning</td>
<td>Good at meeting specific needs</td>
<td>Narrow, fragmenting experience</td>
</tr>
<tr>
<td>Users</td>
<td>Employers value on-the-job learning and standards</td>
<td>Limited evidence that CBT leads to a skilled and adaptable workforce</td>
</tr>
<tr>
<td></td>
<td>Students’ skills are recognized</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transferable qualifications are awarded</td>
<td></td>
</tr>
<tr>
<td>Assessment</td>
<td>Learner control and transparent</td>
<td>Lack of graded assessment</td>
</tr>
</tbody>
</table>

**Benefits and Limitations**

The table below presents benefits and limitations of CBT based on research conducted by the National Centre for Vocational Education Research (NCVER).

In addition, McAshan (1979) cited 14 advantages to this type of training: (i) Avoids duplication of content within a program; (ii) Establishes and maintains consistency of competencies; (iii) Improves individualization of instruction; (iv) Aids in refinement of government-approved accreditation practices; (v) Revises and implements appropriate systems of trainee evaluation; (vi) Better communicates to trainees the learning tasks that they are expected to achieve and how their success will be determined; (vii) Better provides trainees with ongoing information regarding their personal progress; (viii) Better prepares students to function at all levels of learning—KSA; (ix) Makes teachers more accountable to general public for the educational program standards accepted by educational institutions; (x) Refines certification practices; (xi) Provides efficient means of pre-service, in-service training, retraining, and other professional development opportunities; (xii) Bases a student’s fitness to be employed in a given capacity upon his or her demonstrated ability to perform in field situations those functions that are deemed necessary in the positions; (xiii) Better determines trainee achievement through more systematic procedures of evaluation; and (xiv) Improves achievement of desired competencies.

**Trends and Issues in CBT**

Many countries in Asia and the Pacific have demonstrated considerable innovations to cope with the changing demands of the labor market. There is a growing awareness for
the need to adapt CBT to meet the rapidly changing requirements of the economy at the national, regional, and global levels. ANent to these are the major trends such as TEVT national coordinating bodies, internationalization of the curriculum, open and flexible learning, national vocational qualifications frameworks, regional vocational qualifications frameworks, and mutual recognition agreements.

The following issues, based essentially on the current trends, can be noted.

**Competency standards.** For competency standards to be the viable base for CBT and training packages it is essential they maintain their currency with industry by accurately reflecting the skills required. This means national competency standards will have to be regularly reviewed by a technical panel consisting of stakeholders from the industry, academe, local government, etc.

**Balancing job-specific and generic skills.** While CBT is generally applauded for enabling a clear focus on job-specific skills, the importance of conceptual and experiential knowledge should not be left behind. There should be a balance between these skills to enable the trainees to continue to grow and develop in the workplace and in society.

**Integration of key competencies into training programs.** Key competencies should be reflected in the training package. Ways of better integrating the educational experiences which address the key competencies into CBT programs should be devised so that trainees are able to build skills and knowledge cumulatively. This will require links to be made between modules and the establishment of learning conditions that support the acquisition of key competencies.

**Transferability of learning outcomes.** CBT learning outcomes need to be portable and articulate with other education sectors so the skills pool is developed and renewed over time. It is important to ensure that TEVT sector conditions are sympathetic to trainees who undertake CBT to equip themselves with KSAs to change as well as to consolidate their career paths. This is particularly important in an economy where employees are increasingly required to change career paths several times in working life.

**Partnerships between industry and TEVT providers.** CBT has effectively established the industry as a learning environment. Such partnerships should provide trainees with integrated TEVT that combines job-specific skill acquisition with generic skills and skills for adaptability and flexibility. Policies that encourage such partnerships are needed to make such partnerships working and workable. The use of flexible delivery techniques to build and develop such partnerships is fertile ground for their effective creation.

**Industry trainers and assessors.** CBT has established industry trainers and assessors as important TEVT system participants. It is an appropriate time to review the standards and professional development requirements of these staff to ensure they are capable of fulfilling the roles required in CBT delivery and be effective links to further vocational education and training opportunities for learners.

**CBT as a marketing tool.** Enterprises value CBT, particularly for developing job-specific skills. To increase the participation of industry, consideration should be given to utilize CBT as a marketing tool for the TEVT system. TEVT providers of all types could be supported by national marketing campaigns highlighting the advantages and value of CBT for enterprises.
**Professional and staff development of TEVT trainers.** To effectively deliver CBT, training staff will need on-going staff and professional development to maintain work-relevant skills within which they will be in a state of continuous change. They will require marketing skills in an environment of user choice and will need to broker learning in and between workplaces. There is a need for a national staff development policy supporting the full range of the various future needs of provider staff.

**Assessment of competence.** There is general agreement among providers, employers, and trainees that CBT would be improved if some form of recognition of excellence was established. Policy should be developed to enable graded assessment to take place in CBT on a consistent and accepted basis.

The question and discussion session brought out further details of capacity-based training programs. These programs are used in the Philippines, in Australia, and in most Southeast Asian countries. In the Philippines, for instance, four levels of courses are offered.

**Quality Assured Technical Teacher Training Program: A Strategic Model**  
Dr. Pramod Shrestha, Professor, Dept. of Mechanical Engineering, Institute of Engineering, Tribhuvan University, Kathmandu, Nepal

> “Excellence is an art won by training and habituation. We do not act rightly because we have virtue or excellence, but we rather have those because we have acted rightly. We are what we repeatedly do. Excellence, then, is not an act but a habit.”
>  
> Aristotle

**Introduction**

Models, like myths and metaphors, help us to make sense of our world. Whether it is derived from a whim or from serious research, a model offers its user a means of comprehending an otherwise incomprehensible problem.

What is effective teaching and learning? Unsurprisingly this question is raised repeatedly. The simplest answer is that more effective teaching and learning takes place when a variety of teaching strategies are provided in the classroom and when the emphasis is on gaining understanding rather than just right answers.

However, it is important to remember the input process output outcome (IPOO) model and that the final outcome rather than the output is most important. Reaching and training needs a variety of teaching strategies. Different methods are appropriate for different areas of knowledge; furthermore, students have differing levels of background knowledge. Students have different learning preferences; some are more visual learners, some like working in groups, some prefer the written word, etc. A monotonous diet of the same teaching style will cause even the keenest student to lose interest.

The main challenge associated with new technical training initiatives is not with motivating teachers to want to improve their teaching, but rather with the effective transfer of the knowledge and skills attained from their professional learning and training experience to the classroom with the purpose of enhancing student performance. In particular training students in methods using advanced technology may not always be appropriate to the students when they return to their city or rural location and have no access to the same technology.
The challenge before us is to develop and implement a quality assured teacher training program that will train our technical teachers to teach effectively and efficiently so that the students will learn all the skills, knowledge, and attitudes in technical training programs. The technical teacher training programs have a number of additional challenges in the developing countries, some of which can be summarized as follows:

- Training and education are not subjected to adequate quality assurance and control—very few courses are accredited.
- Training courses are generally input-based (numbers of teachers per program) rather than outcome-based.
- The mechanisms for determining teaching and learning needs of the student are inadequate, which leads to a teacher-driven system (not a student or learning-driven system).

**Challenges—Technical Teacher Training Programs**

There is very little standardization of technical teacher training courses and even courses with the same titles can have different contents, duration, and training strategies. There is also very little coordination between the training institutions and the training center.

The integration of teaching and learning competencies in the curriculum and in the training courses is also lacking. Entrepreneurial training is frequently divorced from training courses. There is a lack of competency-based standards in the context of technical teacher training programs.

**Teacher Training Program—What Should our Strategy Be?**

The technical teacher training programs of the future must be:

- Focused on the learner—meeting the needs of a diverse group of learners,
- Oriented to outcomes—with close links to teaching and learning competency standards, ensuring that all trained teachers have the skills they need to compete in a continually changing society,
- Integrated—sharing common resources with common credentials and avoiding duplication in order to enable easy transition among institutions and all forms of non-traditional learning, and
- Innovative—incorporating information and learning technologies, developing new partnerships (industry and community), and ensuring that the system is affordable and accountable.
Quality as Fitness for Purpose

Central to the quality of technical teacher training initiatives is a definition of quality of teaching and learning as fitness for purpose, and therefore the quality of teachers will be the deciding factor in any education and training context. So we might ask: Does the present role of the technical teacher in the classroom fit today’s purpose? Does the present style and content of technical teacher training program fit today’s purpose?

On the whole they do not and substantial reform is necessary in our teacher training programs.

Some Reform Strategies

Such reform strategies might fall broadly into:

- revision of training targets and standards and consequentially of the curriculum, including the range of teaching and learning methods employed, to ensure that emerging individual (student), social, and economic needs will be met;
- reform of both pre-service and in-service technical teacher education and training to equip new and existing teachers to meet these new demands; and
- more systematic direction of technical teacher education and the introduction of quality standards and quality assurance for technical teachers.

Teaching and Learning Standards for Teachers

In the United States, the National Board for Professional Teaching Standards has developed the National Board Certification, a system that establishes high and rigorous standards and reliably identifies accomplished teachers who meet these standards (Open Society Institute, Institute for Educational Policy, http://www.osi.hu/iep/). The National Board Certification involves three critical elements:

- Standards—establishing a unifying vision for what accomplished teachers must know and be able to do and what accomplished teaching practice is, and codifying these standards in specific teaching specializations;
- Assessments—creating reliable and valid performance assessments tailored to specific subjects taught and developmental levels of students instructed, that are also powerful learning experiences for teachers; and
- Professional Development—providing a learning curriculum for excellent teaching and a repertoire of ways to incorporate the substance of this vision into teaching practice.
Five Important Elements of Excellent Teaching

National Board standards and assessments are based on five general propositions about excellent teaching:

- Teachers are committed to students and their learning.
- Teachers know the subjects they teach and how to teach those subjects to students.
- Teachers are responsible for managing and monitoring student learning.
- Teachers think systematically about their practice and learn from experience.
- Teachers are members of learning communities.

Conclusion

In 300 BC, Socrates engaged his learners by asking questions (known as the Socratic or dialectic method). He often insisted that he really knew nothing, but his questioning skills allowed others to learn by self-generated understanding. Plato, who was a student of Socrates and the teacher of Aristotle, wrote down the Dialogues, which have inspired thinkers for more than two thousand years. Plato called this process the dialectic, and considered it the pinnacle of learning. One of the significant features of the dialogical (dialectic) method is that it emphasizes collective activity, as against solitary activity. This is a question and answer form of arguing with an “expert” on one side and a “searcher” on the other. In the dialogues, the questioning of the expert by the searcher often exposes gaps in the reasoning. It is through this back and forth argument amongst friends (or adversaries) that understanding grows and becomes revealed to the learners. Such philosophical pursuit alongside and within a full education allows humans to transcend their desires and sense in order to attain true knowledge.

In the 5th-century BC, the philosopher Lao-Tse wrote, “If you tell me, I will listen. If you show me, I will see. But if you let me experience, I will learn.” And so began one of the first active learning philosophies. Other Chinese philosophers, such as Kung Fu-tse (Latinized as Confucius) and Han Fei-Tzu, followed Lao-Tse by using a method that closely resembles what we now call the case method or case study.

We must find ways to make it happen by focusing on the incentives and standards for teaching excellence in order to empower our most precious resource: our students in the 21st century. Only by empowering them can we meet the broader national and societal challenges we face.

In the question and discussion session, Rolf Genrich commented that the most important criterion for improving the quality of the teaching process is to have an enabling teaching environment and realistic salaries.
Occupational Standards and Accreditation in TEVT
Dr. Tariq Mahmood, Faculty Consultant, Colombo Plan Staff College for Technician Education (CPSC), Pakistan

Introduction

For TEVT accreditation to be meaningful to employers/industries, employees or students, institutions/agencies/governments, educators/teachers/professionals it should be linked directly to occupational standards. This presentation examines the development of occupational standards, makes recommendations for their future development, and then goes on to discuss TEVT accreditation, before finally inspecting the relationship between TEVT accreditation and occupational standards.

What are Standards?

Standards are an agreed reference framework, which enable people to compare and judge the quality of products and services. International standards provide the additional benefit of ensuring that compliant products and services fulfill specifications that have worldwide agreement and acceptance and provide confidence in quality, safety, and reliability.

Standards are developed based on needs. Some of those needs come from industry and from the service and business sectors, whereas others have developed from customer demands. Either way they both increase product/service quality and stimulate competition between the product/service providers.

As well as standards associated with the products/services purchased by end customers, an understanding of the quality assurance process has given rise to the need for standards relating to the skills and processes within the workplace. This process now has wide acceptance, with many companies wanting to achieve ISO certification. High performance workplaces are the key to economic competitiveness. Skill standards link employers, workers, and educators by providing a common language and common goals.

Development of Occupational Standards

The process for developing a standard is illustrated in the flow chart below.
Currently, there is a skill gap between what industry needs and the skills offered by employees. The TEVT institutions have the responsibility to close that gap. In order to meet the requirements of organizations who demand that their workforce work to quality standards and output quality products, TEVT institutions need to introduce or amend their training processes to produce TEVT graduates that can produce sustainable high-quality work which will meet these standards.

Occupational standards are agreed industry-identified knowledge, skills, and abilities required to succeed in the workplace. They are performance specifications that identify the knowledge, skills, and abilities an individual needs to successfully fulfill a particular employment function. Skill standards are critical to improving workforce skills, raising living standards, and improving the competitiveness of economy.

The figure shows a hierarchy of standards and competencies, in which fewer industry high-level specific skills are built upon a lower level of less specific skills and abilities. These in turn are underpinned by a foundation of many general and lower skills.

Research was conducted to find out the procedures that had been taken in a number of countries to develop standards. The countries that were investigated were the United Kingdom, Japan, Canada, Germany, and New Zealand. The responsible bodies and processes differed from country to country, but they all used a combination of government initiatives, national councils, institutes, authorities established as standard setting bodies, sectoral bodies, committees, and groups composed of all stakeholders to develop occupational standards.

Most significantly, though, they had all produced national qualifications and certification frameworks based on occupational standards.

There are four phases of developing standards which can be best illustrated in the following diagram. The phases can be best simplified as plan, do, check, and act.

From inspection of the procedures carried out in the countries examined, the following recommendations have been developed for developing occupational standards in developing countries.

- Developing countries must start occupational standard development at the local level, then move to the national approach.
Employers, professional associations, and labor representatives need to be involved formally from the beginning to ensure that the process is demand and output-driven. Multiple sources of labor market information should be used to identify the skills standards needed. Developing countries may obtain standards from developed countries for benchmarking purposes and adopt those which are international in scope. Development of performance and knowledge assessment should be linked directly to occupational standards as opposed to training standards. Establish a clear linkage between the educational inputs and occupational employment output. Establish a national body to formalize the stakeholders’ involvement, who should own the standards, coordinate, and sustain at the national level.

**Accreditation**

Accreditation is a process of evaluating an institution, program, or accrediting body against set standards and criteria with the result of a certification. Its purpose is:

- To develop and maintain quality institutions;
- To ensure the credibility and value of a program or course;
- To enable student mobility between institutions by means of credit transfer;
- To promote regional accreditation for the greater purpose of workforce mobility;
- To establish criteria for professional certification, licensure, and the upgrading of courses; and
- To keep self-monitoring and evaluation for continual improvement.

It is a primary method of maintaining standards in education. It can be either voluntary or mandatory, and is used by most Colombo Plan Staff College (CPSC) member countries. The process of accreditation is best represented by the diagram below.
Many accreditation systems are now being developed and agreed upon regionally rather than at just a national level. Several regions (including but not limited to the following) were explored: the South African Development Community, the European Union, the Pacific Islands Forum, and the Caribbean Community (CARICOM).

**Relationship between Occupational Standards and Accreditation**

Any accreditation system should be built on the solid foundation of occupational standards at a national or where possible a regional level. This clearly applies to TEVT as well as to any other training. This relationship is illustrated in the following diagram.

Additional time was spent in the question and discussion session to address how best to involve stakeholders. Dr. Mahmood recommended bringing the stakeholders together in a physical location because once they are all together in the same room they quickly become involved and committed to the process. The difference between local and national standards was also brought up. Standards can begin by developing at the local level and then be brought forward to the national level.
Emerging Instructional Technologies

New Paradigms for Technical Teacher Training
Dr. Shyamal Majumdar, Regional Vice-President for Asia and Pacific, IVETA, India

Introduction

There has been a radical change in economic development; in society there is a current knowledge explosion that includes an information and communication technology (ICT) revolution. Development of new broadband communication services and convergence of telecommunication with computers have created numerous possibilities to use a variety of new technology tools for teaching and learning. This has led to the emergence of a more knowledgeable society which enables the learner to share learning resources and spaces, promote learner-centered and collaborative learning principles, and enhance critical thinking, creative thinking, and problem solving skills. Workers are now developing higher order thinking (HOT) skills with a paradigm shift away from manual work to a thinking approach to working.

New Paradigms

Education is experiencing major global paradigm shifts and changes in the teaching and learning environment—particularly for TEVT. There has been an ICT revolution in which technology has changed the nature of the learning process with a new learning culture and growth of communication and computer systems beyond the classroom. These rapid technological changes now enable a process of lifelong learning that is not confined to formal learning but continues within the workplace.

This entire technology set has also changed how teachers have to learn new things and integrate sustainable education in TEVT. The traditional teaching model is a rote method of “chalk and talk” with the main focus on teachers and the learners playing a passive role. This model of teaching has evolved into an information teaching model in which the focus is on the learner. Learning is more active with the use of personal computers enabling one to one individual learning. However this is now changing again towards a knowledge teaching model in which the focus is on group learning and synchronized learning within a virtual classroom. The role of the learner is adaptive; it involves not only a personal computer but also networking with others.

Changes in Teaching-Learning Environment

<table>
<thead>
<tr>
<th>Model</th>
<th>Focus</th>
<th>Role of Learner</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>Teachers</td>
<td>Passive</td>
<td>Chalk &amp; talk</td>
</tr>
<tr>
<td>Information</td>
<td>Learners</td>
<td>Active</td>
<td>Personal computer</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Group</td>
<td>Adaptive</td>
<td>PC &amp; network</td>
</tr>
</tbody>
</table>

Changes in Teachers’ Roles

As learning models change so must the role of a teacher; a teacher needs to move from being a transmitter of knowledge to being guide and facilitator of knowledge, from being a controller of learning to a creator of learning. A teacher is no longer always an expert but a collaborator and co-learner. Instead of learning to use ICT teachers need to use
ICT to enhance learning (use of multi-media) and move from expository learning to exploratory learning. Teachers are expected to create a new flexible and open learning environment with interactive, experiential, and multimedia-based delivery systems.

**Changes in the Learner’s Role**

The learner’s role will also change from that of a passive learner to becoming an active learner and from being a reproducer of knowledge to a producer of knowledge. The learner is no longer a dependent, solitary learner but an autonomous, collaborative one in which a generic skill is learnt in order to learn the new skills that industry requires. Learners are expected to collect, select, analyze, organize, extend, transform, and present knowledge using ICT in authentic and active learning paradigm.

**Changes in Curricula**

The curriculum needs to adapt to ensure learner outputs are not focused on memorizing facts but are inquiry-based and that teaching experiences lead to authentic, open, and flexible learning. Therefore, the curriculum must move from a single-path progression to multi-path progression using creativity, flexibility, and logistic, administrative, and organizational skills.

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive Learner</td>
<td>Active Learner</td>
</tr>
<tr>
<td>Reproducer of Knowledge</td>
<td>Producer of Knowledge</td>
</tr>
<tr>
<td>Dependent Learner</td>
<td>Autonomous Learner</td>
</tr>
<tr>
<td>Solitary Learner</td>
<td>Collaborative Learner</td>
</tr>
<tr>
<td>Solely Learning Content</td>
<td>Learning to Learn/Think/Create &amp; Communicate</td>
</tr>
</tbody>
</table>

**Changes in Teachers’ Roles**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter of Knowledge</td>
<td>Guide &amp; Facilitator of Knowledge</td>
</tr>
<tr>
<td>Controller of Learning</td>
<td>Creator of Learning Environment</td>
</tr>
<tr>
<td>Always Expert</td>
<td>Collaborator &amp; Co-learner</td>
</tr>
<tr>
<td>Learning to use ICT Didactic/Expository</td>
<td>Using ICT to Enhance Learning Interactive/Experiential/Exploratory</td>
</tr>
</tbody>
</table>

**Changes in Media Applications**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Sense Stimulation</td>
<td>Multi Sensory Stimulation</td>
</tr>
<tr>
<td>Single Media Application</td>
<td>Multimedia Application</td>
</tr>
<tr>
<td>Delivery of Information</td>
<td>Exchange of Information</td>
</tr>
<tr>
<td>Monologue Communication</td>
<td>Dialogue &amp; Collaborative</td>
</tr>
<tr>
<td>Analogue Resources</td>
<td>Digital Resources</td>
</tr>
</tbody>
</table>

**Changes in Curricula & Delivery**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memorizing Facts</td>
<td>Inquiry Based</td>
</tr>
<tr>
<td>Artificial Teaching Exercises</td>
<td>Authentic Learning</td>
</tr>
<tr>
<td>Rigid Delivery</td>
<td>Open &amp; Flexible Delivery</td>
</tr>
<tr>
<td>(Fixed Time &amp; Space)</td>
<td>(Any Time &amp; Anywhere)</td>
</tr>
<tr>
<td>Single-Path Progression</td>
<td>Multi-Path Progression</td>
</tr>
</tbody>
</table>

**Changes in Learners’ Roles**

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller of Learning</td>
<td>Experiential</td>
</tr>
<tr>
<td>Teacher</td>
<td>Learner</td>
</tr>
</tbody>
</table>

Teaching media will change from single sense stimulation to a multi sensory stimulation and information will need to be exchanged rather than just delivered. Resources will also change from analogue to digital resources. ICT should help teachers and learners to communicate and collaborate without boundaries; it should make learners autonomous and allow teachers to bring the whole world into classroom activities.
These paradigm shifts give the learners a completely new role that was not described earlier in the transmission model of teaching. Technology and teacher professional development in its use are best introduced in the context of broader educational reform which embraces a shift away from teacher-centered, lecture-oriented towards an learner-centered, interactive and constructive learning environment. ICT can play the role of catalyst for such educational reforms. Multimedia-based courseware can promote effective instruction that is more engaging, learner-centered, interdisciplinary, and more closely related to real life events and processes and adaptive to individual learning styles and needs. It also encourages higher order thinking skills and helps to construct knowledge socially.

All these changes taking place in learning and teaching demand a new learning environment to effectively harness the power of ICT to improve learning. ICT has the potential to transform the nature of education: where, when, and how learning takes place. It will facilitate the emergence of a responsible knowledge society emphasizing lifelong learning with meaningful and enjoyable learning experiences.

“A teacher can never be a teacher unless he is still learning himself.
A lamp can never light another lamp unless it continues to burn its own flame.”

Rabindranath Tagore

In the question and discussion session, Dr. Majumdar was asked to name the percentage of people in India who are illiterate. This percentage, very approximately, is 4 to 5 percent. Regarding the proportion of students in India who are using ICT in education, the speaker said that many schools in rural areas have no ICT facilities due to poor infrastructure, and that therefore rote learning still has a place especially in developing countries. The speaker went on to say that in Pakistan it had been noted that ICT will automatically become part of the learning process regardless of government-initiated programs and that teachers will be forced to learn because students will want to know.

Role of Information Technology in Teacher Training
Matthew Holden, SAP Asia, Pte. Ltd, Singapore

Introduction

When looking at the future of IT we need to consider the trends and likely outcomes, the changing world, the broadband lifestyle, ubiquitous autonomous networks, and mobile education. The technological inter-connectedness of our regions is one of our biggest problems. However, Cambodia is a good example in bypassing analogue and moving to digital connectivity. There is a need for infrastructure to be in place for programs to operate.

The Internet is currently used for education delivery using several different approaches. The CD-ROM is perhaps still the cheapest and most effective way to share information. Other methods include distance leaning, online universities, and delivery through vendor contributions, i.e., large technological organizations that are able to make programs work. One area still to be developed is the need for governments to work more closely with vendors to learn how to use software.

The physical components of hardware are getting smaller, smarter, and cheaper. One example is the massive array cellular system (MACS). This was originally designed by Victor Pierobon as disruptive technology to replace all chargeable communication systems with an
entirely free system. Freenet is another system that the United States is experimenting with domestically to provide free open Internet access for all.

**Portable Devices**

Another project is the One Laptop per Child Program in which it is envisaged that every child will be provided with a flash memory-based portable laptop that can access wireless broadband and freenet systems. Laptops offer the advantage of being moved and shared around whereas desktop computers limit people’s access.

Portable devices will continue to decrease in price whilst storage capacity is increasing at a phenomenal rate, examples being digital cameras and music players. The tools and technology are already with us and it is up to us to harness these to enable access to information. Podcasting is a new initiative delivering audio content to iPods and other portable devices on demand; it can also be listened to through nearly any computer.

Technology is moving at an extraordinary pace and emerging economies must act now to catch up on the ever widening technology and education gap. Paying attention to new technologies such as podcasting will yield economically effective ways to reach audiences.

In the question and discussion session, Mr. Holden highlighted the need for supporting structures for ICT. For example, if a photo copier machine is donated to an organization but no provision is made to buy paper or toner, the machine will become useless because enabling elements are required.

**Integration of ICT in Technical Teacher Training**

Dr. Shyamal Majumdar, Regional Vice-President for Asia and the Pacific, IVETA, India

**Introduction**

Several attempts have been made to classify the functions of ICT in education. However, the most comprehensive and well-defined classification describes the several functions of the use of ICT in education and the level of the students’ knowledge. ICT can be used as an assisting tool, as an object or a discipline, as a medium of teaching and learning, and as a tool for organization and management. Let us describe these functions in greater detail.

Generic ICT assisting tools may be general or specialized in their application. They include such tools as word processing and publishing, database tools, and statistical modeling tools.

ICT as a discipline refers to learning about ICT. This is mostly organized in a specific course. What is being learned depends on the type of education. For example, learning could focus on producing assignments, collecting data and documentation, or communicating and conducting research. It is independent from subject content.

ICT as medium of teaching and learning is the use of ICT as a tool for the purpose of teaching and learning itself. This started with computer-assisted learning (CAL), and then moved onto multimedia courseware, which was followed by web-based instruction and finally computer-mediated communication (CMC).

CAL provides flexibility and enables interactivity and a learner-centered approach. The method of usage involves practice, tutorials and simulation and also enables self-paced instruction. Interactivity refers to the user engaging in direct and continual two-way communication with the computer, responding to questions and receiving feedback to answers provided. The computer user is an active participant in the learning process. The potential for a student merely to observe the learning activity is largely removed in CAL.
The interactive capability of the microcomputer offers considerable potential to both the learner and teacher. Pedagogically the objectives are behavioral.

Multimedia also features interactivity and the multi-modal instruction approach. Hypermedia, 3D animation, and simulation are involved and again allow for self-paced instruction. Multimedia is concerned with the computer-controlled integration of text, graphics, still and moving images, animation, sounds, and any other medium where every type of information can be represented, stored, transmitted, and processed digitally. As a result, multimedia based instructional software facilitates active learning by stimulating multiple senses. It is appropriately used for student-centered learning and real-time assessment and feedback. The pedagogical objectives are also behavioral.

The driving force for the development of web-based instruction (WBI) was the re-definition of learning as a social activity involving extensive use of the computer network. WBI is also known as online education or network-based education. In this environment all the actors in the learning process—learners, tutors, and experts—are connected via a computer network to overcome isolation, enhance group interactivity, and promote collective development.

Collaborative technology is the foundation of this instruction, which supports the learning objectives in conjunction with learning team-centered education. The pedagogical base of WBI is based on constructivist philosophy.

**ICT for Educational Management Information System (EMIS)** refers to the utilization of application software for educational management information systems including record keeping, building databases, developing examination schedules, and other administrative purposes.

Computers facilitate learning by:

- Providing access to ideas and information from diverse sources through searching, locating, selecting, and authenticating material in a wide range of multimedia forms,
- Extending ideas and information through processing, manipulating, analyzing, and publishing material in different multimedia forms,
- Transforming ideas and information into new or different forms through synthesizing, modeling, simulating and creating material in many multimedia styles and formats, and
- Sharing ideas and information across local, national, and international networks by interacting electronically with others in actual and/or delayed time.

**Modeling ICT Development in Education**

There are a number of stages in the development of the usage of ICT. These can be termed the emerging, applying, infusing, and transforming stages. Schools at the beginning stages of ICT development demonstrate the **emerging** approach and then after understanding the contribution of
ICT to learning, move on to **applying** the approach. The **infusing** approach comes later and involves integrating or embedding ICT across the curriculum. This is seen in those schools that now employ a range of computer-based technologies in laboratories, classrooms, and administrative offices. Schools that use ICT to rethink and renew school organization in creative ways are at the **transforming** stage. Different countries can also be seen as currently exhibiting these different stages in their usage of ICT.

Using the ICT continuum model, competency levels can be derived that reflect a teacher’s continuous development of technology capability and pedagogical capability. To be most effective, the ICT activities that a development program provides are likely to deepen in complexity as a teacher’s understanding and skills improve. It is recognized that some teachers who may have excellent pedagogical skills may be only at the emerging stage of technology.

Similarly, newly qualified teachers may have high technical skills but low pedagogical skills. Consequently, the training has to be designed appropriately. Each stage of the ICT development model characterizes the expertise the teacher is required to possess in pedagogy clusters, technology clusters, and integration strategies.

Studies of teaching and learning in schools around the world identify four broad stages in the way that teachers and students learn about and gain confidence in the use of ICT. These four stages give rise to the mapping depicted in the diagram that have been broadly classified as supporting work performance, enhancing traditional teaching, facilitating learning using multi-modal instruction, and creating innovative environments.

### Technology in the Classroom

Three types of technology are used: distributed, interactive, and collaborative technology. Let us discuss the relationship between type of technology and instructional model used in the classroom environment.

There is a close relationship between technology and instruction, as depicted in the diagram. As we move from distributed technology to interactive technology and finally to collaborative technology, there is progressive increase in learner control and greater opportunities for dialogue and emphasis on thinking skills, rather than on mere comprehension. The initial starting point supports the instruction-centered approach along with the information transfer learning objectives. The underlying pedagogical assumption was to transfer information, rather than to interpret or change
it. In the second phase interactive technology was the foundation that allowed the learner to progress at his or her own pace towards the goal of skill acquisition. The underlying pedagogical assumptions had moved to being learner-centered.

In the third phase, collaborative technology is the foundation which supports the learning objectives in conjunction with learning team-centered education. The learning team-centered approach creates an environment in which knowledge emerges and is shared through the collaboration of individuals within learning teams.

**What Does ICT Bring to the Classroom Environment?**

Many experts are predicting that ICT will bring about several benefits to the learner and the teacher. These include the sharing of resources and learning spaces as well as the promotion of collaborative learning and a general move towards greater learner autonomy. One of the most striking examples of ICT is to share learning resources amongst learners and facilitators throughout the networks. Networked computing facilities create a distributed environment where learners can share work spaces, communicate with each other and their teachers in text form, and access a wide variety of resources from internal and external databases via web-based systems through the Internet.

In conclusion, ICT can represent information dynamically and can be used to communicate effectively about complex processes. It can provide opportunities for flexible and interactive learning. It can facilitate collaborative working and provide greater problem solving skills. It can be used as an explanation aid and in addition harnesses multiple senses for learning. It also enables students to exercise more effective and efficient control over their own learning.

In the question and discussion session, participants asked about the negative effects of using ICT in TEVT. One possible negative side effect is that technology can make the person very dependent upon the usage of that technology. For example, someone may need to use a calculator to work out what the change is from $1 for the purchase of a 99¢ hamburger. Similarly children can become very dependent upon the technology they are using.

Regarding a participant’s question on how to build the capacity in Cambodia to use ICT in TEVT, the speaker explained that only developing and implementing a policy to do so could achieve this goal. The importance and usefulness of ICT needs to be recognized by everyone from ministry officials down. Initially an ice-breaking strategy needs to be used to allay fears. From there, we can move forward to awareness and then competency levels.

On the appropriate level of training a trainer needs in order to be able to successfully use ICT within a training program, Dr. Majumdar recommended short-term modular focused courses on one aspect of ICT, e.g., Excel or database design. Making each module about two weeks is successful, but modules could be spread over four weeks. However, the level of training for the ICT trainers would need to be longer. These courses for the ICT trainers of the teachers would be from 9–18 months.

The chairperson remarked that being able to work in a group is very important, as this is what happens in real life. When we just examine people individually we often find that they cannot work in a group. Some research has been done in both training and assessing doctors as a group without any traditional individual exam. This has proved very successful.
Introduction

Over the last few decades computing systems have greatly increased and have become widespread and commonplace; many microchips are embedded in many household devices. We are now moving onto a fourth phase of computing: ubiquitous computing.

Ubiquitous means being or seeming to be everywhere at the same time, so for computing to be “ubiquitous” it must be available wherever we go and whenever we want to use it. We must be able to access the computing network and acquire the necessary information.

In practical terms, ubiquitous computing is the method of enhancing computer use intellectually by making many computers available throughout the physical environment (with microchips in products, roads, bridges, tunnels, buildings, and others in connection with mobile networking systems), but making them effectively invisible to the user.

Ubiquitous computing has the following four characteristics. Firstly, it involves a computer which is connected to a network, although—secondly—its human-like interface is invisible. Thirdly, it is always possible to use a computer in the real world, not a virtual world; and finally its service changes according to a user’s context at any place, for any device, any identification, any time, any temperature, or any weather. It is this total flexibility which is new.

We now need to harness this technology into the teaching and learning process. For some time considerable use has been made of utilizing computing within education, but we need to progress to use the new technology.

..."a new way of thinking about computers in the world, one that takes into account the natural human environment,” Mark Weiser (1952-99, Palo Alto Research Center of Xerox Co.) hoped to create a new world in which people interacted with and used computers without thinking about them...

The 4th Wave of Environmental Changes

- **1st Wave**: Primitive Society
  - Agricultural Revolution (During Several Thousands Years)
- **2nd Wave**: Agricultural Society
  - Industrial Revolution (During Several Hundreds Years)
- **3rd Wave**: Industrial Society
  - Information Revolution (During Several Decades)
- **4th Wave**: Ubiquitous Society
  - Integrated Space Revolution (During Several Years)}
Online education started in the mid-1990s. Offering e-teaching and learning offered new ways for students to access many resources anytime. This then progressed to mobile teaching and learning which is not only wireless or Internet-based e-teaching and learning but includes the concept of anytime and any place without permanent connection to physical networks. Now we are moving forward to the realm of ubiquitous teaching which technically involves a computing environment with integrated networks and invisible computers equipped with sensor micro-chips and radio frequency identification (RFID) systems that can be accessed everywhere. This then enables anyone to carry out information transactions anytime, anywhere, and without special awareness or skills.

The advantages of mobile teaching and learning compared to e-teaching and learning include flexibility, cost, size, and ease of use. The devices are mainly PDAs, mobile phones, portable computers, and tablet PCs with wireless communication.

**Trend of Teaching and Learning Systems**

Any of the three trends of teaching and learning systems (TLS)—electronic TLS (e-TLS), mobile TLS (m-TLS), and ubiquitous TLS (u-TLS)—can provide the possibility of augmenting text with voice, video, animation, and any other interactions. Even with limited connectivity beyond an institution, a teaching and learning path can be determined, technology and knowledge can be taught, and a systematic teaching and learning experience can be provided. With connectivity always available, a fine-grained and rich learning environment can always be available whenever and wherever it is convenient.

**Impact of Ubiquitous Technology in Education and Training**

The rapid and accelerating move toward the adoption and use of mobile technologies has provided teachers and learners with the ability to study away from the classroom and on the move. Wireless and mobile technologies influenced the evolution of current e-TLS use and the development of a new mode of education enabling anytime, anywhere, and anyhow learning: u-TLS provides an even greater freedom than the current learning environments, which have limited access to contents. Its applications also provide the facilities for creating personalized learning environments. Under ubiquitous computing, handheld devices are always networked, thereby allowing easy input through pens and/or speech or even a virtual keyboard when necessary. These devices also have the ability to let the learner see high-resolution images and hear quality sound.

For example, a student ID card with an embedded microchip could be used for student information search, buying snacks at vending machines, as a traffic payment card in the city, as electronic cash, and for attendance check, entrance admission, and parking management in campus life.
Future U-Teaching and Learning System

Developing the ability to learn has become the primary goal of future education and training. It is necessary to universalize access to education, including higher education and technical and vocational education and training.

Step 1: Registration to a multimedia course

Step 2: Applying for teleconferencing contents development course session

Step 3: Identification of contents

Step 4: Interaction with teacher for projects

Ubiquitous Classroom

Below is an example of a ubiquitous classroom equipped with the following components through access point and sensor nodes:

- Doors contain sensors that recognize and verify people with RFID tags, identify their attendance, and monitor every person coming in and going out.
- Lamping and light system automatically adjusts to the illumination requirements of the ubiquitous classroom and the attendance of the people.
Windows automatically close and open according to the degree of sunlight entering the classroom, air circulation, and rain.

Classroom computing system is a monitoring and controlling system that identifies users and keeps track of the results of all teaching-learning processes, such as attendance, evaluation, and achievement.

Flowerpot identifies its management status such as need for water, soil, and light.

Classroom chairs, with the students’ RFIDs, recognize the assigned students, their attendance, and health status and link to the server for health care.

Multi-vision helps classes in connection with the school server and provides full class information such as student affairs, admission, and others.

A Ubiquitous Classroom

Conclusion

The u-TLS is a new and emerging teaching and learning system integrating the e-TLS of cyber space and the m-TLS of physical space with a global repository which has the potential to be accessed by anyone at any place and any time under a ubiquitous computing environment.

The adoption and adjustment of these ubiquitous technologies will radically revolutionize education and training systems and provide a shift from fixed traditional methods to the usage of a flexible innovative curriculum, teaching and learning methodology and tools, and multidimensional control. Processes will be monitored by identification systems and will include self-paced learning. In this way, the learning environment will become completely unconstrained.

Indeed, the promises of u-TLS are manifold; however, the requirements are overwhelming. The u-TLS environment requires a re-engineering of the education and training system: a new breed of students with knowledgeable and creative ICT skills to keep up with this radical evolution. This new technology evolution will also mean significant challenges for teachers who will no longer be passive suppliers of information but space goods providers.

The transition from e-TLS and m-TLS to u-TLS needs a check in the re-usability and conversion of all existing materials. In addition, a change in the educational information system will mean a complete overhaul in the whole management information system, which alone would be an onerous exercise. Another issue will be the identification and security control system for protection of u-TLS and the privacy considerations. Consequently this transition will require considerable and commitment by all those involved, but will reap rich rewards.
Overview of Learning Content Management Systems (LCMS)
Subodh Tripathee, First Vice Chairperson, Forum for Information Technology, Nepal

Introduction

Knowledge management is the process of creating, capturing, and using knowledge to enhance organizational performance. It is most frequently associated with two types of activities: firstly obtaining and documenting knowledge and then disseminating it.

“A Learning in the Past and Present”

A content management system (CMS) is a system used to manage the content of a web site. This allows the content manager or author to manage the creation, modification, and removal of content from the website without needing the expertise of a webmaster.

A learning management system (LMS) is a system for the management and tracking of the involvement of participants with specific content, usually with the assistance of a database. Typically, a LMS tracks who is scheduled to participate in specific training programs, who has begun the program, who has completed the trainings, and what were the participant’s test scores.

Learning objects are small electronic units of educational information that are flexible, reusable, customizable, and interoperable. In order to use them in different contexts, presentation of learning objects has to be separated from the content.

Authoring tools are computer software tools that help content (multimedia) developers to create learning products. Some authoring tools use visual symbols and icons in flowcharts to make programming easier while others use a slide show environment.

What is LCMS?

A learning content management system (LCMS) is a system with a multi-user environment where learning developers may create, store, reuse, manage, and deliver digital learning content from a central object repository. LCMS allows users to create and reuse learning objects. Typically this manages the process of creating, storing and delivering learning content.
Background History

LCMS was originally developed in the mid-1990s and typically focused on client/server systems in the past. Now this has evolved into web-based systems. Stand-alone LCMS marketing strategy came in 2002 and now learning management systems with LCMS have been used by companies such as Microsoft, Cendant, and Lucent.

Characteristics of LCMS

The content of a LCMS is reusable across courses, curricula, or across the entire enterprise and it is not tightly bound to a specific template. It can be re-deployed in a variety of formats such as e-learning, CD-ROM, print-based learning, PALM, and EPSS. The content is stored in a central database repository and can be tagged for advanced search-ability (both at the media and the topic level). However, the most significant characteristic is that there is a complete separation of the content and the presentation logic.

In addition, it allows tracking of participants and can create advanced assessments without the need for additional tools. It is capable of supporting an organization’s formal learning initiatives, and enables the quick and easy retrieval of content for reuse purposes.

Some points to consider when deciding...
whether to use an LCMS are: Are you intending to reuse a lot of contents? Do you plan to manage multiple assets and people? Will you deliver content in different formats or in different looks depending on learner needs? Will you need to create content that is compliant to industry standards? If the answers to all these questions are “yes,” an LCMS is the right system.

Features to Look for in Choosing an LCMS

- Rapid content development tools which can easily be used by novice developers
- Support for both e-learning and print-based content
- Standards-conformant (SCORM, AICC, IMS) e-learning content
- Interoperability with various LMS
- Support for geographically dispersed development team
- Turnkey solution including both LCMS and LMS
- Dynamic pre-testing, adaptive learning

Obtaining an LCMS

Two ways to get started after choosing an LCMS are to either purchase, install, and manage in-house the software, or to or purchase the software, but have a third party house and manage it. Administrators, content builders, instructors, and learners access the system over the Internet.

Some LCMS vendors operate LCMS to share access to their system. You can lease space on the hosted system. This last option is generally the most cost-effective arrangement for using a commercially available LCMS system and is a solution adopted by a high proportion of clients.

However, there are some open-source or free LCMS systems. Those from Moodle (www.moodle.org) and ATutor (www.atutor.ca) are the most popular. Moodle is in fact used by the UK Open University System and is more readily customizable than ATutor.

There are also numerous commercial vendors of LCMS, but the price can be extremely high. There is a detailed breakdown of the LCMS vendors by environment, the databases they support, and their costs and customer bases in the full PowerPoint presentation from which this report is taken.

LCMS in Workforce Development

All organizations want to increase their organizational productivity. LCMS can facilitate the creation of effective training materials and the efficient management of that training. Also, through the use and reuse of learning objects, LCMS delivers targeted learning. Even more significantly, LCMS can seamlessly interact with other systems within an enterprise to easily and effectively create and deploy the content along with management of the training and so provide a much more effective mechanism for workforce development.

Conclusion

An LCMS has the potential to provide unprecedented value to organizations. An enterprise-class LCMS enables companies to deploy and evolve content delivery systems at a fraction of traditional costs, further accelerating return on investment. Hence it has an immense potential as a knowledge management tool in this knowledge economy.
This is a freely available LCMS training tool available to registered users through its website www.adbi-dlc.org.

Emerging Competencies for Technical Teachers in Knowledge Economy
Dr. Shyamal Majumdar, Regional Vice-President for Asia and Pacific, IVETA, India

“We don’t need to think MORE; We need to think DIFFERENTLY”

Albert Einstein

Introduction

In today’s global economy driven by knowledge, the foremost wealth of a firm is its human capital or knowledge assets. The Organisation for Economic Co-operation and Development estimates that already more than half the wealth of advanced industrial societies is derived from knowledge capital. The knowledge-based economy recognizes the key role of information-based technologies in providing a basis for the generation, management, and utilization of knowledge and for the emergence of knowledge-based industries. The employment pattern will shift from manual and clerical workers to knowledge workers. Successful companies will be those that consistently create new knowledge, disseminate it widely throughout the organization, and embody it in the new product and services.

The common features of the knowledge-based industries are interdisciplinary, oriented towards research and development, information intensive, dynamic, and requiring human capital with high reasoning and cognitive skills. Strategic alliances among organizations have become commonplace, giving rise to a new phenomenon: the non-boundary organization. Ashkenas explained that the non-boundary or virtual organization is a living continuum, not a fixed state. The levels of the organizational hierarchy may decrease, functions may merge, and partnership with suppliers and customers may evolve, thus shifting boundaries from “who does what” to “who knows what” and “who is connected to whom”.

In addition to job-specific technical competencies, there is a requirement of a set of generic skills, which are generic to a cluster of occupations in order to perform competently as a knowledge worker. Specific occupational skills are augmented to growing cognitive
skills. These skills are essential for effective participation in the emerging patterns of work and work organizations. In this paper the author suggests a list of generic skills for the emerging knowledge economy and puts forward the idea of integrating generic competencies in the curriculum. TEVT is currently faced with the challenges posed by the displacement of the traditionally strong focus on manual work in favor of mental work or at least the changing mixture of competencies required in the workplace.

**Impact of New Technologies on Occupational Pattern**

All aspects of the way we live and work, the way we produce and consume, are in the midst of a profound transformation as a result of the revolution in information and communications technologies and the rise of the global knowledge-based economy. Products, firms and industries that were unheard of a decade ago are now significant sources of wealth. The skills required for many conventional occupations are changing rapidly, and many skills are quickly becoming dated as new jobs, new technologies and new industries emerge. The use of emerging technology is transforming the way we work and do business in all sectors and in every place.

Educators and employers are beginning to realize that the flexibility of the individual rather than mere acquisition of knowledge and skill in a particular area is emerging as a key requirement. Surveys of leading employers in many parts of the world support the view that flexibility and autonomous learning capacity of the workers will be a key ingredient.

Employers are increasingly looking for not only skills specific to current technologies in use, but higher order generic transferable skills, such as skills of conceptualization, analysis, problem solving, creativity, communication, interpersonal skills, and learning to learn skills.

**Emerging Generic Skills for Knowledge Workers**

A number of research works have been undertaken on key generic skills. Some such efforts have been conducted by the Mayer Committee set up by the Australian Education Council and Ministers of Vocational Education, Employment and Training in Australia (1991), the Secretary’s Commission on Achieving Necessary Skills (SCANS) in the United States (1992), and the British National Skills Task Force. This allows the comparison of generic competencies identified in countries like Australia, the United Kingdom, the United States, and New Zealand (Table 1).

Mayer’s work on key competencies attempted to provide a definition for each of the seven key competencies, which can be helpful in understanding generic skills vis-à-vis job-specific skills. See Table 2 for key competency definitions.

These skills sets can be summarized into the “eight C’s” of emerging generic skills:
### Table 1. Comparison of Generic Competencies

<table>
<thead>
<tr>
<th>Australia</th>
<th>United Kingdom</th>
<th>United States</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key competencies</td>
<td>Core skills</td>
<td>Workplace know-how</td>
<td>Essential skills</td>
</tr>
<tr>
<td>Collecting, analyzing and organizing information</td>
<td>Communication</td>
<td>Information Foundation skills: basic skills</td>
<td>Information skills</td>
</tr>
<tr>
<td>Communicating ideas and information</td>
<td>Communicating Personal skills: Improving own learning and performance</td>
<td>Resources Foundation skills: basic skills</td>
<td>Communication skills</td>
</tr>
<tr>
<td>Planning and organizing activities</td>
<td>Personal skills: Improving own learning and performance</td>
<td>Resources Foundation skills: personal qualities</td>
<td>Self-management skills</td>
</tr>
<tr>
<td>Working with others and in teams</td>
<td>Personal skills: working with others</td>
<td>Interpersonal skills</td>
<td>Social skills Work and study skills</td>
</tr>
<tr>
<td>Using mathematical ideas and techniques</td>
<td>Numeric: application of numbers</td>
<td>Foundation skills: basic skills</td>
<td>Foundation skills:</td>
</tr>
<tr>
<td>Solving problems</td>
<td>Problem-solving</td>
<td>Foundation skills: thinking</td>
<td>Problem-solving and decision-making skills</td>
</tr>
<tr>
<td>Using technology</td>
<td>Information technology</td>
<td>Technology systems</td>
<td>Information skills Communication skills</td>
</tr>
</tbody>
</table>

### Table 2. Key Competency Definitions

<table>
<thead>
<tr>
<th>Competency</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting, analyzing and organizing information</td>
<td>Capacity to locate information, sift and sort information in order to select what is required and present it in a useful way; and to evaluate both the information itself and the sources and methods used to obtain it</td>
</tr>
<tr>
<td>Communicating ideas and information</td>
<td>Capacity to communicate effectively with others using a range of spoken, written, graphic and other non-verbal means of expression</td>
</tr>
<tr>
<td>Planning and organizing activities</td>
<td>Capacity to plan and organize one’s own work activities, including making good use of time and resources, sorting out priorities and monitoring one’s own performance</td>
</tr>
<tr>
<td>Working with others and in teams</td>
<td>Capacity to interact effectively with other people both on a one-to-one basis and in groups, including understanding and responding to the needs of a client and working as a member of a team to achieve a shared goal</td>
</tr>
<tr>
<td>Using mathematical ideas and techniques</td>
<td>Capacity to use mathematical ideas, such as numbers and space, and techniques such as estimation and approximation, for practical purposes</td>
</tr>
<tr>
<td>Solving problems</td>
<td>Capacity to apply problem-solving strategies in purposeful ways, both in situations where the problem and the desired solution are clearly evident and in situations requiring critical thinking and a creative approach to achieve an outcome</td>
</tr>
<tr>
<td>Using technology</td>
<td>Capacity to apply technology, combining the physical and sensory skills needed to operate equipment with an understanding of scientific and technological principles needed to explore and adapt systems</td>
</tr>
</tbody>
</table>
critical thinking and doing, creativity and innovation, collaboration and teamwork, cross cultural understanding, communication and presentation, computing and information, career and lifelong learning, and carrying sustainability.

Generic skills can be structured into a developmental framework. Kearns offers a model for clustering the generic skills which include the cognitive cluster; interpersonal cluster; enterprise, innovation and creativity cluster; and work readiness and work habits cluster. The figure below presents the details of the four clusters of key generic skills required by the 21st century.

Clusters of Key Generic Skills

<table>
<thead>
<tr>
<th>Basic skills</th>
<th>Enterprise, innovation creativity skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using technology</td>
<td>Entrepreneurship</td>
</tr>
<tr>
<td>Practicality</td>
<td>Creativity</td>
</tr>
<tr>
<td>Business orientation</td>
<td>Innovation</td>
</tr>
<tr>
<td>Planning &amp; organizing activities</td>
<td>Innovation</td>
</tr>
<tr>
<td>Self-management</td>
<td>Technology</td>
</tr>
<tr>
<td>Communication</td>
<td>Thinking</td>
</tr>
<tr>
<td>Team skills</td>
<td>Analytical capability</td>
</tr>
<tr>
<td>Customer service</td>
<td>&amp; problem solving</td>
</tr>
<tr>
<td>Cultural understanding</td>
<td>Systems thinking</td>
</tr>
</tbody>
</table>

♦ The interpersonal (or social) cluster with underpinning personal attributes & values e.g., emotional
♦ The cognitive cluster with underpinning personal attributes e.g., willingness to learn positive attitude

Key Skills: A Proposal

Careful analysis of the above reports and working in the TEVT system for more than two decades leads the author to suggest that in addition to the domain-independent core generic skills, the knowledge worker is required to acquire the basic sustainable development (SD) concept of economic, environmental, and social sustainability in all discipline and trades. Let us discuss the key domain-dependent generic skills and then turn to the SD life skills.

Domain Independent Generic Skills

Knowledge workers need to develop the following skills.

- Critical thinking and problem solving skills—critical thinking skills to define problems in complex, overlapping, ill-defined domains; use available tools and expertise for searching, formulating the problem, analyzing, interpreting, categorizing ideas and finding alternatives, and choosing the best solution.
- Creative thinking skills—creative thinking to generate new ideas for solving problems, discovering new principles and new processes and products. Diagnostic and design skills will play an important role.
- Information handling skills—the capacity to acquire, locate, search and find information for effective decision making. They need to evaluate the information and know how to use and communicate with it.
Communicating skills—communication skills in a variety of media for diverse audiences using a variety of modern tools, particularly Internet communications.

Teamwork skills—require working in a team for solving complex problems, creating complex tools, services, and products. Collaboration, coordination and teamwork will be the key for success.

Technology application skills—capacity to apply technology (particularly computing technology) with the physical and sensory skills is essential in the knowledge age. Knowledge workers need to operate equipment with the understanding of scientific and technological principles needed to explore, acquire, adapt and operate systems.

Autonomous learning skills—the ability to diagnose and prescribe one’s own training needs. Knowledge workers will have to manage their own career paths and their own continuous learning of new skills. Learning to learn and lifelong learning will be the key parameters of survival in this era.

Cross-cultural understanding skills—working in a multi-cultural society. They need to have cross-cultural understanding for effective teamwork.

Engineering the New Role of the Teacher

With the emerging generic skills requirements, the role of the teacher must change in the sense that it is no longer sufficient for teachers merely to impart content knowledge. It will be crucial for teachers to encourage critical and creative thinking skills, promote information literacy, and nurture collaborative working practices to prepare the learner for a new knowledge economy. Teachers must begin to reappraise the methods by which they meet the generic skills. Traditional methods of imparting knowledge, such as lectures and books need to be augmented with non-linear strategies for problem solving to match the non-linear human thinking processes. As technology has created change in all aspects of society, it is also changing our expectations of what students must learn in order to function in the new world economy. Students will have to learn to navigate through large amounts of information, to analyze and make decisions, and to master new knowledge domains in an increasingly technological society. They will need to be lifelong learners, collaborating with others in accomplishing complex tasks, and effectively using different systems for representing and communicating knowledge to others. A shift from teacher-centered instruction to learner-centered instruction is needed to enable students to acquire the new 21st century knowledge and skills.

There are several guiding principles for designing effective learning environments to enhance problem-based learning skills. These include creating a problem-based learning environment, presenting authentic and realistic tasks, focusing on construction of knowledge, promoting active learning, using multimedia effectively, mixing appropriate instructional strategies, designing appropriate structured discussions, presenting a contextual learning environment, and focusing on learning in groups.

The role of a learner in the new environment is that of a learner, and as well as a collaborator and a team member.

“Are we thinking DIFFERENTLY?”

De Bono
In the question and discussion session, participants focused on Einstein’s advice to “think differently.” They observed that, because the participants came from many different countries, it might be interesting to see how they think differently. Dr. Majumdar reiterated that it is not quantity but an open mind that we need to learn from each other to become more creative.

Online Simulations for Use in TEVT
Subodh Tripathee, First Vice Chairperson, Forum for Information Technology, Nepal

What is a Simulation?

Simulation to teach tasks and activities is not a new concept during the First World War a wooden horse was used to train soldiers how to ride a horse before real ones were used. The definition of a simulation is using a realistic environment in which students perform a meaningful task, experiencing appropriate consequences as feedback for their decisions. Hence they can derive meaning and learn from this action-reaction approach. The environment in which the task is taking place is exactly replicated.

One classical example of an action-reaction approach is the Beer Game that was developed for management students to understand the effects poor communication can have on an organization. During this game students are part of a beer distribution chain, such as the manufacturer, distributor, retailer, consumer, etc. Distribution partners are not able to talk to each other and poor communication leads to chaos in the distribution chain. By experiencing this chaos, users learn about operations management on a visceral level.

Differences: Games, Learning Modules and Simulation

However there are three major differences between playing a game and a simulation. Simulations are not only about scoring/winning, a player’s progression is nonlinear, and it is governed by dynamic and authentic (realistic) relationships among several variables.

Simulations should be real or virtually real. They need to be hands-on with learners becoming participants rather than passive listeners. Simulations also need to be motivational, age appropriate and empowering (in terms of roles and allowing users to find ways of problem solving).

Types of Simulations

- Experiential—Student learns through experience and by taking part in the activity; student is a functional component, such as in the Beer Game
- Symbolic—Student manipulates variables within simulation’s population
- Software
- Soft Skills—Content revolves around areas such as interpersonal relationships (leadership, coaching skills, listening, etc.), running a business, or engaging in a role-play scenario.
- Hard Skills/Technical—Covers a broad range of skill areas, e.g., modeling physical systems, such as some machinery or an electronic measurement system. This category also covers “task simulators” (e.g., a flight simulator) designed to teach and measure a learner’s ability to follow steps in a procedure.
Where to use Simulation?

Simulations can be used more effectively in the areas where judgment skills are being taught. This makes it ideally suitable to be used in TEVT and when we want to teach developmental skills to learners.

Benefits of Simulations

Elements of reality are compatible with principles of constructivism and can be enjoyable and motivating. They can also be cost effective and provide experiences not readily available in reality. They enhance appreciation of the more subtle aspects of a concept/principle and promote critical thinking. They also help students learn decision making skills for complex situations where the cost of failure is high (e.g., an airline pilot learning to fly).

Disadvantages

Preparation can be time consuming and assessment is more complex than traditional teaching methods, so we need to devise new assessment techniques.

How to Use Simulation in TEVT

Simulations are learning tools for both outside and inside the classroom. They can be used as online exercises that are part of a blended course or as stand-alone e-learning modules. They can also be used to validate a classroom lecture series.

Conclusion

Various studies being conducted on transferring learning show that simulations are as effective as or are more effective in promoting transfer than are traditional methods of instruction. In order for students to learn, interactivity needs to take place either between learner and learner, teacher and learner, or content and learner. This ensures you can see and experience the effect of how something works.

In answer to the question of whether simulation use in TEVT is applicable in Cambodia, Mr. Tripathee described a business game program that simulates the trainee to create a business idea; this is known as achievement motivation training (AMT).
Workforce Mobility with Computer-Supported Cooperative Works
Dr. Man-Gon Park, Director General and CEO, Colombo Plan Staff College for Technician Education (CPSC), Republic of Korea

Introduction

When considering the possibilities for workforce mobility we need to recognize how the technological environment has changed. The technological advances in the last few years have been enormous. For example, communication speeds are becoming ever faster, whereas not long ago we had to use 56-kb dial-up modems. We are now at the advent of the ubiquitous network.

There are new worldwide trends in the workforce, partly as a response to the technological changes. The labor market is opening and there is increased workforce mobility. There is a need to reengineer TEVT/HRD systems to adapt to technological environment changes, and to consider global demands and employment. There is also a requirement for re-training for re-skilling for the ageing society. This is of particular concern in the more developed countries.

Significantly, Pan-Asia is a super growth block in the developing workforce. Specifically, Japan has global leadership in high-tech production; the Republic of Korea has strong industries in electronics, car manufacturing, steel production, etc.; and Taipei, China has a strong industry base. Both the People’s Republic of China and India are exhibiting a rapid growth rate and finally the ASEAN countries of Indonesia, Malaysia, the Philippines, Thailand, Viet Nam, and Singapore are making a strong contribution.

Knowledge Workers

Knowledge workers must have some system (processes or methodology at their disposal) to create, process and enhance their own technological knowledge and in some cases also manage those of their co-workers.

In recent years, the knowledge workforce has increasingly become more mobile, moving across the Asia-Pacific region or even further and opening up of the labor markets. For example many Indian IT specialists are now working in Silicon Valley, California. However, there is also an increase in collaborative work in digital workplaces, with emphasis on establishing multicultural environments. These are setting new dimensions for the workers and the multinational organizations. Workers are effectively moving from the realm of physical space to that of cyberspace.

Collaborative workers in the information era, with electronic connectivity can work anywhere and under flexible time schedules. They need to be innovative, learn quickly and continuously, work collaboratively, and be comfortable with experimentation and risk.
taking. The main three components of the collaborated work environment in the IT-oriented workplace are digital work, digital workplaces, and digital workforce.

Digital Workers

Computer-supported cooperative work (CSCW) requires the use of groupware, which supports the efforts of teams and other paradigms which require people to work together, even though they may not actually be together in either time or space under a computer network environment. Groupware is an umbrella term describing the electronic technologies that support person-to-person collaboration. It includes e-mail, electronic meeting systems (EMS), and audio-video conferencing as well as systems for workflow and business process re-engineering (BPR). Technologies which support collaboration are in greater demand today than ever before. In recognition of that fact, vendors are integrating collaboration technologies into their products. Distributed workforces, information overload, and getting products to market as quickly as possible are just a few of the motivations pushing collaboration technology development.

The view of Microsoft’s chief executive officer, Bill Gates (2005), is that now that we have the platform of the Internet and low-cost connectivity, the thing that is driving the most change is the improvement of the software that sits on top of that platform. He is of the opinion that a technology-oriented workforce is becoming available. More collaboration, availability of information at any time, and collaboration among several organizations are some of the recent trends at the workplaces.

The digital work style is taking shape with elements like presence, unified communication, optimizing supply chains, team collaboration, finding the right information, spotting trends for business information, insight and structured workflow, and improving personal productivity.

The future digital workplace Bill Gates argues would appear to have less complex software, good control on information, and significant productivity benefits.
Background of CSCW Systems

The digital workplace is mainly a web-based workspace where ideas are unleashed and communication and collaboration take place. It is where corporations bring together *cross-functional, cross-enterprise teams* to build and manage relationships with customers, partners and suppliers, to innovate in the design, development and delivery of products and services.

As a technology platform, the digital workplace complements the way companies already work, providing flexibility in adapting to unique business processes, interoperability with existing technology infrastructures and the simplicity and intuitiveness required to facilitate widespread adoption.

**Collaboration** is at the heart of every single extended-organization. It can be asynchronous or real-time, structured or unstructured. Computer-supported cooperative work (CSCW) holds great importance and promise for the new workplace and for society at large. However, in order to benefit, organizations will need to improve the ability of teams to work together through networks of computers. People who work together in cross-functional or cross-enterprise teams must quickly establish a work plan, divide up tasks, and determine means of coordination and self-regulation. Even where team members work asynchronously, their work must still be coordinated effectively.

The success and failure of CSCW systems depends upon competitive alternatives and observance of etiquette and conventions. Also synchronous systems that work well for two users may be less effective with more users. CSCW taxonomy can easily be understood from the following matrix:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Asynchronous</th>
<th>Synchronous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same place</td>
<td>● Project scheduling</td>
<td>● LAN</td>
</tr>
<tr>
<td></td>
<td>● In/Out board</td>
<td>● Networked games</td>
</tr>
<tr>
<td></td>
<td>● Calendar system</td>
<td>● Whiteboards</td>
</tr>
<tr>
<td></td>
<td>● Voice mail</td>
<td>● Software demonstrations</td>
</tr>
<tr>
<td></td>
<td>● E-mail</td>
<td></td>
</tr>
<tr>
<td>Distributed</td>
<td>● E-mail</td>
<td>● Chat rooms</td>
</tr>
<tr>
<td></td>
<td>● Discussion boards</td>
<td>● Net meetings</td>
</tr>
<tr>
<td></td>
<td>● Web pages</td>
<td>● Video conferences</td>
</tr>
<tr>
<td></td>
<td>● Shared documents</td>
<td>● Online games</td>
</tr>
<tr>
<td></td>
<td>● FTP/Shared drive</td>
<td></td>
</tr>
</tbody>
</table>
The following types of cooperation are generated through CSCW:

<table>
<thead>
<tr>
<th>Types of cooperation</th>
<th>CSCW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focused partnerships</td>
<td>For example, joint authors of a report, a team of programmers working on software, journalists and editor working on publications.</td>
</tr>
<tr>
<td>Online teaching/ training</td>
<td>Teaching people at remote sites and enabling to be asked and responded to. Also enabling capture and replay of history.</td>
</tr>
<tr>
<td>Conference</td>
<td>Real time group participation distributed in space, such as chat, video conference, electronic whiteboard, voice-over-net. This can also be asynchronously e.g., e-mail, discussion board.</td>
</tr>
<tr>
<td>Structured work process</td>
<td>Employees with different roles and functions carrying out a large disparate task such as employee recruitment.</td>
</tr>
<tr>
<td>Tele-democracy</td>
<td>Under this type of CSCW, people need to collaborate locally and need tools to record debate and register votes securely.</td>
</tr>
</tbody>
</table>

**Conclusion**

A technology-oriented workforce is becoming available. In an IT-oriented workplace, the main three components of a collaborative work environment are digital work, digital workplaces, and digital workforce.

Technologies that are used to facilitate, augment, and support interactions among members of the community of practice are called computer-supported collaborative work systems. What is not as well known is how to build a model of collaborative work across distance—still to be determined is what works best in a given situation.

CSCW holds great importance and promise for the new workplace and for society at large. Organizations will need to improve the ability of teams to work together through networks of computers. People who work together in cross-functional or cross-enterprise teams must work quickly to establish a work plan, divide up tasks, and determine means of coordination and self-regulation. Often team members work asynchronously, but their work must still be coordinated effectively.

In the question and discussion session, the difference between human development and human resource development was addressed. Sometimes these terms are used interchangeably. The term came about as companies realized that they needed capital, materials and competent workers. They began to refer to all of these as resources. In this context, human resource development relates to equipping people with the skills and competencies required so that they can be effective. However as now more emphasis is being placed upon the “soft” or personality skills and recognition is being given to the fact that people are not the same as capital or materials, the term human development is being increasingly used. However, at times this can be more confusing as human development also embraces “quality of life” as well as any workplace attributes. Human development is the term predominantly used in India.

Regarding the difference between the formal and informal labor market, Dr. Park explained that the informal market includes unregulated workers that do not have agreed regulated working conditions. They include diverse and small-scale workers such as often street vendors, agricultural workers, garment workers working from their homes, etc. They have little or no access to organized markets, credit institutions, formal education and training institutions, or to many public services and amenities. It was estimated in 2003 that 85% of the workforce in Cambodia was in the informal sector.
WORKFORCE DEVELOPMENT FOR IMPLEMENTING INFRASTRUCTURE PROJECTS

Conducive Policies and Strategy Reforms

TEVT Reforms in the Philippines
Dr. Thamrongsak Moenjak, Team Leader, Program Liaison Unit, Second Primary Education Development Program, Thailand

Introduction

The Philippines has a total population of 81,617,000 (2004) and the GNP per capita of $1,170 with a life expectancy of 71 years. There are 34 million people of working age and employed at all levels in all sectors including IT (the Philippines is the second-largest exporter of software in Asia after India). However, 16% of the population lives on less than $1 a day and only 10% of the population have appropriate training for the workplace.

Characteristics and Statistics of TEVT

The structure of TEVT programs in the Philippines is complex—nearly all pre-employment TEVT takes place after the completion of secondary school. Of all training institutions, 60% are private and they provide 80% of total enrollments in institution-based middle level skills development. Despite this high percentage, there is no government subsidy for private training. There are 1,383 private technical vocational institutions (TVIs)/centers and 723 publicly-funded TVIs/schools.

Industry-based training provides work experience and apprenticeships with 60% of firms (employing 50 persons or more) providing systematic training for employees and investing significantly in training.

Philippine Education Reform

There have been three major reviews in order to reform the education system during the 1990’s: the Congressional Commission on Education in 1991, the Philippines Education Sector Study (WB-ADB) in 1998 and the Presidential Commission on Education Reform in 1998.

The reviews led to the tri-focalization of the education sector with basic education under the Department of Education, higher education under the Commission on Higher Education, and TEVT under the Technical Education and Skills Development Authority, which oversees all technical training in the country.

The general recommendations were to:

- Ensure adequate financing and improve the quality of basic education.
- Slow and reverse the haphazard expansion of low quality tertiary institutions.
- Provide equitable access at all levels so that deserving poor households and communities can benefit from public education provision.
- Improve overall sector management through greater local participation and accountability.
- Rely primarily on private providers so that TEVT programs can respond more quickly to the market.
Recommendations for TEVT were:

- Use public financing mainly to induce private providers to deliver high-quality programs.
- Education contracting scheme for providers and a development fund to assist private providers for offering TEVT courses.
- A national coordinating council for education to coordinate policies and plans.
- A national educational evaluation and testing system to measure educational outcomes.
- An adoption of common standards for accreditation applicable for various disciplines across different educational levels.
- PCER is silent on TEVT. The implication is to rely primarily on private providers to deliver programs consistent with market conditions.

A National Coordinating Council on Education (NCCE) was established to harmonize cross-cutting education issues, formulate sectoral policies and priorities, and decide on rational allocation of resources access the different parts of the education system, although it is not yet functioning effectively.

Following the reform three plans—the National Technical Education and Skills Development Plan (NTESDP), 2000-2004, the Medium Term Philippines Development Plan (MTPDP), and the National Employment Plan (NEP) or Medium Term Comprehensive Employment Plan—were developed to improve TEVT. The NTESDP was produced by TESDA and complements and translates the policy thrusts of the MTPDP and the NEP into manpower development strategies to address the critical skills requirements of the country within the medium term.

Outcomes

To date the NCEE is not operational. Planning of the entire sector continues to be fragmented and conduct of initiatives and resolution of issues that cut across the three levels is not undertaken efficiently. The professional regulation commission which administers and enforces the regulatory policies of the national government, including the maintenance of professional standards, has not been modified or improved. Little progress has been made in terms of the accreditation system. Equivalency requires the participation of different agencies. So far, only one agreement for accreditation criteria and guidelines for technical training on industrial skills has been reached.

Thus the goal of establishing mechanism and regulations to facilitate the move from post-basic education and training to university education is far from complete.

What happened after PESS and PCER?

They were partially successful. However, agencies disagreed about the change in legislation to amend the existing situation. The policy of PESS and PCER did not attempt to build a broad political constituency around the conclusions of the reports. The absence of political support from an organized and sustained network of inherent reforms made the recommendations vulnerable to subsequent changes in the political leadership within the three key education agencies.
The absence of an enabling environment for change in the education system deserves the blame for these failures. More basic institutional reforms are necessary for the specific recommended reforms to be implemented.

Three dimensions of TEVT under NTESDP were global competitiveness, rural development, and social integration. The plan adopted the “PSALM” approach to generate skills priorities in each province which provide the signals in identifying investment areas. The PSALM approach is:

- Policy-oriented,
- Sector-focused,
- Area-based, and uses a
- Labor Market-driven approach to manpower planning.

TESDP has numerous schemes to promote quality, and the current reforms require all stakeholders to work together in collaboration and need to be seen as a continuous process that cannot take place overnight. Most reforms force institutions to change and that encounters resistance due to loose or lacking connections between the point of actions and the chief beneficiaries of the reform. Some key questions reformers need to ask themselves are:

- Why reform?
- What/Who needs the reform?
- How should reform be introduced and implemented?
- Is the reform feasible given the limitation and constraints of the present situation/system/condition, priorities and feasibility?
- How can we ensure acceptance and support for the reform from the intended beneficiaries/targets?
- Does the TEVT system in your country, ministry, department, division, institution need a reform?
- Why?/Why not?

Conclusions

A project can be designed to support/implement reforms (policy, system, institutions, practices) through policy dialogues, conditions, covenants, etc. and can extend its coverage or scope to cover both private and public sectors. However, it needs strong commitments and support of stakeholders from both sectors.

Policy reform needs strong commitments from the government, institutions, and individuals who will lose or gain from the reform process. Capacity building for the institutions involved in the reform is a key factor.

Devolution/decentralization needs not only political will but also willingness and readiness of the recipients/beneficiaries. Reforms initiating from within the systems/organizations based on their own needs and conditions are more likely to be accepted and, hence, to succeed.

Donor-driven reform initiatives—the push down approach—are more likely to encounter resistance and, hence, to fail or be unsustainable.

Incentives play a key role in getting acceptance from people who will be affected by the reform. However, incentives should lead to or reinforce commitments and behaviors that will sustain the outcomes and impact of the reform. Reform is a continuous process—a one-shot or one-project approach is not effective or sustainable.
In answering a question on the differences in TEVT between Thailand and the Philippines, Dr. Moenjak explained that in Thailand the public and private sectors are very strong and the government is active in supporting many training opportunities (especially in the big cities), at both diploma and degree level. The government provides the private sector support with subsidies. In the Philippines the government does not play an active role or provide incentives. This reiterates the strong role of government support needed for TEVT to be promoted in Cambodia as well.

Workforce Development Policies of Bhutan

Dr. Tshering Tobgay, Director, Department of Human Resources, Ministry of Labor and Human Resources, Bhutan

Introduction

The quality and relevance of TEVT in Bhutan is currently failing both students and employees. Despite the country’s small population—only about half a million—it is developing fast and making heavy investments in infrastructure. The children, who were previously part of the labor force, are now in school, and consequently Bhutanese workers are in short supply at all levels. The country has a disproportionate number of foreign workers, most of whom are unskilled.

School leavers currently have their choice of occupation as demand outstrips supply; they thus prefer general education that will hopefully lead to white-collar jobs, especially in the civil service. Skilled work in industry is unattractive as the pay is low and the hours are long. As a result, students do not choose vocational training. The industry base is small and more reliant on low-paid foreign labor than on the use of technology.

In 2003 the Ministry of Labor and Human Resources (MoLHR) assumed responsibility for providing vocational education and training, promoting employment opportunities, and facilitating the labor market transactions. Accordingly TEVT policies were developed but were deliberately kept simple. To establish effective VET training throughout the country, an employment trust fund of $100,000 was set up.

Services to Bhutanese Citizens

The fundamental requirement is to ensure that every Bhutanese will have access to high quality TEVT, so that they can secure good and sufficiently paid employment. This would be not only be available for the youth, to improve employment opportunities, but also to the self-employed and adults who want training to improve their skill set. Initial training will be free (as stated in the draft constitution) and subsequent training will be subsidized.

Part of the responsibility of the MoLHR is to identify economic and employment growth sectors and ensure that students understand their best prospects. TEVT then needs to be designed accordingly to match these employment needs. The MoLHR will also ensure that all courses are designed and delivered in accordance with the developed national occupational standards by providing testing and certification services and an accreditation system.

Additionally, the training needs to be compliant with occupational standards and consistent with the needs of the economy providing appropriate skills, knowledge and attitudes. Furthermore, the training will need to include core competencies to enable occupational mobility and adaptation to change to help safeguard against possible future unemployment.
Currently there is little rural-based training both rural locations and occupations such as agriculture. The TEVT program will expand rural-based training, of both a formal and non-formal nature, and where appropriate introduce village-specific training.

Apprenticeship programs will also be increased, but the industry-based placements will be supported with the appropriate training in a TEVT institute. Entrepreneurial programs will also be introduced so that students understand the skills and requirements of private enterprise. Finally, training will be introduced for special groups, for example monks, delinquents, and the handicapped. The objective is to enable all of these to receive the appropriate TEVT training.

In accordance with the philosophy of gross national happiness (GNH), national identity needs to be reinforced by TEVT. Along with occupational competencies, language, culture and heritage should be taught. Furthermore the work ethic should be reinforced along with the traditional values. Environmental awareness and social responsibility also need to be incorporated into the training programs.

Information on training and jobs needs to be made available to both students and parents. This is facilitated by the provision of both a TEVT directory and a career and occupational directory. Career guidance and counseling needs to be introduced with representatives from both the Ministry of Education and industry. Employment promotion services must be set up to give information/services on job opportunities both nationally and internationally. Training opportunities (including entrepreneurship courses) should be established along with business start-up possibilities. Job-seekers and employers need to be brought into contact with each other.

Currently there are many agencies involved in TEVT, but the Bhutan Vocational Qualifications Framework (BVQF) needs to streamline the qualifications to facilitate both vertical and lateral movement for students. The BVQF will also ensure quality assurance. Additionally there will be appropriate assessment procedures and an acknowledged accreditation system.

There also needs to be established a system of initial short training programs which can then be followed by further or upgrading training courses. It has been recognized that the previous training courses were often too long, resulting in students losing direction or focus. However, again it is essential that all these training courses—whether short initial courses, upgrading courses or retraining courses—should be nationally certified to provide value and recognition of the standard of competence achieved.

**Services to Employers**

The policy seeks to address the employers’ need for more skilled workers by increasing the capacity of existing training institutes and programs and expanding the training institutes. If this is to happen it is essential to engage the employers as much as possible in the specification of their occupational standards and the implementation of this policy. Additionally, the importance and value of skilled work needs to be emphasized to promote appropriate jobs in the private sector.

Furthermore, the private sector must be encouraged to improve their working conditions. The employers must be educated regarding the value of employing higher skilled and correspondingly higher paid workers, for whom they will need to ensure occupational health and safety and also provide social benefits and workers’ rights. This will need to be underpinned by an amended Labor Act. Financial incentives will also be provided to the private sector through a system of subsidies, sponsorships and government subcontracts. This then may enable the private sector to gradually replace unskilled foreign workers with skilled Bhutanese workers.
Services to Training Providers

Every TEVT provider in Bhutan can obtain the Ministry’s support for designing, organizing and marketing training courses geared to raise employability of the citizens. MoLHR will assist in the development of competencies in important areas of training of trainers, course identification and marketing, instructional design, assessment and testing, management of training programs and institutes and the employment and labor market services.

MoLHR recognized that we would need to build new training institutes and increase the choice of training options. However it is not proposed that all training will be in the public sector; the government will encourage and support private institutions to deliver the required services, namely, vocational training, testing, counseling, and job placement. Financial incentives will be provided through a system of subsidies, sponsorships and government subcontracts to the private sector.

Shorter training courses will be promoted to equip students with required specific competencies and also incentives will be offered to companies. These incentives will encourage and support both company-based corporate training and apprenticeships.

MoLHR will seek to identify and project workforce demand in occupational and geographical areas and provide a clearinghouse on labor and employment data which will help institutes design and market their courses. The MoLHR will ensure that all courses are designed and delivered in accordance with the developed national occupational standards by providing testing and certification services and an accreditation system.

The question and discussion session allowed the participants to explore the MoLHR’s efforts in more detail. On the question of limited funding, Dr. Tobgay said that while each type of funding has a ceiling, in villages a micro-credit system is available. Regarding the level of dropout in training, the level is almost zero because either the students are interested in the potential job or perhaps due to the stipend offered by government whilst they are training.

Although very few students start their own businesses after graduating from the course, many courses are being conducted to encourage entrepreneurship so that students can understand how to establish their own business.

TEVT Reforms in Pakistan

Dr. Thamrongsak Moenjak, Team Leader, Program Liaison Unit, Second Primary Education Development Program, Thailand

“No country can hope to compete in the global economy without an educated and healthy work force.”

UNESCO

Introduction

Both business leaders and policymakers in Pakistan cited lack of skilled manpower and lower labor productivity as constraints to raising productivity, strengthening competitiveness and achieving sustained high economic growth. The globalized and technology-driven world economy will require a growing pool of workers with leading edge skills. This points to the need for increases in the level and quality of secondary, vocational, and high education.
Basic Data and Statistics

Poverty is higher among unskilled laborers in the informal sector and particularly within rural areas with a significant increase in poverty between 1998-1999 and 2001-2002.

History of TEVT

Pakistan inherited a very narrow technical vocational education base. Technical education as an independent stream started in the mid-fifties with the establishment of polytechnic institutes in Karachi and Rawalpindi. The Federal Ministry of Education is responsible for planning, coordination of standards, and curriculum development for post secondary technical education provided in colleges of technology and polytechnic institutes. A number of institutions particularly for females are also being run by the Provincial Education Department.

There is a very complex administrative TEVT structure with the polytechnic institutes and colleges of technology managed by the Federal Ministry of Education and Provincial Education Department. Commercial training institutes are under the Ministry of Education and Provincial Education Department and vocational institutes are under the Department of Education. Training centers operate under various departments, e.g., Labor and Manpower, Social Welfare, and Industry and Agriculture.

Current Challenges

One of the main challenges is the lack of coordination among various departments involved in TEVT. Every province has its own technical board and examination system, so there is no national examination system. TEVT is completely different in each province and is managed not only by the education sector but also by three or four other ministries. In order to harmonize they have to establish TEVT authorities to coordinate and integrate all technical training activities.

There are also inadequate financial resources and over-dependence on government faculty, a lack of coordination among various departments involved in TEVT, and a lack of industry-institution liaison, resulting in low external efficiency. There is also an acute shortage of contextual materials as private publishers are not attracted because of low clientele and economic viability, inadequate and poorly trained faculties, poorly equipped and maintained workshops, and inadequate administrative infrastructure resulting in low internal efficiency and poor institutional capacity for planning and development of TEVT and lack of relevant data. The supply does not keep pace with the need of the labor market.

Education Reform Strategies

Plans are for a sector-wide reform, based on efficiency and equity with a political will to reduce poverty and encourage resource mobilization, decentralization, public private partnership, and community participation.
Public-Private Partnership

Proposed are packages of incentives for the private sector, particularly in rural areas and also urban slums, with provision of land free of cost/and or at concessional rates in rural areas and utilities such as electricity and gas to be assessed at non-commercial rates.

National Policy for TEVT

The goal of national policy for TEVT must be to develop opportunities for technical and vocational education in the country for producing trained manpower, commensurate with the needs of industry and economic development goals. Improvement of the quality of technical education is needed to enhance the chances of employment of TEVT graduates by moving from a static supply-based system to a demand-driven system. Institution-industry linkages will be strengthened to enhance the relevance of training to the requirements of the job market.

Revision and updating of curricula shall be made a continuing activity to keep pace with the changing rules of the job market and for accommodating the new development. Emerging technologies (e.g., telecommunication, computers, electronics, automation, petroleum, garments, and food preservation) greatly demanded in the job market will be introduced in selected polytechnics. A National Council for Technical Education shall be established to regulate technical education and to coordinate efforts of various departments and organizations in the field. The evaluation and accreditation system will be improved.

The emphasis is not to present a drastic policy change, but to present a paradigm shift in implementation based on an holistic and integrated approach that is anchored in people exercising decision making rights about their lives.

National Technical Teacher Training College (NTTTC)

NTTTC, a competent authority, in collaboration with the Boards of Technical Education; Provincial Research and Development Cells; the proposed Council for Technical Education; and experts from commerce and industry shall carry out a revision of the curriculum on a continuing basis to keep pace with the changing job market requirements.

Expected Outcomes

TEVT will be improved through:

- Competency-based training, teacher training, provision of learning resources, and quality control;
- Support for rural poor and women through new programs and facilities, rural livelihood training and entrepreneurship training, and access to micro-credit and self employment;
- Restructuring and strengthening institutional capacity, efficiency, and autonomy of TEVT institutions;
- Improving the quality and relevance of TEVT programs;
- Enhancing access to quality TEVT, particularly among the rural poor and women; and
- Restructuring the Directorate of Technical Education and Manpower Training and strengthening its institutional capacity to provide quality TEVT.
Lessons Learned

The lack of cooperation and support from the private sector in the operation and management of TEVT institutes results in poor quality of TEVT and mismatch of skills among TEVT graduates. Planning, management, monitoring, and supervising of the TEVT system was not effectively carried out due to lack of baseline data, benchmarks, management information systems, benefit monitoring and evaluation systems, and internal project statistics. Lack of social monitoring campaigns resulted in poor response and participation by the target groups and beneficiaries.

Education and training opportunities should be provided to the socially, economically, and/or intellectually disadvantaged. As long as the target clientele is provided such opportunities it is deemed good enough regardless of quality or industry demand.

There were no significant additional capital investments in the project after completion, and inadequate current expenditure budgets have had adverse consequences for internal and external efficiencies of the system. Dropout rates were minimal except in Sri Lanka where it was as high as 50% especially in technology courses. Pass rates were high at more than 90% in Malaysia and Papua New Guinea (PNG), but they were lower in Sri Lanka and Pakistan at around 54% and 40%, respectively.

Of those who sought employment upon course completion, 80% in Malaysia and PNG got a job within six months but only 60% were successful in Pakistan and 50% in Sri Lanka. About 68% of graduates in PNG worked as technicians in their first job, and the corresponding percentages were 50% in Malaysia and Pakistan and only about 15% in Sri Lanka. About 43% of graduates in Sri Lanka worked as operators or skilled workers in their first job.

Graduates of non-project schools received higher average initial salaries than those of project schools with an average differential of 16% in Malaysia, 9% in Sri Lanka, and 5% in Pakistan. Among final year students, more than 90% of those in technical, vocational, and academic schools in Malaysia intend to pursue further studies. The corresponding percentages are 50% in PNG, 35% in Pakistan, and 25% in Sri Lanka. Those who intend to seek employment upon course completion comprise 60% in Sri Lanka, 55% in Pakistan, 40% in PNG, and less than 1% in Malaysia.

ADB Study Recommendations

Education authorities and heads of TEVT institutions need to shift from a predominantly “safety net” orientation to a “source-of-competitive-advantage” orientation without necessarily discarding the former. The governments (in particular Pakistan, PNG, and Sri Lanka) need to raise their level of commitment to TEVT from policy to action. To follow Malaysia’s example, it would mean increasing the present budgetary allocation for TEVT by about three times.

Developing Member Countries need to commit support to TEVT over the longer term given the long development cycle of the sub-sector. Past experience suggests that long-lasting impact cannot be attained through a single project, but through a series of overlapping projects with consistent core objectives carried out over a long period.

In the question and discussion session, Dr. Moenjak was asked to recommend one innovative policy intervention that can be used in Cambodia. The recommended policy intervention was establishment of standardized national authorities. Further, a study visit was a good example of how to increase prestige in technical training; investment in TEVT is expensive but the training is important. Therefore technical training priority is low but once the country has good facilities and good teachers the students will come and prestige will be raised.
Vocational Education and Training Policies

Dr. Tshering Tobgay, Director, Department of Human Resources, Ministry of Labor and Human Resources, Bhutan

“The future promise of any nation can be directly measured by the present prospects of its youth”

John F. Kennedy

The above statement was made in 1958 and is even more valid and relevant today with our increased youth (15–24 yrs) population, many of whom are anxious and disturbed due to unemployment issues. Youth are active “agents of change” and many wish to do good in the world. However, if their dreams are not realized they get frustrated and can become a dangerous force.

Background

The development of any country depends on the productivity of its workforce and its people to develop quality and the education of youth is recognized as a main vehicle in achieving this. TEVT is a master key in reducing poverty and sustaining development. However TEVT is not responding to the challenge—there is a mismatch; quality assurance is lacking and is generally inflexible, outdated, irrelevant and inadequate with many countries not responding to TEVT. TEVT should respond to emerging needs, concerns and issues for employment providing a basis to train future workers.

Youth Unemployment in Asia and the Pacific

The Asia-Pacific region is made up of 25 countries with more than 3.6 billion people who have a median age of 20–30 years. There are more than 660 million young people in the region and youth constitute 13–20% of the population. Several countries in the region have high and rising numbers of unemployed youth widespread among rural areas and also a rapid urbanization migration. Half the world’s youth are unemployed in this region; one in three are unemployed and the International Labour Organization (ILO) predicts this will increase.

Under employment is also a problem particularly for rural youth who have no access to income generating activities. Even though they may have skills they have no outlets to use them. Urban centers are over-crowded and a lack of job opportunities traps people in a cycle of poverty.

The youth labor force participation rate has declined by 4.8% to 54.1% in the last decade due to youth attending college and higher education institutions. Youth constitute only 25% of the world’s working population, but almost half of the 192 million unemployed worldwide are youth.

Youth find it harder to get jobs and are often in engaged in low-quality, low-skill, low paying and insecure jobs thus making them feel alienated and anti-social. One billion youth will enter the workforce in the next decade therefore more than one billion jobs need to be created. An integrated holistic approach with interventions at macro- and micro-economic levels is needed along with a vibrant and robust TEVT system that focuses on the demand and supply of labor.
Directions for TEVT

TEVT systems vary widely; some are relatively successful although most have problems with assessment systems and quality. Many are private sector-driven with too few countries having governments play a dominant role. TEVT has low prestige and is chosen as a last option. It is more expensive than general education, but is allocated less money.

Countries need to make use of technological changes that are influencing TEVT and take note of the changes in the economy in order that youth entering the workforce have the relevant skills. The workforce is becoming more mobile and the need now is to enhance mobility through international networks and supporting systems that allow youth to access global information, skills standards, and training opportunities.

Entrepreneurship is an area that creates jobs; entrepreneurship is not born, but can be taught and learnt. The education system and TEVT has not given entrepreneurship enough attention. We need to take steps to promote entrepreneurship through entrepreneurship awareness camps, entrepreneurship development programs, and entrepreneurship courses. Almost all TEVT institutions have IT departments but not do have an entrepreneurship department.

TEVT is a tool to create a youth workforce with the right skills, knowledge, and attitude to work who have a good understanding of self and the environment. With the growing number of youth and the increasing challenges, TEVT must step up to the challenge to improve systems and increase funding to support institutes to allow them to realize their mandate. TEVT should be used to answer the challenges of youth.

In the question and discussion session, one participant asked, “If Cambodian youth are conscripted to join the army, are they working and part of the workforce?” Dr. Tobgay answered that soldiers are not unemployed, but whether they are productive and add value to nations resources is a different matter. The army can pass on certain skills and knowledge that can used outside army and some countries offer training courses.

Workforce Development and Vocational Education and Training in Lao People’s Democratic Republic

Dr. Rolf Gennrich, GTZ Adviser, Lao PDR

Introduction

The Lao PDR is taking advantage of opportunities to establish deeper cooperation between itself and other countries, particularly in terms of development. The Laos-German HRD-ME Program is made up of two components and there are several challenges to overcome, as depicted below.

Laos is facing ambitious economic, social and cultural changes as the country begins to move away from an agriculture-dominated to an agro-industrial-oriented society. The Lao PDR government is moving away from an agricultural society to a knowledge society. Human resource development is one of the priorities that is facing an ambitious challenge.

TEVT is related not only to education policies, but also to labor market policy. Therefore, harmonization is required between TEVT policy and economic policy. Private sector strategies are also an important factor in the development of a sustainable civil society.
Lao-German Program on Human Resource Development for Market Economy

The enterprise conducted a baseline survey to provide a detailed account of the present situation of enterprises in Lao PDR with respect to their competitiveness and constraints. The survey focused on four areas:

- Business development and enhancing competitiveness
- Enhancing business & investment environment
- Human resource development
- Promotion of SME development

The report should be of high interest to all experts and institutions related to socio-economic issues and the private sector as well as SME development. During the national training needs analysis, industry and handicrafts were the main areas that were predicted...
to increase. This type of information will assist TEVT planners in preparing and providing training in the relevant required areas.

The section on human resource development deals with the basic requirement for economic and social development of the society. Market-oriented education and training in general and the youth in particular are prerequisites for private sector and business development as well as for the further development of civil society. Aspects covered are:

- General education
- Vocational education and training
- Entrepreneurship development & management skills training
- Higher and academic education

A national baseline tracer study was also conducted to assess the effectiveness of TEVT training from both a student and employer perspective. The survey concluded that nearly 84% of the TEVT students that graduated stated they could find employment in their chosen occupation. Other indicators such as usefulness of theory (extremely useful: 39%) and of practical instruction (extremely useful: 54%) have shown that theory is also of importance to students. This is useful information for politicians and planners; it shows that employers would like to see more practical applications.

Survey Responses from Students

Survey Responses from Employers
Master Plan for Sustainable TEVT/IVET Development

The TEVT system is a complex one, and an holistic approach with all institutions working together is required to produce a TEVT policy in Lao PDR that serves the labor market. Some of the main areas for sustainable development include policy and strategy development, quality and relevance of training institution, and improving qualification and competence of trainers.
Common Characteristics among Philippines, Pakistan, Sri Lanka

English is widely spoken, especially among the urban educated populations of the Philippines, Pakistan, and Sri Lanka. A large number of expatriate workers from these countries are distributed around the world (Middle East, Hong Kong, Malaysia, Europe, US). Their rural economies are agriculture-based but they have growing manufacturing and service sectors. All three countries pursue export-led economic development with open door policies for foreign investors. Poverty, especially in rural areas, is a major challenge. The working age (workforce) population in all three countries is large and growing, and all three countries have (had) female heads of government or state.

Human Development Index

Human Development Index (HDI) is a composite indicator. It covers three dimensions of human welfare: income, education, and health (life expectancy at birth). The purpose is not to give a complete picture of human development but to provide a measure that goes beyond income. The HDI is a barometer for changes in human well-being and for comparing progress in different regions.

Demographic and Economic Data

Sri Lanka has a total population of 20.570 million, 76% of which are living in rural areas. Poverty (less than $2 day) characterizes 51% of the population. Economic activities include trade, hotels, manufacturing, agriculture, transport and communications. Over the past 6 years, the share of agriculture has decreased while that of transport and communications has increased. Nearly one million Sri Lankans are abroad either as migrant workers or asylum seekers.

Education Data and Statistics

The pupil/teacher ratio is 1:22 with only 3% of primary school age children out of school. There are free textbooks from grades 1 to 11, free school uniforms, subsidized transport, bursaries for bright deserving students from grade 5 up to university, a mid-day meal for primary students in identified schools, free medical inspection in schools, provision of dental care, and free spectacles to needy students.

Education Reform 1997

The President declared 1997 the Year of Education Reform in order to provide access and equal opportunities to all children and to improve quality through new curricula, new textbooks, and new pedagogical methods.
In 1997 findings of the NEC were examined and transformed into the Plan of Action and focused on technical skills, technological orientation, and hands-on, activity-based training of teachers and principals. School management was targeted to be improved by increases in expenditure and resource management. Tasks were handed over to three presidential task forces for (i) school education, (ii) university, and (iii) technical education and vocational training. The findings of the task force led to major changes in the TEVT sector in terms of rationalization, reorganization of vocational training as a ministerial function, and coordination of TEVT activities at the national level.

One of the main recommendations was that the role of the government should change from provider to facilitator and increase active private sector participation.

Three Major Challenges facing TEVT

- Qualitative and quantitative mismatches in certain areas of skills demand
- External and internal effectiveness in the sector with duplication of courses
- Outdated equipment, curricula, shortage of good teachers and high drop out rates, and sub-optimal use of public sector workshops and laboratories

TEVT policies should promote private sector-led skills training, target youth with an entrepreneurial mindset, link performance and budgets, provide institutions with increased autonomy, foster more skills training through a system of skills accreditation, provide skills to compete in the global markets, and train to match industry skills needs.

Lessons Learned

Matching instruments to target groups is as important as choosing the best delivery mode. The government’s role in facilitating information on TEVT has been relatively neglected. The unemployment rate is high among educated young people who have low or no skills. School leavers; grade 9, A, and O levels; and university graduates are entering the labor market ill-prepared for the world of work, so youth unemployment results in prolonged job searches.

Reforms have been aimed at increasing the role of private sector participation and private-public partnership in technical education and vocational training to enable all those who do not seek higher education to develop skills required by the labor market. Therefore there is a need to develop TEVT and facilitate the school to work transition and to reduce skills gaps and skills mismatches in the labor market.

Recommendations for Improving TEVT

- Skills laddering to facilitate upward mobility of skills acquisition
- Better linkages of TEVT with the school and university system
- Private participation in training
- Improve functioning of the TVEC as the apex body for TEVT
- Accreditation and quality monitoring of public and private training institutions
- Rationalization of the public TEVT system
- Setting up a degree awarding institution for TEVT
Reform is still continuing, however. The foundation has been laid to reform TEVT and a second phase will support the upper half of NVQ (Levels 5–7). Levels 1–4 of NVQ have been developed under SDP.

Some of the main activities that the project will ensure are:

- Levels 5–7 of the NVQ framework will be developed and institutionalized.
- Quality assurance mechanisms for the technician and technologist programs need to be put in place.
- A registration system for providers needs refinement and wider implementation.
- Quality assurance at TVEC for the TEVT system needs to be strengthened to audit programs and institutions to ensure that they comply with TEVT accreditation standard.

Projects should not attempt to do too much; particularly sweeping reforms such as these would probably be beyond the national implementation capacity. Labor market analysis and tracer studies are important for proper direction and feedback for the training system. In the areas of private training provision, obstacles to growth and improvement including constraints should be examined. Financial sustainability is a big challenge for TEVT projects. More emphasis should be given to analysis of sustainability, while at the same time being realistic as public TEVT projects also have equity objectives. When reform of the training system is undertaken, the establishment of a national qualifications framework will facilitate labor mobility and more efficient use of training resources.

Pakistan should upgrade the quality of existing polytechnics and develop short courses for skills upgrading that will strengthen linkages with industry, improve utilization of facilities, provide extra income to instructors, and enhance cost recovery.

Sri Lanka should focus on total quality improvement of existing TCs and the conversion of the TC curriculum into competency-based training. This will soon become necessary given the country’s relatively fast growing and modernizing manufacturing sector.
Remarks

Welcome Remarks: H. E. Loav Him, Director General, DGTVET, Ministry of Labor and Vocational Training, Cambodia

Respects made to all the Excellencies, Ladies and Gentlemen, and Dr. Tully from the Asian Development Bank Institute (ADBI). My appreciation for your attendance.

This seminar is related to the workforce development needed for the growth of a country with an emerging economy. It is of prime importance to develop an educated flexible training workforce and this is of greater importance than helping those that are currently unemployed. A trained workforce is the key to improving the economy. To achieve this we need to work closely with all other related agencies. Long-term planning must be utilized, taking into account the skills of the workforce and focusing on upgrading the skills and knowledge of the technical teachers to help learners improve their retention and memory.

“If you tell me I will listen, if you show me I will see, but if I experience I will learn.”

How can learning and effectiveness be achieved? This is by using variety of techniques and strategies, focusing on understanding rather than memory, and being aware that different students will have different learning styles. When presented with an inappropriate style a student may lose interest.

The challenge of teacher training in a developing country is that there is no guaranteed quality control or official accreditation. Currently the focus is on teaching, i.e., the input, rather than learning, which is the output.

Cooperation is needed between teacher trainers and institutes, and the curriculum must be linked to the economic needs. Currently the curriculum is not linked to the workforce requirements and training needs. Furthermore, any training course is too short and the number of trained qualified teachers is too few.

We need to move forward to achieve a competency-based curriculum, involving activities and interests which are of more relevance and interest to the students. We also need to achieve course accreditation.

The focus must be changed to students’ needs and outcomes. Also, standardized curriculums should be developed so that students can easily change from one institution to another. These curriculums should ensure accountability and sustainability.

Competency standards for technical teacher training need to be developed and established. It is also important to promote the status of teachers and in particular to reward highly effective teachers.

A national framework for registration and participation must be established along with a task force to draft a national standard. A committee has been formed involving participants from the Ministry of Labor, the Ministry of Education, and the Ministry of Women’s Affairs.
to develop a draft competency-based accreditation system. Although this is not officially recognized it will enable us to move forward.

Opening Remarks: Dr. Peter McCawley, Dean ADBI, Tokyo

Welcome, all participants and speakers, to the first training of trainers course organized by the Asian Development Bank Institute (ADBI), in which it is envisaged that training materials will be provided for use in Cambodia. The main topics will focus on workforce development policies and strategies. This includes understanding some of the issues and challenges of new technology in developing workforces. There is a need to monitor labor market demands in order to assess the emerging competencies and formal qualifications of technical teachers through new instructional technologies and innovative assessments to improve future programs.

The main reason for this is that the students and young people of today are the workers of tomorrow and we need to equip young people with employable skills to enable growth, provide good work ethics, and develop potential that will accelerate economic development and therefore reduce poverty.

Some of the main challenges include the abolition of child labor and exploitation of young people, being able to break into a competitive labor market, gender and minority group discrimination, and skills upgrading that focuses on life-long learning.

ADBI is a think tank based in Tokyo but it has many outreach programs in research and capacity building in countries within the Asia-Pacific region. The E-Newsline is updated on a daily basis and provides information on developing issues throughout Asia. There is also a website that focuses on development activities across Asia, CD-ROM reviews, and distance learning courses.

We would encourage you please to ask questions, share experiences, and learn from the resource speakers during the course of the workshop.

Closing Remarks: Tep Oeun, Deputy Director General, Ministry of Labour and Vocational Training, Cambodia

I would like to pay respects to all participants and colleagues in the technical education and vocational training (TEVT) sector and thank all of the guest speakers who spent valued time for six days to participate in the workshop.

I’m sure we are all tired—especially the resource speakers and organizers—however your presentations are very useful for the TEVT sector. To have workforce response for the labor market, TEVT is different to the general education system. Thanks to the Asian Development Bank Institute (ADBI) for spending a lot of money to organize the workshop. I am grateful to ADBI and it is a contribution to human development, especially for TEVT in Cambodia.

Thanks to all participants and resource persons for your physical and mental effort to share experience with all participants so we can take this knowledge and put into practice with our colleges in order to improve and develop how Cambodia is moving forward.

We have observed many topics from policy to curriculum development and evaluation and performance appraisal. We have 18 technical trainers here who are responsible for teaching and have gained knowledge that is appropriate to students in the TEVT sector.

We need to think about our own competency; incentive and motivation is crucial to developing the TEVT sector. If teachers have ability they can participate more effectively
and the students will benefit and get a job. Their income will be increased and this will improve living conditions in line with the poverty reduction strategy of the Cambodian government.

However, during these six days we not only learned methods for TEVT reform, but we learned that information and communications technology (ICT) can respond to the needs of economy and technology. ICT is a tool not only for business but also for institutions to help develop curricula and improve lectures so students can learn more effectively. Learning theory needs to be closely linked to practice and there is a need to learn theory and practice. We have observed various ways of using techniques, and I believe all participants including me will make use of this approach.

Many thanks go to Dr. Man-Gon Park for spending personal money and organizing dinner for us and developing relationships between resource persons and participants to work together to develop TEVT and human resources to respond to needs of society and the labor market.

Finally, I thank all guest speakers for leaving your country and family. I wish you a safe return trip.

Closing Remarks: Dr. Jeoung-Keun Lee, Director, Capacity Building and Training, Asian Development Bank Institute, Tokyo

On behalf of the Asian Development Bank Institute (ADBI), I am pleased to provide the closing remarks for this important meeting. This is the first course offered by ADBI in Cambodia to train trainers in technical education and vocational training (TEVT) to enhance the effectiveness of workforce development so that Cambodian workers can work not only for building their country, but also for producing products for the world market.

This is the right time to review our objectives of the meeting. As you recall, the main objectives of the meeting were to: (i) identify emerging competencies of technical teachers; (ii) review new developments in pre- and in-service teacher training; (iii) examine new instructional technologies; and (iv) share innovative practices in training of trainers. Owing to your hard work even during the holidays and with support from the enthusiastic resource speakers, I am confident that we have achieved all the objectives of the meeting.

In a knowledge economy, globalization and rapid advances in technological innovation have rendered the production of goods and services more complex, competitive, and increasingly dependent upon information and communications technology (ICT). The social, economic, and cultural impacts of these economic trends are unprecedented. The emerging knowledge economy requires a highly flexible and increasingly skilled workforce that can be continuously trained and upgraded. Therefore, new and innovative policy, legislation, and planning must be introduced in the sector. This is also true for Cambodia and through your institutions you can become “ambassadors of change.” Let me summarize briefly what we have learned from this meeting:

- It is expected that population growth rates will decline in many economies, life expectancy at birth will continue to increase, and the median age for the population of the workforce will increase over the next 20 to 30 years. As indicated by Professors Pramod Shrestha and Tariq Mahmood, trainers’ jobs will not easily disappear within the next two to three decades, although they will change in their delivery.
- Over the past three decades there have been huge developments in the provision of primary education. As a result literacy levels in the Asia-Pacific
region have improved enormously. However, we failed to equip them with employable skills. As discussed by Mr. Tshering Tobgay, now is the time to provide youngsters with relevant job skills for their gainful employment.

- An important labor market characteristic of many of the economies is an overall oversupply of workers, but with shortages of trained and skilled workers. We also observed comparatively high levels of underemployment and a large proportion of the workforce engaged in informal economic activities. With proper skills training, labor productivity will increase dramatically as well as workers’ income, as demonstrated by Mr. Mark Cully of Australia.

- TEVT for young people is undertaken concurrently with secondary education or is being integrated into secondary school curricula, as shown by Dr. Thamrongsaik Moenjak and Mr. Sunil Kularatne. This arrangement has prevented upgrading training opportunities of employed youths and adults, an issue which deserves our attention.

- The primary goal of TEVT has mainly been placed on meeting the needs of employers and industry, as Dr. Shyamal Majumdar observed. Less emphasis was placed on providing training for those who will become self-employed or who will work in the small business sector or in family businesses. Now is the time to think about individual career development, as Prof. Ligaya Valmonte suggested.

- In a number of countries the responsibility for the public TEVT system is shared among a comparatively large number of government departments and agencies. As explained by Dr. Moenjak, the system in the Philippines is highly coordinated under the auspices of a single agency, the Technical Education and Skills Development Authority, or TESDA.

- There should be mechanisms for responding quickly to changing economic and social demands. However, in most instances the arrangements are ad hoc with few formal arrangements for periodic review. It is necessary to review competences of technical teachers periodically, as proposed by Prof. Agni Kafle.

- Most countries have accreditation requirements for private TEVT providers, to be able to issue recognized qualifications or to receive public funds to deliver TEVT programs, as indicated by Dr. Rolf Gennrich and Dr. Pramod Shrestha. This is a kind of control system, not a good supporting system. We may start providing assistance to the private sector trainers as well.

- Use of occupational skills maps and skills standards to improve the responsiveness of the system to industry and workforce needs varies considerably, as Prof. Tariq Mahmood explained. This is very important as the rate of international labor migration is an increasing trend and quality training is becoming indispensable, as shown by Dr. Pramod Shrestha.

- Information and communications technology plays important roles in delivering TEVT programs as demonstrated by Mr. Subodh Tripathee and Mr. Matthew Holden. ICT will surely improve not only the efficiency of training but also the quality of it, by harnessing it properly. Dr. Man-Gon Park and Prof. MyungHee Kim took us on a journey of ubiquitous teaching and learning systems.

- The need for skills upgrading and lifelong learning has not been ignored, but actual implementation has been limited. Distance learning courses using advanced information and communications technology should be offered more in the future, as Mr. Subodh Tripathee showed us an example.
Provision should be made for flexible delivery of training and modularization of training courses so that adults can more easily participate in their career development.

- There is a clear national policy for TEVT, with specific and achievable goals in many countries, as reviewed by Dr. Moenjak. However, there should be strong links to workforce policy and planning systems, linking employers, employees and training providers.

You will agree with me that Dr. Pramod Shrestha and his supporting team did an excellent job in organizing and conducting this meeting. We owe him a lot, as he devoted himself to making this meeting a huge success, despite his family difficulties.

In closing, I would like to thank every one of you for making this meeting a huge success. I owe a lot to our partner, the Ministry of Labor and Vocational Training, for their full support. Without their support, this meeting would not have been feasible. I thank also our office in Cambodia for their administrative support. I commend your active participation in the discussions and in helping other colleagues. Your efforts were indispensable to our success. I wish you all the best in applying the tools and lessons learned from this meeting to your future teaching tasks.

Taking this opportunity, I express my thanks to two young and competent interpreters and two hard-working reporters. I am sure they will come up with an excellent book to be distributed throughout the world. My thanks go to the Colombo Plan Staff College for Technician Education, especially Dr. Park, for his kind support and for hosting a fabulous dinner.

I wish you every success in your endeavor to train your workforce. Please do not forget to share your experiences with us. We are here to lend our hands to you for your success. Thank you very much and I hope to see you soon.
Schedule of Activities

Wednesday, 25 October 2006

08:00 – 08:30 Registration
08:30 – 09:00 Opening Ceremony
   Welcome Remarks by H. E. Sok An
   Deputy Prime Minister, Cambodia
   Opening Remarks by Peter McCawley, Dean, ADBI
   Election of Officers
   Group Photo Session
09:00 – 09:30 Introduction to the Meeting and of Participants and Resource
   Speakers by Jeoung-Keun Lee, Director, CBT, ADBI
09:30 – 10:00 Break
10:00 – 11:00 Role of Technical Education and Vocational Training (TEVT)
   in Global Knowledge Economy by Mark Cully
   General Manager, National Center for Vocational Education
   Research (NCVER), Australia
11:00 – 12:00 New Paradigms for Technical Teacher Training
   by Shyamal Majumdar, India
12:00 – 13:30 Lunch Break
13:30 – 14:30 How to Become an Effective and Efficient Technical Teacher:
   New Roles and Responsibilities
   by Pramod Shrestha, Nepal
14:30 – 15:30 Qualifications of Professional Technical Teachers
   by Agni P. Kafle, Nepal
15:30 – 16:00 Break
16:00 – 17:00 Non-Technical Skills for Technical Teachers
   by Ligaya Valmonte, Professor, Don Mariano Marcos
   Memorial State University, Philippines
18:30 – 20:30 Welcome Dinner hosted by Peter McCawley, Dean, ADBI
Thursday, 26 October 2006

08:00 – 09:00 Integration of ICT in Technical Teacher Training by Shyamal Majumdar, India

09:00 – 10:00 TEVT Reforms in the Philippines by Thamrongsak Moenjak, Former ADB Staff, Thailand

10:00 – 10:30 Break

10:30 – 11:30 Competency-based Training in TEVT by Ligaya Valmonte, Don Mariano Marcos Memorial State University, Philippines

11:30 – 12:30 Role of Information Technology in Teacher Training by Matthew Holden, SAP Asia, Pte. Ltd, Singapore

12:30 – 14:00 Lunch Break

14:00 – 15:00 Research and Evaluation Strategies in Workforce Development by Mark Cully, General Manager, NCVER

15:00 – 16:00 World Trends and Implications for Sustainable Human Resource Development by Man-Gon Park, Director General and CEO, CPSC

16:00 – 16:30 Break

16:30 – 17:30 Curriculum Development in TEVT by L. W. Sunil Kularatne, Sri Lanka

Friday, 27 October 2006

08:00 – 09:00 Emerging Competencies for Technical Teachers in Knowledge Economy by Shyamal Majumdar, India

09:00 – 10:00 Learning Theories in TEVT by Ligaya Valmonte, Don Mariano Marcos Memorial State University, Philippines

10:00 – 10:30 Break

10:30 – 11:30 TEVT Reforms in Sri Lanka by Thamrongsak Moenjak, Thailand

11:30 – 12:30 Overview of Training Methods by L. W. Sunil Kularatne, Sri Lanka

12:30 – 14:00 Lunch Break
WORKFORCE DEVELOPMENT FOR IMPLEMENTING INFRASTRUCTURE PROJECTS

14:00 – 15:00 Total Quality Journey at TEVT Institutions: Where are we Going? by Pramod Shrestha, Nepal
15:00 – 17:30 Study Tour to the Cambodia-Korea Institute

Saturday, 28 October 2006

08:00 – 09:00 Mentoring Techniques in Technical Teacher Training by Agni P. Kafle, Nepal
09:00 – 10:00 Enhancing Youth Employment by Tshering Tobgay, Director, Department of Human Resources, Ministry of Labor and Human Resources, Bhutan
10:00 – 10:30 Break
10:30 – 11:30 Developing Entrepreneurship in TEVT by Tariq Mahmood, Pakistan
11:30 – 12:30 Quality Assured Technical Teacher Training Program: A Strategic Model by Pramod Shrestha, Nepal
12:30 – 14:00 Lunch Break
14:00 – 15:00 Quality Management in TEVT by Tariq Mahmood, Pakistan
15:00 – 16:00 TEVT Reforms in Pakistan by Thamrongsak Moenjak, Thailand
16:00 – 16:30 Break
16:30 – 17:30 Individualized Instruction in TEVT by Agni P. Kafle, Nepal

Sunday, 29 October 2006

Free

Monday, 30 October 2006

08:00 – 09:00 Occupational Standards and Accreditation in TEVT by Tariq Mahmood, Pakistan
09:00 – 10:00 TEVT and Gross National Happiness by Tshering Tobgay, Director, Department of Human Resources, Ministry of Labor and Human Resources, Bhutan
10:00 – 10:30 Break
10:30 – 11:30 Overview of Learning Content Management System by Subodh Tripathee, First Vice Chairperson, Forum for Information Technology Nepal

11:30 – 12:30 Workforce Mobility with Computer-Supported Cooperative Works by Man-Gon Park, Director General and CEO, CPSC

12:30 – 14:00 Lunch Break

14:00 – 15:00 Coordinating Training Programs by L. W. Sunil Kularatne, Sri Lanka

15:00 – 16:00 Online Simulations for Use in TEVT by Subodh Tripathee, First Vice Chairperson, Forum for Information Technology Nepal

16:00 – 16:30 Break

16:30 – 17:30 Workforce Development Policies of Bhutan by Tshering Tobgay, Director, Department of Human Resources, Ministry of Labor and Human Resources, Bhutan

18:30 – 20:30 Farewell Dinner hosted by Man-Gon Park, Director General and CEO, CPSC

Tuesday, 31 October 2006

08:00 – 09:00 Workforce Development and Vocational Education and Training in Lao PDR by Rolf Gennrich, Adviser, GTZ

09:00 – 10:00 Ubiquitous Teaching and Learning System by Man-Gon Park, Director General and CEO, CPSC

10:00 – 10:30 Break

10:30 – 11:30 Evaluation of the Workshop by Jeoung-Keun Lee, Director, CBT, ADBI

11:30 – 12:30 Closing Ceremony

Handing Out Certificates

Vote of Thanks by Participants

12:30 – 14:00 Lunch and Adjourn
WORKFORCE DEVELOPMENT FOR IMPLEMENTING INFRASTRUCTURE PROJECTS

Directory

Participants

1. Pann Nora
   Position: Director of Cambodia India Entrepreneurship Development Center (CIEDC)
   Address: #329, Moa Te Tong Blvd, Phsar Depo I, Toukork District, Phnom Penh, Cambodia
   Tel. No. +855-12-806-631
   E-mail: norapann@hotmail.com

2. Ek Phanna Rann
   Position: Teacher
   Address: #61, Str. 199, Sangkat Toul Svay Prey II, Chamkarmon, Phnom Penh, Cambodia
   Tel. No. +855-12-957-684

3. Prak Sam Ol
   Position: Deputy Department of Electrical and Electronic Engineering
   Address: #806E2, Str. 128, Sangkat Teuk Laak I, Toul Kork Phnom Penh, Cambodia.
   Tel. No. +855-11-878-065

4. Bun Phearin
   Position: President of National Polytechnic Institute of Cambodia
   Address: Phum Sre Reachas, Samrong Krom, Khan Dangkor, Phnom Penh, Cambodia
   Tel. No. +855-12-844-741

5. Muong Phasy
   Position: Head of Academic Affairs (NPIC)
   Address: #768, Gr. 11, Mithpheap Village, Sangkat Ressey Keo, Khan Ressey Keo District, Phnom Penh, Cambodia
   Tel. No. +855-16-938-405
   E-mail: phasynpic@edu.kh

6. Huy Rith Reangsey
   Position: Head of Planning and Coordination Affairs
   Address: #116BE0, Road 163, Sangkat Toul Tompong I, Khan Chamkarmon District, Phnom Penh, Cambodia
   Tel. No. +855-12-773-303
   E-mail: seyhuy@yahoo.com
7. **Seng Sibora**  
Position: Lecturer  
Address: #31E3Z, Sangkat Monorom, Khan 7  
Makara District, Phnom Penh Capital, Cambodia  
Tel. No. +855-11-939-322

8. **Tear IV Huot**  
Position: Deputy Chief of Industrial Liaison office  
Address: Monireth Blvd (St. 117), Sangkat Steung  
Mean Chey, Khan Mean Chey District, Phnom Penh Capital, Cambodia  
Tel. No. +855-12-853-030  
E-mail: nib@everyday.com.kh

9. **Man In**  
Position: Lecturer (National Technical Training Institute)  
Address: #248, St. 150, Sangkat Teuk Laak II, Khan Toul Kork, Phnom Penh, Cambodia  
Tel. No. +855-12-501-528

10. **Saing Sokhsophal**  
Position: Trainer of Cambodia-India Entrepreneurship Development Center (CIEDC)  
Address: #92E2, Moa Tsetong Blvd, Boeng Trabek Quarter, Chamkar Mon District, Phnom Penh, Cambodia  
Tel. No. +855-12-343-844  
E-mail: Sokhsophal_saising@yahoo.com

11. **Tep Oeun**  
Position: Deputy Director General TVET  
Address: #3, Str. Russian Federation. Blvd, Sangkat Teklaok2, Khan Tuol kork, Cambodia  
Tel. No. +855-23 884 376  
Fax: 855-23 884 276  
H/P: 855-12 606 572  
E-mail: oeun_tep@yahoo.com

12. **Khim Chantha**  
Position: Director of Department of Technical Vocational Education Training Management  
Address: Ministry of Labor and Vocational Training  
Tel. No. +855-12-866-080
13. Kheng Khemara  
**Position:** Deputy Director of Department of Technical Vocational Education Training Management  
**Address:** No 681, Eroup 2, Steung Meancheuy, Khan Meyahey Phnom Penh, Cambodia  
**Tel. No.** +855-12-844-282  
**E-mail:** Khemara36@yahoo.com

14. Hing Sideth  
**Position:** Deputy Director of Department of Technical Vocational Education and Training Management of MoLVT  
**Address:** #2AEo, Group 10, Sotheoros, Sangkat Chaktomouk, Khan Don Penh, Phnom Penh, Cambodia  
**Tel. No.** +855-12-658-546

15. Nong Kanika  
**Position:** Deputy Director of MDTVET  
**Address:** #146, Str. N0148 Phsar kandal 2 Distric Doun Penh, Phnom Penh, Cambodia  
**Tel. No.** +855-12-752-074  
**E-mail:** nong_kanika@yahoo.com

16. But Chan  
**Position:** Chief of Study and Planning Office, Industrial Technical College  
**Address:** No08, Str. 202, Sangkat Phsar Daemkor, Khan tu olokork Phnom Penh, Cambodia  
**Tel. No.** +855-12-890-235

17. Ouk Dara  
**Position:** Deputy Director  
**Address:** #9, Phum Borey 100 Khnorn Village, Sangkat Teuk Thla, Khan Russey Keo District, Phnom Penh, Cambodia  
**Tel. No.** +855-11-805-244  
**E-mail:** o_dara1259@yahoo.com

18. You Sokorn  
**Position:** Deputy Director, Department of LMI, MoLVT  
**Address:** #28, St. 184, Khan Daun Penh, Phnom Penh, Cambodia  
**Tel. No.** +855-16-52-58-86
19. **Suy Chheng**  
**Position:** Head Master DONBOSCO, Phnom Penh, Cambodia  
**Address:** #671, Sangkat KaKab, Khan Dongkor District, Phnom Penh, Cambodia  
**Tel. No.:** +855-11-899-481  
**E-mail:** le08asdb@everyday.com.kh

20. **Moeung Viriya**  
**Position:** Chief of Education Office (PPI)  
**Address:** Russian Foundation Blvd, Sangkat Tuk Thla, Khan Russey Keo, Phnom Penh, Cambodia  
**Tel. No.:** +855-16-355-356

21. **Mam Sophoeu**  
**Position:** Chief of Electronic Department  
**Address:** Preah Kossomak Polytechnic Institute  
**Tel. No.:** +855-16-856-081 / 11-56-081  
**E-mail:** Sophoeu@hellegsm.com.kh

22. **Iem Kounthdy**  
**Position:** Deputy Director  
**Address:** N028, Str.184, Phnom Penh, Cambodia  
**Tel. No.:** +855-12-954-731  
**E-mail:** kundy_iem@hotmail.com

23. **Chhom Tharith**  
**Position:** Teacher  
**Address:** JVC Technical School and Workshop, Cambodia  
**Tel. No.:** +855-12-181-8512

24. **Chap Chan Therany**  
**Position:** Chief of Planning Office  
**Address:** Cambodia-India Entrepreneurship Development Center  
**Tel. No.:** +855-11-90-22-37  
**E-mail:** ciedc_ci@yahoo.com

25. **Sous Rithirong**  
**Position:** Trainer  
**Address:** Cambodia-India Entrepreneurship Development Center  
**Tel. No.:** +855-12-27-65-22  
**E-mail:** rithirong.ci@gmail.com
Speakers and Resource Persons

26. Dr. Mark Cully  
Position: General Manager, National Center for Vocational Education Research Ltd  
Address: Level II, 33 King William St. Adelaide, South Australia 5000; PO Box 8288, Station Arcade SA 5000  
Tel. No. +61-8-8230-8404 / Mob 0410 533 251  
Fax: +61 8-8212-3203  
E-mail: mark.cully@ncver.edu.au

27. Dr. Tshering Tobgay  
Position: Director  
Address: Dept. of Human Resources/Ministry of Labour and Human Resources  
Tel. No. +975-2-327337  
Fax No. +975-2-326246  
E-mail: ttobgay@drukret.bl

27. Dr. Agni P. Kafle  
Position: Director of CTEVT  
Address: Kathmandu University, NepalTribhuvan University, Nepal  
Tel. No. 4419873  
E-mail: apkafle@yahoo.com

29. Dr. Ligaya Valmonte  
Position: Professor  
Address: DMMSO, Philippines  
Tel. No. 072-242-5641  
Fax No. 072-242-5642  
E-mail: li_phils@yahoo.com

30. Dr. Shyamal Majumdar, India  
Position: Regional Vice President, Asia & Pacific, IVETA Also Professor & HOD Dept. of Computer Science and Engineering  
Address: Block-FC, Sector-III, Salt Lake City, Kolkata-700 106, India  
Tel. No. +91-33-2337-3959/  
Direct: +91-33-2337-0479/ 4125  
Fax No. +91-33-2337-6331  
E-mail: dr_majumdar@yahoo.co.in
31. Dr. Thamrongsak Moenjak  
   Position: Former Director, Colombo Plan Staff College for Technician Education, 85/172 Jirattikorn 7, Soi  
   Address: SenaniKorn 1, Phaholyothin Rd, Bkk 10230, Thailand  
   Tel No. +66-2-570-1165  
   Fax No. +66-2-570-1165  
   E-mail: moenjak@hotmail.com

32. Matthew Holden  
   Address: SAP Asia Pte. Ltd., Singapore

33. L. W. Sunil Kularatne  
   Position: Lecture/Trainer  
   Address: 3/21, First Lane, Katuwawala Mawatha, Boralessamduwa, Sri Lanka  
   Tel. No. 0094-11-2624029  
   Mobile: 0094-777-105189  
   Fax No. 0094-11-2622461  
   E-mail: sunilkula@hotmail.com

34. Dr. Man-Gon Park  
   Position: Director General and CEO, Colombo Plan Staff College for Technician Education  
   Address: Reped Complex, Meralo Ave, Pasig City, Manta, Philippines  
   Tel. No.  +63-2-633-8413  
   Fax No. +63-2-633-8425  
   Email: mpark@pknu.ac.kr

35. Dr. Tariq Mahmood  
   Position: Education Adviser  
   Address: Ministry of Education, Islamabad, Pakistan  
   Tel. No. 00-92-51-2252016  
   E-mail: tariq_moc@yahoo.com

36. Mr. Subodh Tripathee  
   Position: Vice-Chairman, Forum for IT Nepal  
   Address: Kathmandu, Nepal  
   Tel. No. 977-1-20-30-399  
   E-mail: stripatheec@adbi.org
37. Dr. Rolf Gennrich
Position: Senior Advisor in Charge of HRD for Market Economy, Lao-German Technical Cooperation
Address: Ban Thong Toum, House No. 138, Unit 11 Chanthabouly District, Vientiane, Lao People’s Democratic Republic
Tel. No. 856-21-217554
Fax No. 856-21-217329
E-mail: rolf.gennrich@gtz.de

Organizers and Facilitators

38. Dr. Jeoung-Keun Lee
Position: Director, Capacity Building and Training
Address: Asian Development Bank Institute, Tokyo, Japan
Tel. No. +81-3-3593-5512
Fax No. +81-3-3593-5587
E-mail: jklee@adbi.org

39. Dr. Pramod Shrestha
Position: Community-Based Skills Training Advisor
Address: Third floor #3 Russian Federation Blvd, Khan Toul Kork, Phnom Penh, Cambodia
Tel. No. +855(0)12-170-1848
Fax No. +855(0)23-216-370
E-mail: pramodshrestha@yahoo.com

Support Staff

40. Un Sophat
Position: Computer Technician
Address: Cambodia India Entrepreneurship Development Center
Tel. No. +855-16-314-340
E-mail: un_sophat@yahoo.com,
sophath_un@yahoo.com

41. Met Sopheanaroth
Position: Technician
Address: Cambodia India Entrepreneurship Development Center
Tel. No. +855-12-28-83-18
E-mail: sopheanaroth_met@yahoo.com
Rapporteurs

42. Carol Elliott
Position: Rapporteur
Address: #17AEo, Str. 278, BBKI, Phnom Penh, Cambodia
Tel. No. +855-12-772-024
E-mail: carolincambodia@hotmail.com

43. Marylin Dixon
Position: Rapporteur
Address: #25b, Sortearos, Towlle Bassac, Phnom Penh, Cambodia
Tel. No. +855-12-385-781
E-mail: marylinxon@gmail.com

Observers

44. Prof. Hyong-Hee Kim
Position: Faculty Member
Address: Colombo Plan Staff College for Technician Education
Tel. No. +63-2-631-0991
Fax No. +63-631-0996
E-mail: mhgold@cpsctech.org

45. Prof. T. J. Tesoro Gayondato
Position: Faculty Member
Address: Colombo Plan Staff College for Technician Education
Tel. No. +63-2-631-0991 to 95
Fax No. +63-631-0996
E-mail: tjtesorogayondato@yahoo.com; tj_gayondato@cpstech.org
WORKFORCE DEVELOPMENT FOR IMPLEMENTING INFRASTRUCTURE PROJECTS

25–31 October 2006
Phnom Penh, Cambodia

About the Asian Development Bank Institute

The Asian Development Bank Institute (ADBI), located in Tokyo, is a subsidiary of the Asian Development Bank (ADB). It was established in December 1997 to respond to two needs of developing member countries: identification of effective development strategies and improvement of the capacity for sound development management of agencies and organizations in developing member countries. As a provider of knowledge for development and a training center, the Institute serves a region stretching from the Central Asian republics to the Pacific islands.

ADBI carries out research and capacity building and training to help the people and governments of Asian and Pacific countries. The Institute aims to provide services with significant relevance to problems of development in these countries. In line with this aim, ADBI’s Capacity Building and Training (CBT) group seeks to respond to demand for sustainable, wide-reaching training of government officials in ADB’s developing member countries.