Final Report
The Workshop on the Development of Guideline on Teacher Training in ICT Integration and Standards for Competency in ICT

27-29 September 2003 · Beijing, China

Asia and Pacific Regional Bureau for Education
UNESCO Bangkok

UNESCO Implemented Project on Training and Professional Development of
Teachers/Facilitators in the Effective Use of ICTs for Improved Teaching and Learning
Supported by Japanese Funds-in-Trust Programmes

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1 *Introduction*

The Asia Pacific Programme of Educational Innovation for Development (APEID) at UNESCO Asia and the Pacific Regional Bureau for Education is implementing a project on "Training and Professional Development of Teachers/Facilitators in the Effective Use of ICTs for Improved Teaching and Learning". The project is being supported by the Japanese Funds-in-Trust programme to promote the use of ICT for expanded access to and improved quality of education for all.

The project is focusing on professional development to build the capacities of teachers and other facilitators, including policymakers, school headmasters, and technology supporters/providers in project countries. It will also attempt to find alternative strategies for integrating ICT in the teaching-learning process and for tapping the potential of ICT in improving education quality in learning environments affected by new technologies.

The overall objectives of the project are: (1) to improve teacher competencies, through pre-service and in-service training, in integrating technology in content and pedagogy and in facilitating ICT-assisted, interactive learning; (2) to create and disseminate country/locally-specific pedagogies and models of teachers' use of ICT in varied contexts, cultures and environments; and (3) to develop a regional online teacher resource base and offline network of centres of excellence in teacher training in using ICT for improving educational quality.

As a first activity the Experts Meeting on Teachers/Facilitators Training in Technology-Pedagogy Integration was held in Bangkok, Thailand from 18 to 20 June 2003. The Experts Meeting reviewed the situation of ICT use by teachers in the Asia Pacific region and in the global context, the issues and challenges in integrating ICT in teacher education, and the conceptual and curriculum framework of teacher development. The Experts Meeting completed the first task of developing a curriculum framework for the integration of ICT in teacher education.

1.1 Developing guidelines and competency-based standards

As a second step of this project, UNESCO invited a multidisciplinary group to develop a framework of guidelines and competency-based standards for integrating technology with pedagogy in teacher education for greater teacher professional development. In collaboration with UNESCO National Commission of China, a multidisciplinary group workshop on Development of Guidelines for Teacher Training in ICT Integration and Standards of Competency was organized from 27 to 29 September 2003 in Beijing.

1.2 Objectives of Beijing workshop

The Beijing workshop was organized to fulfil the following three objectives:

- to propose and explore issues in the development of regional guidelines and a conceptual/curriculum framework for teachers in integrating ICT in education for improved teaching and learning;
- to propose competency-based standards which can be adapted to national contexts as references in ICT training modules; and
- to develop a plan for the adaptation and development of teacher training modules (through a team approach) for capacity-building in technology-pedagogy integration through "training of trainers" workshops at national and regional levels.

The triple objectives of the Beijing workshop showed an ordered and logical sequence. The first task, to put forward a conceptual/curriculum framework for teachers in integrating ICT in education, led logically to proposing competency-based standards that can be adapted to national contexts. Following these two tasks, it was a quite natural progression to consider the development of teacher training modules to help teachers meet the identified standards.

2

Papers, questions and issues

Background papers, country case studies and concept articles were presented regarding the emerging challenges of technology, identifying the complexities of integration of ICT in teacher education, and highlighting the issues of professional development for teachers. All the papers were developed with current themes in using ICT for teacher education in mind. The participants raised many questions and identified issues for general discussion. Participants at the workshop provided cases, examples and illustrations from a variety of contexts, for example, Brunei, China, India, Philippines and Singapore.

The curriculum framework that was developed by the Experts Meeting of Bangkok was the starting point of the workshop. After evolving an agreed curriculum framework for integrating ICT with pedagogy for improving classroom practice, the Beijing workshop discussed the procedures for arriving at an agreement on the guidelines for developing competency-based standards, both for students and their teachers. Once a clear statement about ICT competency-based standards is made, it is then possible to plan to adapt or develop training modules for the trainers and teachers.

Key questions and issues that emerged during the workshop

While writing the background papers, a few participants expressed the feeling that they were unclear as to the accepted use of the term "guidelines". Thus they wanted to clarify this and other terms, such as teacher education, curriculum framework, competencies, standards, and developmental stages of integration of technology, among others. Once we opened this discussion many new doubts and questions were brought in. Some of those questions, issues, terms and concepts that demanded clarification are given in the box (next page).

The nature and contents of these questions, issues and discussion points vary so widely that it becomes difficult to categorize them neatly. However, some of them are related to: i) seeking answers about the appropriateness of the pyramidal model of the curriculum framework; ii) agreeing on meanings of important concepts and terms; iii) discussing the content and formats of training modules and materials; iv) exploring the nature of delivery systems; and so on. These questions and issues did guide the deliberations during the workshop. The following sections will deal with them one by one.

Basic concepts
- What are the similarities and differences between guidelines, recommendations and instructions, as far as their importance in teacher training is concerned?
- What will be the content areas of these guidelines? Will there be guidelines for (i) social context and cultural content; (ii) using technology; (iii) using pedagogy; and (iv) using school curriculum for projects?
- Who will be the target users of these guidelines? Will these guidelines cover pre-service and in-service teachers? Will guidelines be addressed to other functionaries?
- What do we mean by benchmarks, standards and norms in the context of ICT and teacher education and training?
- What will be the nature and format of these standards? Will these standards be the benchmarks for the input stage? Will they include process-related indicators for feedback and final indicators of a successful project?
- What is the scope of capacity-building? Whose capacity will be addressed: e.g. working teachers, teacher educators and teacher trainees?

Pyramidal framework
- Are the contextual factors of Context, Change and Lifelong Learning in the outer layer of the pyramidal framework sufficient to take account of regional and within-country diversity with respect to ICT of participating countries in the JFIT Teacher Training Project?
- Are the core teacher competencies of Pedagogy and Technology within the inner layer of the pyramidal framework sufficiently broad to encompass the skills, experiences and attitudes to be included in a teacher education curriculum?
- Does the modified framework for a teacher education curriculum in the pyramidal framework seem appropriate for the purposes of the JFIT Teacher Training Project?

Competency standards
- Are competency standards in ICT integration for pre-service or new teachers the same as for teachers already in the classroom?
- Are competency standards in ICT generic or are they subject-specific?
- When competency standards are adapted or developed for teachers, is it necessary to consider competency standards for students? for educational administrators? for teacher educators?
- Are separate competency standards in ICT required at different levels of schooling?

- How do we best integrate knowledge, skills and attitudes or values within a set of standards?
- What are the areas of these competencies? Will competencies for using ICT as tools, related website competencies, pedagogical competencies, management competencies for using ICT, curricular project management competencies, etc. be considered while preparing training modules?

Training modules and capacity-building
- What is the master plan for the development of teacher training modules?
- What will be the nature of the training modules in terms of language, context, content, level of technology, duration and so on?
- Who will develop the training modules? What will be the nature of module writers and area/country representation? What type of infrastructure is required to produce the modules?
- How will these authorize the assigned to write the modules and develop them into a multimedia format? Where and how will they be validated?
- How will the regional and country workshops for capacity-building be organized?
- How will the on/offline delivery of these modules be organized in the region?
- How do we determine the relative effectiveness of different training models?
- How do we deal with the prevailing conditions of limited availability of trainers in rural or remote areas?

Issues in integrating ICT
- How do we deal with the issue of a heavy use of English language in ICT and on the Internet that is creating a barrier for non-English speakers and how do we facilitate the use of local-language software wherever possible?
- While dealing with integration of ICT into teaching methods, how do we deal with multidimensional change in relation to technologies, curricula and pedagogies?
- How do we procure sufficient equipment for creating adequate opportunities for practice and skill-building?
- How do we overcome the strong tendency in some countries to teach ICT as a subject rather than view it as a tool for further learning?
- How do we support those countries that rely heavily on face-to-face training models in spite of the availability of new technologies for training purposes?
- How do we handle the situation of low levels of ICT skills and knowledge among many teacher trainers?

3 *Defining guidelines*

3.1 Mandatory parameters

At the beginning of the workshop, the organizers presented mandatory delimitations expressing that the ICT guidelines for teacher education should satisfy the needs of the region in general and the 12 project countries in particular. Specific needs of a project country should guide the adaptation of the generic guidelines.

The guidelines should be applied to pre- and in-service teacher education and to different levels of integration of technology and pedagogy in teacher education. Owing to budget shortages, the primary target of these guidelines could be restricted to the trainers of teachers in schools from the project countries.

These guidelines should form the core processes of teacher training, support persons who are engaged in teacher education, and facilitate the procedures for integrating ICT-pedagogy in teacher training. The guidelines could include competency-based standards, development of training modules, capacity-building, and on/offline resources needed for the development of teachers.

The guidelines could be generic, yet flexible and should include examples of local cultures and curricular subjects from the region. The quality of the end result must be emphasized over uniformity of process; these guidelines should not be treated as prescriptions for country-specific teacher training programmes. Guidelines may offer alternatives or enhance diversification of the use of ICT in teacher education especially in the 12 project countries.

These guidelines should consider opportunities to bridge the gap in the use of technology in teacher education within the region, between countries as diverse as Afghanistan and the Republic of Korea. The guidelines may be arranged according to the level of development of any community or country.

Within this mandatory framework, the participants of the Beijing workshop presented very diverse views about the term guidelines. However, the participants felt that guidelines should cover "WHAT", "WHY" and "HOW" statements that will enhance the process of integrating ICT and pedagogy into teacher education.

3.2 Brainstorming around key terms

Standard meanings of some terms were accepted from the general and technical literature and dictionaries. Some others were brainstormed during this workshop. These are:

Principle: A basic truth, law, or assumption: *the principles of democracy.* A basic or essential quality or element determining intrinsic nature or characteristic behaviour: *the principle of self-preservation.*

Indicators: Indicators are items of information used to assess outcomes and to document and measure performance. Simple indicators are information or statistics used in managing a system or operation. Performance indicators are items of information collected at regular intervals to judge the achievement of a system or institution. A simple indicator may become a performance indicator if linked to a specific management objective or to a value judgment. Performance indicators can be used to measure both processes and outcomes and are made concrete through setting targets or standards related to the chosen "quality" goals and values.

Guidelines: Some terms similar to guidelines are advice, advisement, assignment, briefing, directive, indication, notification, plan, prescription, recommendations, regulations, specifications and tips. Guidelines are a set of statements or other indications of policy or procedure by which to determine a course of action; a broad indication of appropriate practice or procedure, less specific than standards or criteria. Guidelines often accompany statements of standards, to clarify and guide users. They are not in themselves mandatory or formal requirements, which are usually formulated as a Code of Practice.

Competency: Specific skills or knowledge, demonstrated through performance or evidence which shows that an individual has reached defined standards for a particular level. Assessment of competencies is criterion-referenced, not norm-referenced, and focuses on observable learning outcomes including performance in the workplace, whenever possible. The required specific learning outcomes provide the criteria against which learners are assessed. The different competencies of an individual may be charted against a set of standards or statements to create a profile of the capabilities or repertoire of the individual.

Measurable outcomes: Results that indicate the extent to which an organization is achieving its overall objectives and critical success factors. The outcomes need to be defined in ways which are concrete, specific and capable of being measured in some way. While this produces results based on evidence, one danger is that some important outcomes may be neglected because they are more difficult to measure. Because of this, the tendency may be to include in an assessment of achievement only those outcomes which are easily measured or tangible in the short term.

Standard: A degree or level of excellence, or attainment required in something, such as a practice or a product that is widely recognized or employed, especially because of its excellence or moral conduct. Some synonyms for standard are belief, conduct, convention, conventionalities, criteria, ideal, imperative, integrity, practice and principle.

Criteria:[1] The selected characteristics or standards of a product, programme or service, on which judgements about quality are made. The selection of characteristics and standards defines what "quality" means for a particular product, programme or service. A criterion can be either more specific or less specific than a standard.

Code of practice: Broad indication of appropriate practice by an authoritative body, usually indicating the minimum or threshold standards to be achieved. It may also refer to a disciplinary code produced by professional organizations; such a code includes sanctions for failure to conform to the particular Code of Practice. A Code of Practice is usually more formal, prescriptive and forceful than guidelines (guidelines are often introduced as a first step towards establishing a Code of Practice).

Recommendation: Like an action, especially a favourable statement concerning character or qualifications.

Template: A pattern or gauge, such as a thin metal plate with a cut pattern, used as a guide in making something accurately, as in woodworking or the carving of architectural profiles. In computer sciences it refers to a file that has a preset format that is used as a starting point for a particular application so that the format does not have to be recreated each time.

Media and technology: Media refers to different forms of communication which represent and organize knowledge in particular ways (for example, through sound or vision, as in radio or television). In education the five main media are direct human contact (face-to-face), text, audio, television and computing (including computer communications). Technology refers to the form of delivery or carrier of a medium. For example, a single medium (sound plus vision, as in television) can be delivered by various technologies (satellite, cable, fibre-optics or microwave).

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[1] Criteria are standards, rules or tests on which a judgement or decision is based; criteria can be based upon laws, by-laws, rules, regulations, charters, canons, ordinances, guidelines, or directions. The sources of criteria may be: (i) precepts, requirements, specifications, gauges, stipulations, boundaries, limits, conditions, parameters; (ii) conventions, norms, regularities, uniformities, generalizations; (iii) principles, assumptions, presuppositions, definitions; (iv) ideals, purposes, goals, aims, objectives, intuitions, insights; (v) tests, credentials, factual evidence, experimental findings, observations; and (vi) methods, procedures, policies, measures (Lipman 1991).

3.3 Scope of guidelines

Guidelines are normative and guiding principles for undertaking actions that will help to integrate technology with pedagogy in the field of teacher education. These guidelines may cover all the stakeholders, particularly the trainers, the trainees and teachers who are engaged in training, teaching and learning. The guidelines will cover all the stages of the processes in which those stakeholders are engaged.

Regarding the **scope** of guidelines, two views were proposed: narrow and broad. The narrow view included the common-sense approach that restricts the scope by defining guidelines as roadmaps to reach the goal by using a given means. The broad view included the "means to reach the goal" as well as visions, principles, integration of pedagogy and technology, and other guidelines for capacity-building, preparing the materials, and delivery systems, for all types of teachers.

Some Asian countries already have highly developed standards and guidelines for the use of ICT in education. Countries which have only recently embarked on the development of ICT in education are the ones most likely to make use of the guidelines and standards, though those further on in their use of ICT may find it useful as a point of reference or comparison.

A number of tools to assist teachers and managers to integrate ICT into teaching already exist and should be collected systematically to support the use of the guidelines.

3.4 Agreements about guidelines

The development of general guidelines or standards seems most appropriate for the Asian region. The international tendency is towards the creation of generic standards and guidelines rather than specific ones, though some countries have developed specific subject standards in relation to teacher education and national schools curricula.

Based on the papers presented at the Beijing workshop and the discussions held therein, the following points about guidelines were accepted for the JFIT project (see next page).

Purpose and needs addressed
- The purpose of developing guidelines is to assist the capacity-building efforts of those project countries where it is needed most.
- The guidelines should address the different needs relating to integration in countries where ICT is emerging, being applied and transforming teacher education. However, the pyramid model and the guidelines should remain open and flexible.

Format and character
- Guidelines are usually expressed as short statements embodying principles.
- The guidelines should define what has to be achieved; their interpretation in each context should represent how this will be achieved; and the visionary statement should give the reason why the standards or goals have to be achieved.
- The structure of the guidelines should have different levels: vision, principles, standards and indicators.
- The guidelines should be generic in character but may include local examples and specific cases.

Focus and scope
- In devising guidelines, the focus should be on working teachers at secondary school level.
- The focus should be on the pedagogy of ICT and teacher training for teachers at secondary school level.
- The guidelines should include competency-based standards, training modules and links to online resources for teachers.
- The scope of the guidelines should include teacher educators and head teachers, so a broad framework for the guidelines is required. It is possible that the structure may need to include subsets for different role-holders, such as head teachers, managers and trainers.

*Development, finalization and testing*
- Further development of the guidelines should build on the model agreed at the Bangkok meeting.
- A framework for the guidelines should be finalized in the light of feedback provided on the underlying conceptual model.
- Because of financial constraints, the guidelines should be piloted in a few of the countries in the Asian region.

4 *Teacher education curriculum framework*

The term teacher education will comprise the pre-service and in-service development of teachers and allied persons who are contributing to the development of education systems, and particularly to the improvement of the teaching-learning environment at all levels of education in all kinds of countries going through a variety of developmental cycles of integrating technology.

**Guidelines for using
the pyramid framework**

Change

Lifelong Learning

TECHNOLOGY
|
TEACHER EDUCATION
CURRICULUM
|
PEDAGOGY

Context
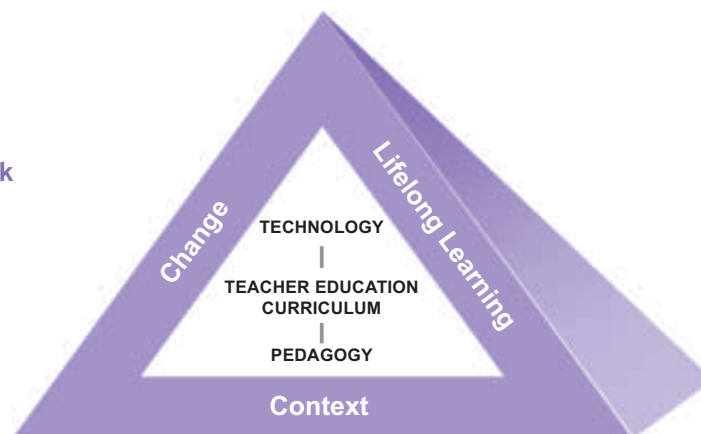
The curriculum framework for such a teacher education has been conceptualized through a pyramidal model that was adapted and developed by the Experts Group Meeting in Bangkok.

The modified curriculum framework for teacher education suggested by the Bangkok Experts Meeting is presented with the same spirit as it was discussed in Beijing. As seen here, the central issue is of integrating the pedagogy with the technology. The issue of integration is positioned in the centre of this framework within three broad contextual factors of context, change and lifelong learning. Some of the elements of the three contextual factors are given below:

- **Context – contextual factor 1**
    - current social and economic conditions
    - existing telecommunications infrastructure
    - cultural and linguistic factors
- **Change – contextual factor 2**
    - a national vision for ICT
    - the cycle of curriculum reform reached
- **Lifelong Learning – contextual factor 3**
    - recognition that learning continues throughout life and that learners need to learn how to learn

Within the outer layer of the pyramid, a teacher education curriculum comprises two principal clusters of core competencies that are related to pedagogy and technology. However, we should appreciate that we will need to understand the concept of the integration of these two competencies at an appropriate place a little later. Furthermore, placing pedagogical competencies at the base of the pyramid reinforces the key role pedagogy plays in technology-pedagogy integration.

- **Pedagogy**
  - new ways of doing things with ICT
  - new theories of learning
  - pedagogical skills: selection, presentation and assessment
- **Competencies in technology**
  - concepts and operations relating to ICT
  - social, health, legal and ethical issues relating to ICT
- **Competencies in integrating "pedagogy and technology"**

In addition to knowledge of and competency in technology and pedagogy, the process of integration by itself needs a new set of competencies.

The teacher education curriculum framework must fall in line with the status of ICT in the school system of a country. Some school systems within one country are concurrently treating the subject of ICT in four different ways: (i) ICT as a basic tool; (ii) ICT as a tool to teach curriculum subjects; (iii) ICT in the curriculum in the form of integrated themes of learning; and (iv) ICT for enhancing the professional development of teachers.

All these types of school curricula require different kinds of teacher education. Recently, Mongolia, for example, has started to develop draft outlines for teacher education in these four different curricula.

5

Competency-based standards

5.1 Meanings of competency-based standards

We have seen that some people communicate in a rather vague way, using terms like standards, competencies, norms, benchmarks, indicators and guidelines for ICT in teacher education. We wanted to confront this issue a bit more seriously at the Beijing Meeting. We looked into the term "standards". We found that standards do stand for: (i) an accepted level and scope of attainment of proficiency; (ii) a reference point against which other things are judged or measured; and (iii) a combination of attributes underlying the particular aspects of successful performance involving the use of ICT.

Furthermore, the term "competency-based standards" involves three interrelated components: (i) identifying quality/acceptable attributes; (ii) measuring the quantity of those attributes; and (iii) stating the acceptable level of that qualitative assessment or quantitative measure.

The first component is to identify the quality or the attribute. This will depend upon the meaning and the scope of the domain. As far as this project is concerned, our domain is related to integration of pedagogy and technology.

The second component concerns the tools by which to measure or assess that quality and will demand the use of particular mechanisms to show the levels of attainment for making judgements. The nature of these tools will be governed by the concept of integration and its agreed manifestation.

The third component is the accepted level of proficiency in using ICT in teacher education. This is defined by accepted benchmarks that are objectively based on requirements to achieve proficiency on the one hand, and subjectively by the support system available in a given economy and culture on the other. This accepted level will become the reference point(s) against which things are judged.

The term "competency" stands for a desirable quality or behaviour, or, rather, what a person will be able to do after a period of instruction or training – a performance indicator as it is sometimes called. The accepted level of this desirable quality/competency will be referred to as "standards".

5.2 Four-dimensional, competency-based standards

Normally, the identification of competency-based standards follows a vision statement about the use of ICT in education. A vision for ICT in education follows the conditions of the countries; for example, Singapore's vision aims to position itself as an "Intelligent Island", while Australia sees itself as the "Creative Nation". Thus, a vision derives from a nation's perceived need for change to achieve the image it wants to project, as recognized by its people, governments or institutions.

Likewise, China presents a four-dimensional model in its vision that consists of 16 competency-based standards:

Dimension 1
- understanding the concepts of ICT and its impact upon current society and the whole world;
- understanding the existence of various technology resources in education and their functional differences in supporting teaching and learning;
- demonstrating knowledge and skills for operating technology tools applicable for education *(productivity tools, problem-solving tools, communication tools, research tools)*; and
- demonstrating knowledge and skills for using technology in ethical, legal and safe ways.

Dimension 2
- understanding that technology extends the dimensions of learning *(temporal, spatial, interactive)*, and enables significant changes in the teacher-student relationship;
- understanding the diversity of learning styles with students and the possibilities of using technology to fit personal learning needs;
- designing effective learning experiences and creating rich learning environments with the support of technology; and
- applying technology-supported strategies to manage students' learning.

Dimension 3
- understanding that technology enables multiple representations of curriculum knowledge and makes available extensive resources;
- understanding the importance of balancing indigenous/local knowledge with global knowledge in the context of globalisation;
- designing technology-enhanced representation and presentation of curriculum knowledge and reorganizing learning resources; and
- demonstrating knowledge and skills for acquiring and processing learning resources with technology tools and using the resources for educational purposes in fair ways.

Dimension 4
- understanding the importance and requirements of teacher professional development in the information age;
- understanding the potential of technology to support professional practice and personal development;
- using technology to improve professional skills and work performance; and
- using technology to support interaction in learning/social communities.

This model varied from the one that was developed and accepted at the Expert Group Meeting held in Bangkok.

5.3 Pedagogical competencies

The formulation of the vision and the identification of pedagogical competencies need a fuller explanation of the context and the wide spectrum of approaches that have been developed through experimenting over the years. Educational theory, such as constructivism, can only continue to develop with the help of new technologies, where learners will be offered new ways of solving many types of problems, such as the following examples:

11 Kinds of Problem Solving

1 Logical Problems

2 Algorithmic Problems

3 Story Problems

4 Rule-using Problems

5 Decision-making Problems

6 Trouble-shooting Problems

7 Diagnosis-solution Problems

8 Tactical-strategic Problems

9 Case/Systems Analysis Problems

10 Design Problems

11 Dilemmas

Jonassen and Howland (2003)

It is not possible to deal in depth with such a serious topic as problem-solving in this report. However, it seems that the most popular reason for introducing ICT into education is to improve teaching-learning efficiency and effectiveness. In addition, we understand that the use of ICT is going to impact considerably upon both the roles of teachers and of learners.

Within the framework of these changing roles, we will find that responsibility for learning will fall more and more on the learners. The constructivist approach will demand competency in the newer pedagogies. Some work towards identifying such skills has already been done, for example the UNESCO document "ICT in Education 2002", which describes how pedagogical competencies will include and build on those at the earlier stage. These competencies should address why, when, where and how ICT tools will contribute to learning objectives. Examples include:

- choosing ICT tools and pedagogy that integrate ICT into the whole curriculum;
- choosing and recommending ICT tools and pedagogy appropriate to the individual student's learning objectives;
- emphasizing the quality of student work and the contribution of ICT to individual learning goals and levels of attainment;
- planning a whole learning programme that allows a range of ICT tools and pedagogy to be used as and when required;
- choosing tools and pedagogy that allow the teacher and student to manage their own learning.

However, this has to be viewed in the context of using technology in teacher education in this region of the world. We have yet to undertake this kind of work.

5.4 Technological competencies

Teaching and learning tools are changing very fast. Teachers must learn to appreciate the availability of hardware and learn to use it appropriately, as well as confront sometimes deep feelings of techno-phobia. In fact, competent teachers will learn to use these new teaching tools with great skill, and may even become proficient in dealing with simple problems of maintenance and minor repairs. Technology competency must not be understood solely in terms of hardware and software.

Technology competencies will help teachers access, gather, present and communicate, and manipulate the information that is available in the form of text, images, sound, title page, references and designs. It is not enough to learn basic skills like word processing and spread sheets, multimedia and presentation materials, or accessing instructional web pages. Teachers will have to develop

competencies related to communication information analysis and processing like locating relevant information, collecting and evaluating data, storing and managing data, and so on. The teacher can develop competencies to handle this information from many sites and sources by using general and special search tools.

Other areas demanding teachers' full attention include ethical and security issues. Teachers have to familiarize themselves with the educational implications of fair and equitable use of the national education information system, including protecting intellectual property rights and preventing the distribution of unethical information, and must be able generally to support the needs and interests of new knowledge-based societies.

5.5 Competencies of integration

The inclusion of both pedagogy and technology as core competencies for teachers acknowledges that integrating ICT in education for teaching and learning is far broader than the simple acquisition of these two sets of competencies.

Integrating ICT is not simply a matter of acquiring competency in technology alone, nor in pedagogy, nor even a combination of the two. Rather competencies of integration are about the appropriate selection, use, mix, fusion and integration of many sets of competencies, including, but not exclusive to, those in pedagogy and technology.

These competencies are creating a new environment where, to a large extent, learners are in control of their own learning needs and habits. Competencies of integration might be better appreciated when we understand the many levels of adding, mixing, amalgamation, assimilation, embedding, fusion, and synthesis that the process involves.

The integration of technology-pedagogy will be embedded throughout all subject areas, all learning styles, and all levels of teacher education within the Asia-Pacific region.

Integration will cover all kinds of teacher education, procedures, and the many issues arising out of the region's diverse educational climate.

The following analogy of "interdisciplinary thinking" illustrates the spirit of integration of technology and pedagogy.
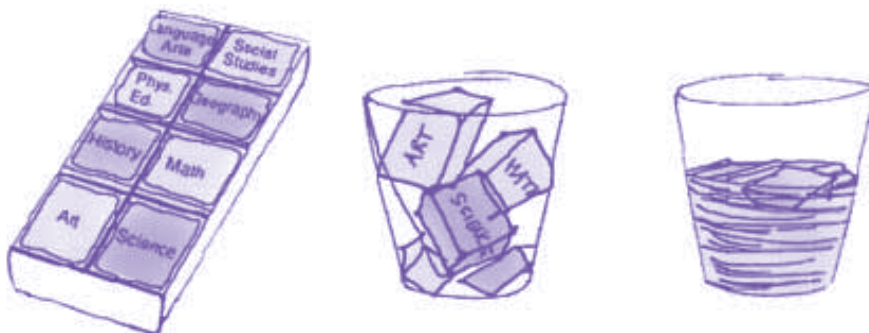
Disciplinary thinking   **Interdisciplinary thinking**   **Integrative thinking**

6 *ICT standards and solutions of diversity*

6.1 Dilemmas of uniformity and multiplicity

One of the most serious issues that the educational community must confront concerns the question of uniformity versus multiplicity of standards. This created a dilemma for some of the members of the workshop. Many arguments were presented in favour of uniformity of standards, while many participants also voiced strong support for multiplicity. One of the major arguments against generic standards was the wide-ranging and diverse nature of ICT facilities. It was felt that the range of ICT skill-use is so wide that an acceptance of any one set of standards will only create more problems. Adopting a single, uniform set of standards for using ICT in education may not be fully applicable in this region.

The range of ICT environments within education in Asia and the Pacific is tremendously broad. There is great diversity in the current levels of teachers' skills and their use of ICT, as well as in policy goals and teacher training curricula. Some teachers in this region have gained advanced skills in, for example, the use of digital learning management systems, while others still lack even the most rudimentary computer skills.

In addition, there is a wide gulf in access to ICT infrastructure and educational resources in the region. For many teachers, access to computers and other educational technologies remains a distant dream. A teacher in rural China or Mongolia, for example, will not have the same facilities as a city-based teacher in the Republic of Korea or Singapore. This difference in access to ICT in education also extends to internal digital divides within countries, broadly speaking in terms of urban-rural and rich-poor divides, and such disparities will inevitably affect the performance levels that we may expect from different teachers.

The amount of control that teachers in different countries have over the curricula they teach also varies widely. For example, teachers in Japan have a comparatively large degree of freedom. As a result, they must learn to work and be comfortable with a greater level of autonomy than teachers in countries where this freedom is not available.

We can see, then, that there is great disparity even within countries and communities as far as the level of ICT use in education is concerned. From the related literature and experiences gained, we identified four broad categories describing the different environments in using ICT for teacher education in the region, namely: emerging; applying; infusing; and transforming environments. This four-stage model can be applied to the use of ICT by individuals as well as by systems and institutions.

Two elements were also identified which must work hand-in-hand: "variations in ground realties" and "a teacher education framework for using ICT". Accordingly, the workshop participants agreed that we may discover multiple sets of standards of competencies to suit the four-stage environment model.

Competencies of integrating "technology and pedagogy" in varying environments of ICT in teacher education

1 Emerging
2 Applying
3 Infusing
4 Transforming
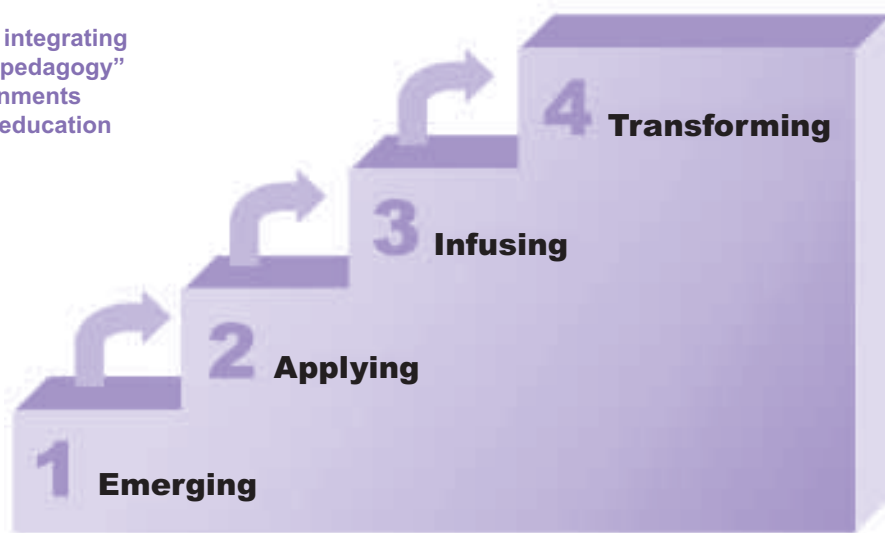
The final choice of competencies should be consistent with the model adopted in the Bangkok meeting. Our standards should relate to different levels of competency, ranging from novice to highly skilled practitioner. We have yet to do a lot of work on this model; however, as a first step, we may elaborate upon a few selected core competencies.

In contrast to the multiple-standards approach, the USA has possibly gone furthest in adopting competency-based standards for teachers across the country. The International Society for Technology in Education (ISTE) has put in considerable work to this end, and the ISTE National Educational Technology Standards for Teachers are now available online.

Of course, there are also those who feel that there should be separate standards for the teaching of different subjects. Examples of subject-specific standards in the UK can be found on the British Educational Communications and Technology Agency's (BECTA) website at www.becta.org.uk. Apart from subject-based diversity, BECTA also puts forward the view that there should be separate standards for students, teachers and educational administrators.

As far as ISTE is concerned, standards for teachers are grouped into six broad areas. The areas are designed to be sufficiently general so that they may be customized to meet local needs, yet sufficiently specific to define clearly what is required.

6.2 Agreement

A common trend is to develop separate ICT standards. ISTE has produced an example of generic standards that can be accessed at www.iste.org.

Given the diverse contexts within the Asia and the Pacific region, the creation of general standards illustrated with subject-specific examples seems most appropriate, leaving scope for customisation to meet local needs.

Competency standards can take the form of general or specific statements and the example from ISTE provides a useful model.

There is no need to create new sets of competency standards from scratch. Much work has already been done in some countries on the development of standards and these should be adopted or built on rather than reinventing whole new models. In making any use of existing standards, the focus should be kept clearly on pedagogical aspects.

7

Instructional design for practice

Developing competencies requires a complete instructional design, including training systems that draw on a variety of processes, tasks and practices. The standards should reflect or include instructional systems and strategies in an integrated way.

In the Beijing workshop, a great deal of discussion took place to identify and construct the instructional design for providing large- and small-scale training systems. Issues of pre-service education, in-service training, and lifelong professional development for teachers were considered from different angles. Ultimately, the following conceptual framework was constructed and is being presented here to give an overall picture of this design.
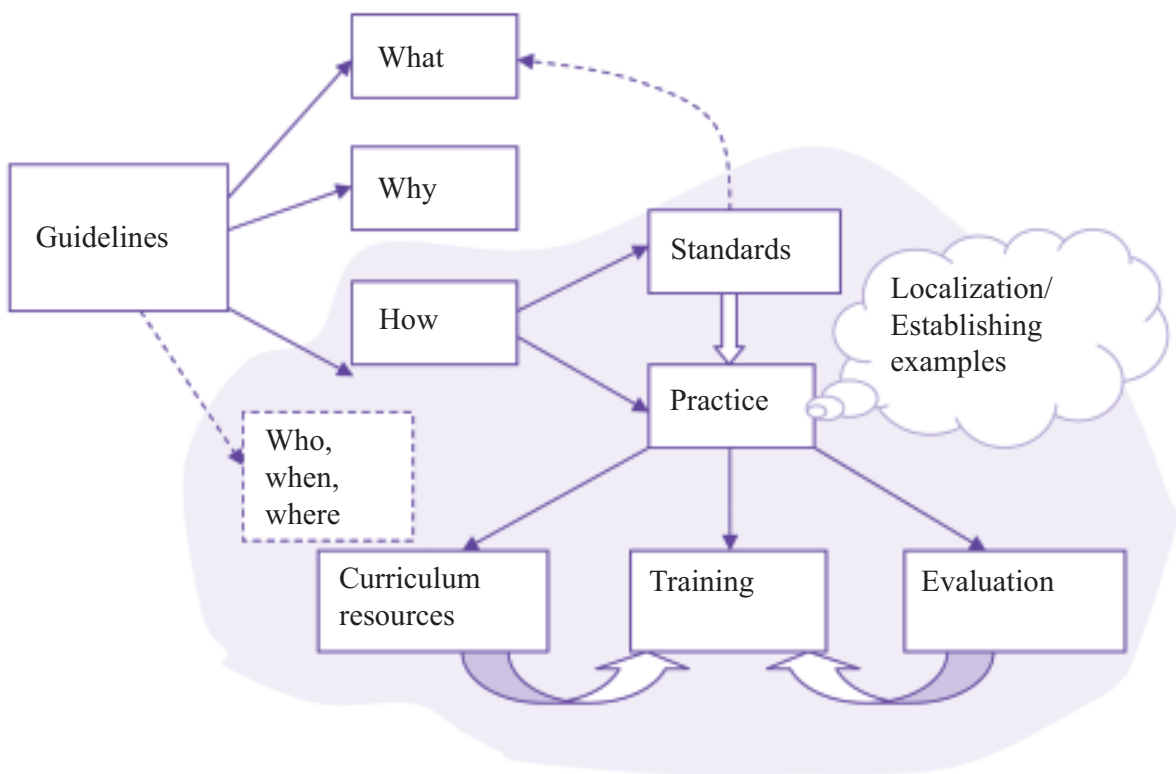
8 *Developing a training module*

8.1 Delimitations

Professional development for all types of teachers is important, but owing to budgetary constraints, careful planning is essential. It was felt at the Bangkok workshop that while we need to focus on all kinds of teachers, we ought to give priority to trainers.

We need to prepare materials that will support pre-service education as well as in-service training initiatives. Development of materials aimed at a variety of users, such as trainers, teachers, trainees, and even administrators is seen as a very useful strategy.

As a first priority, we may target in-service programmes, due to urgent need and ease with which such programmes can be launched. We must, however, focus on content that can meet the needs of both in-service and pre-service professional development programmes. The modules should support a blended model of teacher training, which includes face-to-face training, short courses, self-study and distance learning.

8.2 Vision and master plan

The vision and the changes that are taking place will act as guides to developing training modules. A master plan is an essential step for implementing this project, which will develop the instructional design and training materials, decide the nature and number of modules, and will include a work plan which will identify project participants.

The development of materials will involve various stages, with phases to include analysis, design, development, implementation and evaluation. This development cycle will also confront many other issues, broadly relating to (i) the stage of teacher education to be targeted, such as deciding between pre- and in-service training; (ii) identifying the needs of the trainers/audience; (iii) selecting content from different sources in the curriculum; (iv) the nature and role of the trainee-learner; (v) choosing alternative pedagogies; (vi) language and medium; (vii) emphasizing cultural content; and (viii) establishing the desired level of integration.

8.3 Materials and modules

Many experiences from all over the world can help in the development of materials and training strategies. Systematic surveys to identify existing materials will help those working with limited resources achieve effective outcomes. Materials should be created only where critical gaps exist.

Once we identify existing materials, we need to evaluate them for their relevance and availability. The training modules should make use of multimedia formats. Materials produced may range from print to video to computers, and can be classified by media, content and level.

The importance of using locally-relevant examples can not be overstated. Cases of good practice from within a national context are highly inspiring, while local databases and websites tend to engage teachers more than remote ones and have proved more motivating.

The involvement of local master-teachers right from the planning stage of the instructional design, and during the production of the materials, is also very motivating. If teachers are involved in the production of their own materials they can easily demonstrate the value of using technology. This model of an inbuilt mechanism for capacity-building will be useful for further expanding and localizing the training systems. We may also find strategies to involve the local community, as well as the business and corporate sectors.

9

Online and offline delivery systems

9.1 Planning

Planning and designing projects for the use of ICT in teaching-learning requires an understanding of the underlying processes of local school systems, a knowledge of on-going teacher training programmes, and insight into the level of ICT infrastructure in all those project countries. There needs to be a full analysis of all the issues relating to and stemming from various instructional models, including: school-based/off-school; preparatory/just-in-time; standard/diversified; generic/subject-specific; face-to-face/distance; and on/offline.

The workshop debated around these issues. We agreed to follow: (i) a systems approach to instructional design; (ii) multiple-technology models for the training of teachers and other personnel; and (iii) multiple modes of delivery for pre-service and in-service teacher education programmes. We must also create a fair environment for the distribution of resources for organizing short-term/long-term/lifelong models of professional development for teachers.

9.2 Preparing trainers

The workshop endorsed the value of using master-teachers as part of the main training strategy, and the aim is to prepare master trainers for project countries through regional workshops. Also, teacher-directed training will help meet specific local needs.

Development of a core group of external and local trainers in each of the functional areas could be useful and may prove to be an acceptable mode of training. Hybrid models that suit local needs may also be encouraged.

Multiple strategies and a blended approach that uses master-teachers, on/off-site training, school-based training, face-to-face models, short/long courses, self-study and distance learning will work better where situations are more complex and diverse. The idea of advanced learning through action learning could also be tried out wherever possible.

9.3 Delivery and sharing of experiences

Multimedia and multimodal transmission, while more expensive, is widely considered to be more effective. Furthermore, instruction that uses a range of formats, from video and CD, to printed materials and on-screen delivery covering prescribed curricula could well be beneficial.

Online training using web technology, which is flexible and easy to revise, may be more useful for lifelong education. This mechanism can be useful for servicing more remote schools, and can even help teachers to connect with colleagues and other schools through online networks, and thus create an environment for building local capacity in the use of ICT, and may also help teachers to better serve their community. Teachers will thereby be able to further increase their own capacities to develop local teaching materials. This can also then act as a focal point for further in-service development.

Single-tier programmes using a satellite/mass media/stand-alone approach are also considered to be simple and convenient.

9.4 Evaluation

Evaluation is essential for determining the effects of interventions and the extent to which the project objectives have been achieved. There are a number of models around the world for assessing whether teachers have acquired the necessary skills to effectively use ICT in education. For example, the Danish Pedagogical ICT Driving License offers standardized and accredited outcomes on a national level and specifically addresses the pedagogical aspects of ICT in education. It remains for the Asia-Pacific region to decide how relevant this model may prove, especially bearing in mind that many regional countries are at very different levels of ICT development.

The use of self-assessment tools for competency looks promising because it engages teachers in their own learning. Self-assessment helps to sensitize the learner to their own learning outcomes.

10 *Conclusions and recommendations*

All over the region, school and teacher-training curricula are reorienting themselves to take advantage of the rapid changes in educational technology; some schools in Asia and the Pacific are undergoing wholesale transformation. Singapore, Malaysia, Brunei and Australia, for example, are overhauling their existing curricula aiming for seamless integration of ICT into their education systems. In Japan, the Ministry of Education has created a more autonomous environment where the school principals and teachers are free to develop their own curricula and even formulate their own objectives. At the other end of the spectrum, meanwhile, Afghanistan is only now entering the "emerging" stage, and is taking preliminary steps towards drawing up policies for ICT in education. All these changes and developments need to take place within a framework that supports decision-makers and makes available best practices and innovative training models. This project is one such effort that is being organized at the regional level. The following are a summary of the workshop's findings:

Formulating guidelines
- Guidelines should be formulated according to the Teacher Education Curriculum Framework that emerged from the Experts Group Meeting. Guidelines should include a vision statement, appropriate principles of education, a list of competency-based standards, development of instructional materials, and a delivery system for capacity-building for using ICT in teacher education that will aim to improve the quality of learning.
- Guidelines should emphasize the integration of pedagogy and technology for all levels of trainers, and particularly for secondary education.
- Guidelines should be generic, flexible, and relevant to the project countries' teacher education needs, according to their stage of development along the four-fold model: emerging, applying, infusing and transforming.

Competency-based standards
- It is recommended that competency-based standards be identified for technology and pedagogy, but even more so for integration. Integration is the key term in the phrase "integrating pedagogy and technology for effective teaching and learning".

Training module
- It is recommended that the training module be developed in accordance with the needs of the project countries. A glossary of terms should be prepared to ensure common understanding.

Capacity-building
- It is recommended that the capacity-building workshops to pilot the projects be aimed at the regional and country levels. Likewise, online training and mass media training may also be used wherever possible.

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Appendices

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II. Selected papers

Anderson, J. 2003. *Curriculum Frameworks and ICT Competency Standards for Teachers.* Presentation to Workshop on the Development of Regional Guidelines on Teacher Training in ICT Integration and Standards for Teacher Competency, Beijing, China. September 27-29.

Cabanatan, P. 2003. *Integrating Pedagogy and Technology: The SEAMEO INNOTECH Experience* Presentation to Workshop on the Development of Regional Guidelines on Teacher Training in ICT Integration and Standards for Teacher Competency, Beijing, China. September 27-29.

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Passi, B K. 2003. *ICT in Teacher Education.* Presentation to Workshop on the Development of Regional Guidelines on Teacher Training in ICT Integration and Standards for Teacher Competency, Beijing, China. September 27-29.

Shinohara, F. 2003. *Introduction to JFIT Programme on ICT in Education in Asia and the Pacific Region*. Presentation to Experts Meeting on Teachers/Facilitators Training in Technology-Pedagogy Integration, Bangkok, Thailand. June 18-20.

Siribodhi, T. 2003. *Approaches to Teacher Training in ICT: Focus on School Based Training.* Presentation to Workshop on the Development of Regional Guidelines on Teacher Training in ICT Integration and Standards for Teacher Competency, Beijing, China. September 27-29.

Zhou, Nan-Zhao. 2003. *An Overview of the JFIT-Supported Project on Teacher Training in Technology-Pedagogy Integration and Elements of a Regional Guideline.* Presentation to Workshop on the Development of Regional Guidelines on Teacher Training in ICT Integration and Standards for Teacher Competency, Beijing, China. September 27-29.

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III. Workshop schedule

27 September

08.00 – 09.00	Registration

09.00 – 09.45 **Opening**
- UNESCO Asia and Pacific Regional Bureau for Education
  Mr Zhou Nan-Zhao, Coordinator, APEID and Project Officer
- UNESCO Office Beijing
  Mr Yasuyuki Aoshima, Director
- Chinese National Commission for UNESCO
  Mr Du Yue, Deputy Secretary-General

09.45 – 10.15 Self-introduction of participants

10.15 – 10.45 *Coffee break*

10.45 – 12.00 **Session I**
- Introduction to JFIT Programme on ICT in Education
  in Asia and the Pacific
  Mr Fumihiko Shinohara
- An Overview of JFIT Teacher Training Project
  and Elements of a Regional Guideline
  Mr Zhou Nan-Zhao

12.00 – 13.30 *Lunch*

13.30 – 15.00 **Session II**
A Proposed Framework of Regional Guidelines and Competency-Based
Standards of Teachers' Technology-Pedagogy Integration
Mr Jonathan Anderson and *Mr Zhu Zhiting*

15.00 – 15.30 *Coffee break*

15.30 – 17.00 Presentation of Discussion Papers on Teacher ICT Integration
(20 minutes each followed by discussion)
Ms Priscilla G. Cabanatan, Philippines; *Mr Mohammad Miyan*, India;
Ms Insung Jung, Republic of Korea; *Mr Passi B K*, Thailand

19.00 Reception hosted by Chinese National Commission
and UNESCO Bangkok

28 September

08.30 – 10.00	**Session III**
	• Teacher Standards Based on Japanese Experience
	  Mr Fumihiko Shinohara
	• Approaches to Teacher Training in ICT Use in Education:
	  A General Review with Focus on School-Based Training
	  Ms Tinsiri Siribodhi
	• Discussion papers on Teacher Guidelines in Use of ICT
	  Mr Ding Xingfu, China
	• General Discussion on Guidelines and Standards

10.00 – 10.30	*Coffee break*
10.30 – 12.00	Discussion Papers on Guidelines and Standards *Mr Qi Zhiyong,* Gansu-Based Joint Innovative Project, China; *Ms Rossukhon Makaramani*, Thailand; *Mr Wilfredo Pascual,* SEAMEO's Experience
12.00 – 13.30	*Lunch*
13.30 – 15.00	General Discussion on Guidelines and Standards (continued)
15.00 – 15.30	*Coffee break*
15.30 – 17.00	General Discussion on Teacher Guideline Training in Use of ICT (continued)

29 September

08.30 – 10.00	**Session IV**
	• Teacher Standards for Competencies in ICT Integration:
	  International Perspectives, *Ms Bernadette Robinson,* UK
	• General Discussion and adoption of an Agreed Outline of the
	  Guidelines and Structure of Competency-Based Standards

10.00 – 10.30	*Coffee break*
10.30 – 12.00	General discussion (continued)
12.00 – 13.30	*Lunch*
13.30 – 15.00	**Session V** Discussion on follow-up actions: team work, timeline, linkage of adaptation/development of training modules.
15.00 – 15.30	*Coffee break*
15.30 – 16.30	**Conclusions and Recommendations**