Integrating ICT and Other Technologies in Teacher Education: Trends, Issues and Guiding Principles

By Jonathan Anderson
Flinders University of South Australia

Diversity of the Asia-Pacific Region and ICT

The Asia-Pacific region has enormous diversity: it contains some of the world's largest countries like China and Australia, and some of the smallest like Bhutan; it contains the world's most populous nations (e.g. China, India, and Indonesia) and some of the least populated and most remote (e.g. many Pacific nations and territories). The region also has approximately three-quarters of UNESCO's estimated number of adult illiterates in the world. This diversity is reflected in ICT development within countries.

Geographic, Demographic, Economic and Educational Factors (Indonesia)

Affecting access to ICT and impacting on teacher education are geographic factors such as size, terrain and communications; demographic factors such as population size, density and dispersion; economic factors such as gross domestic product (GDP); and educational factors including years of compulsory schooling, levels of education and literacy rates. Cultural factors such as language and alphabet might also exert particular influences. Consider, for example, Indonesia spread over more than 1,200 habitable islands where 60 per cent of the villages are remote, with many lacking regular power supply or any telephone connections. Population and high birth rates make the task of teacher education enormous: there are 1.6 million primary and secondary teachers and more than 40 million students of school age.

Barriers to Implementing IT in Schools (Pacific Islands)

A survey conducted for SEAPREAMS (South East Asia and Pacific Region Educational Administrators and Managers Symposium) across eleven countries, many of them islands in the Pacific, aimed to identify those factors that facilitated or worked against the inclusion of computer-based technologies in schools. The following barriers to implementing information technology programmes in schools were reported:

- Physical barriers such as remoteness and an unreliable electricity supply,
- Scarcity of funds,
- Lack of staff development,
- Insufficient and inappropriate software, and
- Speed of technological development (Anderson 1997)

Integrating ICT in Teacher Education

Integration of ICT in teacher education is influenced in large part by two sets of factors: national policy and resources, and policies relating to curriculum development. In this section, these two sets of factors are illustrated by developments in three countries within the Asia-Pacific region – Malaysia, Thailand and Viet Nam. The section concludes with a description of an ICT project in Chile, which has implications for practice elsewhere.

National Policy and Resources (Malaysia, Thailand, Viet Nam)

Countries in the region are at different stages in adopting national policies relating to ICT in education and also have different levels of resources to devote to such policies. Three country reports included in a SEAMEO document on pre-service teacher training and professional development in the use of ICT illustrate the diversity in the region (Downes et al. 2003). The country report for Malaysia notes that the Prime Minister announced his Vision 2020 for Malaysia in 1992 and in 1994 unveiled a plan for a multimedia Super Corridor, which involved the development of

Smart Schools. The first of these Smart Schools came online three years later with the aim that by 2010 all schools in Malaysia will be Smart Schools.
An Outline Perspective Plan for 2001-2010 aims to:

- Develop a quality workforce that is knowledgeable with highly tuned thinking skills, is able to use technology and new resources optimally to combine creativity and innovation effectively and has a diversity of skills and knowledge in the use of ICT.
- Educate students so they are knowledgeable and ICT literate and able to use technology for the betterment of themselves, their communities and their nation. (Downes et al. 2003, p. C5).

In the case of Thailand, the country report notes that a National Education Act (1999) mandates that ICT play a key role in education with a major goal being "to promote, develop and support the use of technologies in education." More specifically, the Act stipulates that "the reform of learning will lead to lifelong learning, and bring about the realization of the emerging pedagogical paradigm via the use of ICT" (Downes et al. 2003, p. D7).

In Viet Nam a national statement on ICT in education was launched in 2001, with a Master Plan for 2002-2005. The target is to increase ICT use in teaching to between 5 and 10 per cent of the total time for each subject.

These three country reports illustrate the different stages when national policies for ICT in education were adopted, and the varying goals with regard to implementing these policies depending on national resources. How ICT is integrated in teacher education will be influenced by these national policies and goals.

Curriculum Development Within Countries (Malaysia, Thailand, Vietnam)

The second set of factors to influence integration of ICT in teacher education is the stage countries have reached in the cycle of curriculum development. Again, the country reports for Malaysia, Thailand and Viet Nam describe curriculum development within these countries. In Thailand national reforms are underway across the entire school curriculum. In Viet Nam a revised curriculum is being implemented in primary and lower secondary schools from the 2002/2003 school year, and for upper secondary schools from 2004/2005. With respect to ICT, curriculum documents in Malaysia explicitly require the use of ICT; in Thailand ICT use is encouraged; while in Viet Nam the new curriculum emphasises the need to use ICT (Downes et al. 2003, p. 30).

Integrating Other Technologies in Teacher Education

The country reports and case studies described in the preceding section focus on the integration of ICT in teacher education. However, other technologies besides ICT are commonly used in teacher education in the Asia-Pacific region. Three case studies reported by UNESCO (Kvaternik 2001) show how technologies like television, radio, audio- and video-cassettes are proving an affordable means of delivering teacher education programmes through distance learning.

Reaching Teachers through Television (China)

In China, distance education is a common feature of teacher education, and television has proven useful in providing a range of programmes to upgrade teachers' qualifications. The UNESCO case study describes the provision of large-scale teacher education through a national distance teaching institution, the China Television Teachers College, a part of the China Central Radio and Television University since 1994. Distance education is included in China's strategic planning and plays a significant role in teacher education and continuing professional development (Kvaternik 2001, p. 13).

Extending Teachers' Understanding of Young Children (India)

A case study from India reports that audio- and video-cassettes were chosen as the most appropriate technologies for a distance education programme leading to a Certificate in Guidance. The UNESCO case study describes the programme in Child Guidance for primary teachers, parents and social workers, provided by Indira Gandhi National Open University in India. Using printed text and audio and video materials it provides a practically-oriented non-specialist programme which is not otherwise available (Kvaternik 2001, p. 15).

Re-orienting Teachers to New Teaching Approaches (Mongolia)

Radio and audio-cassettes were the selected technologies in Mongolia to help primary teachers to adapt to changes in curriculum and pedagogy. The UNESCO case study describes the project for primary teachers in Mongolia at a time of rapid change and reduced resources for education. Though new to the country, distance education was chosen as an affordable means of reaching more teachers more quickly and would help re-orient them to new teaching approaches and curricula (Kvaternik 2001, p. 17).

Key Principles for Effective ICT Development in Teacher Education

The UNESCO *Planning Guide* for ICT in teacher education (Resta 2002, pp. 32-33) cites three key principles for effective ICT development in teacher education that were put forward by the Society for Information Technology and Teacher Education (SITE). These principles are particularly pertinent for countries in the Asia-Pacific region looking for the most effective ways of integrating ICT in teacher education.

The first principle is that technology should be infused into the entire teacher education programme. This principle means that ICT should not be restricted to a single course but needs to permeate all courses in the programme.

The second principle advanced by SITE is that technology should be introduced in context. According to this principle, particular ICT applications like word processing, databases, spreadsheets and telecommunications should not be taught as separate topics but rather encountered as the need arises in all courses of the teacher education programme.

The third of the key principles is that students should experience innovative technology-supported learning environments in their teacher education programme. This last principle requires that students should see their lecturers engaging in technology to present their subjects, for example, utilizing PowerPoint or simulations in lectures and demonstrations. Students should also have the opportunity to use such applications in practical classes, seminars and assignments.

The application of these three principles will go a good way towards effectively integrating ICT in teacher education.

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Jonathan Anderson is Professor of Education within the School of Education at Flinders University in South Australia (email: Jonathan.Anderson@flinders.edu.au).