

Teacher Education Through Distance Learning

Brazil

Burkina Faso

Chile

China

India

Nigeria

Mongolia

South Africa

United Kingdom

Technology

Curriculum

Evaluation

Cost



TEACHER EDUCATION THROUGH DISTANCE LEARNING

TECHNOLOGY - CURRICULUM - COST - EVALUATION

Summary of
Case Studies

Brazil, Burkina Faso, Chile, China, India, Mongolia,
Nigeria, South Africa (two studies), United Kingdom



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C O N T E N T S

PREFACE	IV
1 INTRODUCTION	1
1.1 Why the case studies	1
1.2 Educational needs and problems	1
1.3 The case studies	2
1.4 Background – open and distance learning	3
2 CASE STUDIES	5
Television-Plus: Journalism in the service of teacher development, Brazil	7
Professional development of headteachers in Burkina Faso	9
Teachers learning to use information technology, Chile	11
Reaching teachers through television, China	13
Developing primary teachers' knowledge and skills in child guidance, India	15
Re-orienting primary teachers to new teaching approaches, Mongolia	17
An alternative route to primary teacher qualifications, Nigeria	19
Interactive radio for supporting teachers of English as a second language, OLSET, South Africa	21
New routes to teacher education degrees, South Africa	23
Using ICT to support school-based initial teacher education, United Kingdom	25
3 CONCLUSIONS	27
3.1 What is it being used for?	28
3.2 How effective is it?	30
3.3 What does it cost?	32
3.4 What media and technologies is it using?	33
3.5 How is it managed?	36
3.6 How is it funded?	36
4 WHAT DO WE STILL NEED TO FIND OUT?	38
TABLE 1: THE CASE STUDIES	4
TABLE 2: TYPES OF PROVIDERS	35
FIGURE 1: FUNDING SOURCE	37
REFERENCES	39

The present document is a summary of ten case studies currently in process of publication. By releasing this summary document early it is hoped that Member States will be able to consider the overall trends and national experiences described therein, in their present teacher training development activities. The rich detail, which will follow in the individual full-text case studies, is intended for use by programme planners and researchers during 2002-2003.

These case studies represent a major activity in one of UNESCO's main lines of action, as summarized in the Organization's Approved Programmes and Budget for 2000-2001 (30 C/5), paragraph 01240. In that paragraph reference is made to the fact that "The General Conference authorizes the Director-General: (a) to implement an inter-sectoral project entitled 'The status of teachers and teacher education in the information society', in order to assist Member States in renewing teaching methods and the training of teachers at all levels, and, using open and distance education approaches, adapting them to the emerging information society, and..."

These case studies also follow up the recommendations concerning teacher education using distance learning that were made by the World Conference on Higher Education (WCHE, Paris, October 1998), the World Forum on Education (Dakar, April 2000), and the Seventh Session of the Joint ILO/UNESCO Committee on the Application of the Recommendations concerning the Status of Teachers (Geneva, September 2000).

The studies represent an interesting mix of applications of different modes of distance learning. Distance education still remains, at heart, a reflection of individual national infrastructures and a wide complex of educational, social, cultural and economic issues, including the willingness and capacities of teachers themselves to become engaged in these modes in their various learning institutions and communities.

Within UNESCO itself and with our Member States and partners (chiefly those of the Dakar and WCHE follow-up groups), we intend to use these studies as a basis from which to develop guidelines on the application of distance learning in teacher education.

We thank the contributors to these studies, which we hope will find wide applicability in Member States.



John Daniel
Assistant Director-General for Education

1 INTRODUCTION

The world needs better teachers and more teachers. The Dakar conference revealed that there were still more than 100 million children out of school: they need teachers as the world moves towards the 2015 target of education for all. And we need to raise the skills of the existing 60 million teachers, too many of whom are untrained and unqualified. Beyond that, the skills and knowledge all teachers need are no longer fixed and familiar targets but moving ones. Teachers therefore need more opportunities than ever before to go on learning throughout their careers. One of the ways of strengthening the teaching profession is to use distance education or open and distance learning.

1.1 Why the case studies

UNESCO commissioned this set of case studies because of demands from Member States for guidance on implementing programmes of distance education for teachers. The studies are therefore intended to document experience on which to base the *Guidelines for teacher education at a distance*, a separate document from this, to be published in 2002.

More specifically we wanted to find out what open and distance learning was being used for in teacher education, how effectively it was working, and what methods it was using. In asking how effectively it was working, we wanted to examine its record in attacking the major problems confronting teacher education. There are two kinds of question here: about effectiveness and about relevance. To gauge effectiveness we were looking for data on completion rates and comparative costs and for any indicators of effects on the work of teachers in the classroom or the community. To assess relevance we wanted to discover whether the initiatives were a significant, sustainable, part of the service of teacher education or a small, peripheral, activity with little chance of making any major impact on the problems.

If open and distance learning for teachers is effective, and working on a big enough scale to be actually or potentially significant, then it is worth going on to ask how it is managed. We therefore went on to ask about the curriculum of open and distance learning initiatives, and the extent to which this matches that of other forms of teacher education and professional development. We also looked at organisational structures, and the kinds of organisations that provide teacher-education programmes, and the different patterns of funding. We looked at the technologies, ranging from print to computers, and the relationship between work done through the technologies and work done face-to-face, including all-important issues about classroom practice.

1.2 Educational needs and problems

Many countries still do not have enough teachers. In some, the expansion needed in the teaching force is far beyond the capacity of traditional colleges. The supply of teachers is also adversely affected in countries where retention rates are low for newly trained teachers or where significant numbers of teachers are being lost through HIV-AIDS or in rural areas which have difficulties in recruiting and retaining teachers.

Teacher quality is an issue in most countries. Many teachers are untrained or underqualified or teaching subjects in which they are not qualified or trained. In addition, teachers face a widening range of demands and roles. National governments, international organisations and specific circumstances continually set new goals: gender parity by 2005 and universal basic education by 2015; inclusive education; education for democracy, peace and social cohesion; multi-grade teaching; increased accountability for achieving learning targets; the development of learners who are self-managing and independent, skilled in critical thinking and problem solving, equipped with life-skills; the preparation of learners who are competent for knowledge-based economies, capable in the use of information technology; and the expansion of teachers' roles to include social work in communities where child-headed households and orphans are common as a result of HIV-AIDS.

The attention given to teacher education and their continuing professional development has in many cases lagged behind that given to other parts of the education system. Some countries lack a policy for it, though the importance of teachers is emphasised in many international reports (e.g., UNESCO 1998, UNESCO 2000, OECD 2001). Although there is wide recognition that teacher education, training and professional development need to be integrated, in ways that operationalise lifelong learning for teachers, the resources allocated to it are usually inadequate and the opportunities too few. In some countries teachers can expect one week's in-service professional development once every five to ten years. On average, countries spend around one per cent of their annual education expenditure on the continuing professional development of teachers (business and industry typically spend 6 per cent on staff development).

All of this creates new challenges for teacher education and continuing professional development: the need to find ways of using existing resources differently, of expanding access to learning opportunities at affordable cost, of providing alternative pathways to initial teacher training, of drawing on new constituencies of the population to work as teachers, of using technologies appropriately to enrich a teachers' context and support practice, of stimulating and supporting teachers' active learning and of reconceptualising the traditional organisation of initial teacher education and continuing development.

Can open and distance learning respond to these challenges? The case studies here offer some answers, in describing a range of uses of open and distance learning for both initial and continuing teacher education, using a variety of technologies.

1.3 The case studies

Initial teacher education and training is the programme of studies which leads to qualified teacher status according to the official standards of a country. It is the basic or first level of qualification for a teacher. It may be taken as a pre-service programme (before a trainee teacher begins work as a teacher) or an in-service one (while an untrained teacher is working as a teacher).

Continuing professional development enables teachers to extend existing knowledge and skills and develop new ones. Some of this takes the form of long structured courses leading to formal qualifications (diplomas or bachelor's or master's degrees). Other forms are shorter, concentrate on skills in managing children's learning or curriculum change and do not lead to additional qualifications. In some countries, qualified and unqualified teachers alike participate in continuing professional development. It may be provided as in-service activities (on-the-job learning) or out-of-school courses of varying length (off-the-job or in vacations).

We have categorised the case studies in four ways. **First**, some countries have used distance education to provide a route to initial qualifications for significant numbers of teachers, both new entrants to teaching and experienced unqualified teachers. The China Television Teachers College and the National Teachers' Institute in Nigeria have long experience of this approach and have become a recognised and institutionalised part of the regular education system in their countries. In a programme that reflects an official policy shift towards more school-based training, the Open University in Britain has run a school-based qualifying programme for graduates who want to enter teaching but have had no professional teacher training.

Second, initial teacher education is no longer seen as enough. Distance education is therefore also being used to raise the skills, deepen the understanding and extend the knowledge of teachers. Some programmes are broadly focused while others are targeted at specialist groups. Programmes are taken either by individuals or by groups of teachers who are encouraged to participate by their schools or their employers, as can be seen in these case studies. For example, a non-profit television station is taking the lead on supporting school groups in Brazil. In other cases, programmes are available for individual teachers who want to improve their skills and their status, often enrolling on an individual basis, and at their own expense. Indira Gandhi National Open University in India has a number of programmes of this kind of which its Certificate in Guidance is one. The University of South Africa also offers programmes on this basis.

Their BEd programmes are for experienced underqualified teachers and also new entrants to teaching, which serve to meet individual goals as well as contributing to the policy goal of a graduate teaching force. Some programmes are aimed at the upgrading of teachers' qualifications required by official policy as new standards are set in a country (as in China).

Third, distance education can have a role in programmes of curriculum reform which aim to change either the content or the process of education. In South Africa, the Open Learning Systems Educational Trust is using radio to improve the teaching of English, and to support teachers in this work. In Mongolia, radio and print are used across large distances to re-orient teachers to official changes in curriculum and teaching methods within a country in transition. In response to policy initiatives aimed at establishing the use of ICT in schools, the Universidad de la Frontera in Chile is using ICT to support teachers who are teaching these subjects.

Fourth, distance education has been used for teachers' career development. As they seek promotion, or aim for the next qualification level, or aspire to become a headteacher, or work in a teachers' college, or become an inspector, teachers need to acquire new skills. A multinational distance education project in West Africa has developed a training programme in school management for headteachers and aspiring heads.

These categories inevitably overlap: career development may be regarded as part of continuing professional development; it blurs a distinction between the initial education of new recruits to teaching and of experienced but unqualified teachers. Some of the programmes have more than one audience, qualified and unqualified teachers, teachers studying for initial qualifications and those using the same programmes to upgrade their qualifications.

In general, distance education programmes have been developed with varied intentions: of widening access to teaching qualifications; of disseminating good practice; of strengthening the education system as a whole by reaching not only teachers but the wider community; in enabling school-based training and professional development and as a means of strengthening the links between theory and practice, focusing on the school as a site of teachers' learning. The case studies (listed in table 1) reflect these purposes.

1.4 Background: open and distance learning

Distance education been used to teach, support and develop teachers for many years: UNESCO was a pioneer through its UNRWA/UNESCO Institute of Education which was training teachers for refugees forty years ago. While the success of programmes has varied, experience demonstrates that distance education can be used to enable teachers to learn and to gain qualifications. The use of new information and communication technologies has drawn new attention to open and distance learning and offers new possibilities.

Distance education has been defined as an educational process in which a significant proportion of the teaching is conducted by someone removed in space and/or time from the learner. Open learning, in turn, is an organised educational activity, based on the use of teaching materials, in which constraints on study are minimised in terms either of access, or of time and place, pace, method of study, or any combination of these. The term 'open and distance learning' is used as an umbrella term to cover educational approaches of this kind that reach teachers in their schools, provide learning resources for them, or enable them to qualify without attending college in person, or open up new opportunities for keeping up to date no matter where or when they want to study. The flexibility inherent in open and distance learning, and the fact that it can be combined with a full or near full-time job, makes it particularly appropriate for the often widely-distributed force of teachers and school managers. Some open and distance learning programmes lead to a qualification, others do not; some are addressed to individuals and others to groups; some are tightly organised and others essentially a way of making learning resources available to teachers. All fall under this one umbrella of open and distance learning.

Table 1: The case studies

Category	Cases	Technologies
Initial qualifications Programmes leading to qualified teacher status.	An alternative route to primary teacher qualifications, Nigeria	Print with face-to-face meetings.
	Using ICT to support school-based initial teacher education, United Kingdom	Print, computer communications, face-to-face meetings, video and audio, written feedback on assignments.
	Reaching teachers through television, China	Television and video copies, some print, audio-cassettes, face-to-face classes or meetings.
Continuing professional development Programmes and activities extending teachers' knowledge, skills and expertise throughout a teacher's working life.	Television-plus: journalism in the service of teacher development, Brazil	Television and video copies, magazines, newsletters, telephone 'call-in' centre, face-to-face meetings.
	New routes to teacher education degrees, South Africa	Print with some face-to-face meetings, audio- and video-cassettes and some small optional element of computer communications
	Developing primary teachers' knowledge and skills in child guidance, India	Print, face-to-face meetings and some audio- and video-cassettes.
Re-orientation of teachers for curriculum reform and change Supporting teachers in changing what they teach and how they teach it.	Interactive radio for supporting teachers of English as a second language, South Africa	Radio programmes, audio-cassette copies, print and some face-to-face meetings.
	Re-orienting primary teachers to new teaching approaches, Mongolia	Print and audio (radio and audio-cassettes), some videos and face-to-face meetings.
	Teachers learning to use information technology, Chile	Computer communications for an online programme, for delivering materials, supporting interaction, providing access to databases and submitting coursework.
Teachers' career development Programmes to extend the careers of qualified teachers.	Professional development of headteachers in Burkina Faso	Print and face-to face meetings.

Note: The technologies listed in table 1 are those used for delivering the programmes. More are used in developing the materials or, in some cases, in training tutors, and computers play a large role in materials development and production.

2 CASE STUDIES

Within the constraints of the ten case studies we wanted to get a geographical balance, to look at the use of a variety of technologies, and to include programmes with differing purposes. A further constraint was that we were not attempting to commission or support original research: the case studies are mainly based on existing data.

We wanted generally to find researchers within the countries in which they were working (although we made exceptions in the case of Mongolia, where one of the planning team was currently working as a consultant, and Burkina Faso where the project was developed in association with RESAFAD, whose headquarters is in France). We also tried to ensure that authors had both a knowledge of the institution on which they were writing and an appropriate distance from it. In some cases we did this by seeking joint authorship from within and outside the institution. Our bias was towards developing-country experience but we were pushed by the technologies and the inherent interest of the case studies concerned to include two more developed countries; there is so little documented developing-country experience so far of the use of computer-based technologies in teacher education that it made sense to look also at Britain and Chile.

Outline plans for the research were drawn up by the International Research Foundation for Open Learning and refined at a meeting with UNESCO staff and researchers from three of the case-study countries in Paris in March 2001. All writers were then asked to write to the same brief and the same timetable. We are grateful to them for trying to do this, for their support and interest, and for the wealth of interesting experience that they have reported to us.

The following summary versions of the case studies are based on the full versions, to be published separately by UNESCO, and have been drafted by the authors of this volume.

TELEVISION-PLUS: JOURNALISM IN THE SERVICE OF TEACHER DEVELOPMENT, BRAZIL

A-Plus is a daily television series designed to stimulate interest in education, teaching and learning among teachers and in the broader community. Taking a journalistic approach, it uses a private educational television channel to reach an audience of 13 million across Brazil. It also helps mobilise teachers into follow-up action through its Community Mobilisation Networks.

The context

The Brazilian education system has large numbers of primary and secondary teachers who have low levels of qualification. The poor quality of many teachers has been a matter of concern. As a result, many initiatives have been taken by a variety of state and private providers for in-service teacher development. Teachers in Brazil are well-provided with all kinds of professional development opportunities though their relevance and effectiveness are sometimes questioned. Many of the initiatives offer distance education, usually print and other media. Some of the providers are non-governmental organisations (NGOs) and private sector organisations. One of these is TV-Futura, a non-profit educational television channel sponsored by a consortium of 14 public and private institutions. TV-Futura ('The Learning Channel') has sponsored the popular A-Plus television series. The target audience is educators at large: primarily teachers but also parents, social workers, nurses, childcare providers, and the community. TV-Futura states that its mission starts when the broadcast ends so one of its goals is to mobilise viewers (especially teachers) through its Community Mobilisation Network.

The programme

Its purpose is to help educators deal more critically and effectively with practical matters of concern to them and the community. The 15-minute daily TV programmes have a magazine format, combining general educational news with an in-depth documentary. Each programme shows two examples of real-life applications of the programme topic, for example, a method of literacy teaching or using videos in the classroom or conducting PTA meetings. An education expert comments in a challenging way on the examples or presents arguments designed to lead viewers to reflect. Suggestions for further activities and references to other sources of information are given at the end of each broadcast. Twice a week, the programme is supplemented by two sets of commentaries, one based on relevant research, the other introducing literature to help viewers apply the topic in real-life situations. Follow-on activities and monthly meetings are organised around these programmes for teachers' groups that opt in to the 'plus' part of the programme. A-Plus provides 60 Community Officers who facilitate the Community Mobilisation Network which supports this activity. The programme has no set curriculum but aims to be responsive to teachers' needs, drawing on several sources of guidance.

Brazil

Population (millions)	168.2	
Size ('000 km ²)	8,547	
GDP per capita (purchasing power parity US\$)	7,037	
Human Development Index	0.750	
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force total '000	1,388,247	326,827
'000 female	--	--
Gross enrolment ratio		
All students	125	56
Female	--	--
Pupil teacher ratio	24	--

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996

Media and technology

A-Plus programmes are broadcast daily by TV-Futura, the philanthropic division of the GLOBO communications network in Brazil. Television was chosen to provide national coverage, build on a tradition of educational television in Brazil and exploit the high ownership of televisions at home and in schools (36 million out of 40 million households and 50 per cent of 118,000 urban schools have it). Production standards are high and its status as an independent provider helps it take a broad approach to programme content, avoiding adherence to a particular pedagogic doctrine. Some urban schools video-record the programmes though rural schools are less equipped to do this. From 2001, local TV stations will be able to rebroadcast the programmes. There are two main categories of audience: a general pay-TV audience (a potential 40 million) and the captive audience of institutions and educators that have joined the Community Mobilization Network. Print is used for a bi-monthly Network newsletter and a quarterly magazine for viewers, giving schedules and background reading.

Funding and costs

TV-Futura has an annual budget of US \$78.7 million, financed by 14 sponsors, including private national and multinational firms and Chambers of Industry. Its financing structure determines the budget of specific programmes. Budgets cover costs for staff and development but not facilities for production, broadcasting, administrative and infrastructure costs. Like other TV programmes, A-Plus has high front-end production costs and low per user costs. The average cost of a 15-minute programme includes US \$1,750.00 direct production costs, US \$750.00 indirect costs and US \$1,000.00 travel costs (on location). Broadcast costs are 2 per cent of total costs or a few cents per viewer per year. The annual cost of the Community Mobilisation Network is US \$720,000 for the total officers (av. US \$12,000.00 per officer). On present participation figures this amounts to annual unit costs of US \$84 per institution, US \$18 per teacher and 60 cents per potential beneficiary. Cost per viewer (based on 7 million per day and a daily transmission cost of US \$24,000.00) is less than 10 cents per viewer per programme. Participating institutions receive free cabling by TV-Futura or receivers by NET SKY (6.3 million subscriptions in January 2001). TV-Futura is a high-risk and vulnerable initiative since it relies totally on private funding and being an educational channel, it cannot sell advertising. However, there is potential for fund-raising through joint ventures.

Quality, effectiveness and outcomes

The programmes have a large regular viewing audience. Surveys reveal 13 million regular viewers, mainly teachers (60 per cent) but also parents, social workers, nurses and child carers. Most (78 per cent) view at home and 12 per cent in schools. Reasons given for viewing include personal development (65 per cent), to get lesson plans (39 per cent), to stimulate classroom discussion (30 per cent), as background material for homework (26 per cent) and for content information (14 per cent). About 70 per cent of viewers are women.

The Community Mobilization Network is active. It currently includes 8,600 participating institutions (schools, hospitals and prisons). Schools are 90 per cent of participating institutions and serve a potential 1,200,000 educators. So far, 40,000 teachers and educators have participated in training and other Network activities. The programmes are exploited in different ways in different regions but appropriate to their schools and communities. Through these activities, teachers have also become familiar with the use of video for educational purposes.

Although there is no hard data about how much is learned and used by teachers, there is plenty of evidence that the programme communicates with them, addresses relevant needs, prompts varied action and suggests new approaches. Unlike many of the other professional development programmes, A-Plus allows teachers to observe, discuss, probe and interact with what other teachers are doing or trying to do. It addresses educational issues determined by teacher interest rather than educational authorities. Its pedagogy encourages educators to reflect on a variety of educational approaches and to extend their practices in ways that include community involvement. Its content avoids domination by a particular educational dogma but draws on many points of view and sources.

PROFESSIONAL DEVELOPMENT OF HEADTEACHERS IN BURKINA FASO

In association with RESAFAD (the African Network for Education at a Distance) Burkina Faso has developed a course for the in-service professional development of headteachers. The programme benefited from the use of new information and communication technologies to help the process of course development but used print, coupled with meetings of headteachers, to reach its scattered audience. Over four years it reached about a quarter of Burkina Faso's headteachers.

The context

More than 80 per cent of Burkina Faso's population is rural so that its schools are widely scattered, some of them being many kilometres from district education offices. The need to develop in-service programmes for headteachers was recognised at a meeting of ministers of education in 1992 and carried forward by RESAFAD in a joint programme initially involving Burkina Faso, Guinea, Mali and Togo. Distance education was identified as an appropriate methodology to reach headteachers, and to offer them professional upgrading without their having to lose their jobs.

The programme

The intention of the programme was to strengthen the management capacity of headteachers. The programme contained material on pedagogy, practical teaching, educational principles and values, environment and the local community, concentrating above all on school management. Plans for the course were developed in association with RESAFAD, which works to develop regional uses of distance education, and with the other member countries in the region. But the materials used within Burkina Faso were developed in-country, by the staff of teachers' colleges there, who received training about distance education through RESAFAD. Three cohorts of headteachers went through the programme between 1997 and 2000. The programme concentrated on the heads of larger schools – those with more than three classes. The headteachers themselves had varied background education: while a small number had a university diploma some had no more than six years of primary and three years of junior secondary education. The programme did not lead to any formal qualification but this is not reported to have caused difficulty or raised objections.

Burkina Faso

Population (millions)	11.2	
Size ('000 km ²)	274	
GDP per capita (purchasing power parity US\$)	965	
Human Development Index	0.320	
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force	14,037 ^a	
total '000		--
'000 female	3,412 ^a	--
Gross enrolment ratio		
All students	40	--
Female	31	--
Pupil teacher ratio	50	--

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are for 1996

Media and technology

In view of the limited communications infrastructure of Burkina Faso it was decided to use the simplest technologies for this course. Radio was considered but the idea was not pursued. The course therefore consisted of a series of printed modules which were backed by two-day meetings of heads organised on a district basis.

During the design phase there was discussion of the possibility of using more sophisticated technologies and, indeed, to develop their use within education. At the same time there was considerable scepticism about the new technologies from some countries of the region which were unhappy with earlier experiences. Some of the new technologies were used to help the process of course development and to enable those working on the course nationally and internationally to keep in touch. Thus e-mail was used to keep course designers in touch with each other within Burkina Faso and a CD-ROM of materials was developed for them. RESAFAD used Listserv and Web links were used to keep in touch with its collaborators.

Funding and costs

The programme was funded within the framework of a bilateral aid agreement between Burkina Faso and France. Headteachers were not required to pay a fee and received a per diem allowance when they attended face-to-face sessions. The course was developed in close cooperation with the ministry of basic education and literacy and used resources within the national education system as well as external funds by, for example, drawing on staff time and expertise from teachers' colleges. But the reliance on external funding meant that the project was fragile. Funding came to an end in 2000 and, although it had by then reached only about a quarter of the total number of headteachers, it was not possible to continue it for a further period. A full costing of the course is not available but indicative figures suggest that the costs of any face-to-face alternative would have been significantly greater than that of the distance education version, as well as requiring headteachers to take time away from their schools in order to do so.

Quality, effectiveness and outcomes

The programme was not formally evaluated. It reached 70 headteachers, within two districts of one region of Burkina Faso in the first, trial, year; 920 heads in 30 districts of three regions in the second year and 1,275 heads when it reached 34 districts in four regions in the third year. A total of 1,275 headteachers participated over the three years though within this number some may have participated twice if posted to another district. Most of the heads enrolled were men, varying from 98 per cent of total enrolments in the northern region to 72 per cent in the central region. Very few dropped out of the course which suggests that participants valued it. Headteachers who had gone through the programme reported favourably on it, identifying ways in which it had resulted in changes in ways in which they managed their schools, and that it had increased their confidence in their work. They had valued the opportunity of face-to-face meetings to share experiences and broaden their understanding of the ground covered by the programme. There is some evidence from reports of school inspectors of more efficient school management as a consequence of the course.

The programme also had some side benefits, in developing national capacity in distance education, including the writing of materials, and in promoting international cooperation in this area. In the last analysis, however, despite the varied evidence of success, the programme was not seen as having sufficient priority for its continuation to be funded from national resources.

TEACHERS LEARNING TO USE INFORMATION TECHNOLOGY, CHILE

This in-service programme enables teachers to learn to use information and communications technology (ICT) in their teaching. It uses ICT to teach teachers to use ICT. Distance education, though fairly new to Chile, was chosen in order to extend the geographical reach of the programme and to meet the teachers' needs for new skills and knowledge created by the recent widespread provision of computers to schools.

The context

The Children's education system is undergoing a major reform, with a shift of emphasis from teaching to learning, changes in the curriculum, and moves towards decentralisation. With an advanced communications infrastructure, the country has equipped all of its secondary schools, and about half of its primary schools, with computers under its Enlaces project. This in turn has created a demand for teacher in-service programmes in the use of information technology. There are about seven face-to-face programmes on information technology available for teachers in Chile and one distance education programme offered by the Instituto de Informática Educativa of the Universidad de la Frontera, an independent public university.

The programme

This programme is designed mainly for primary and secondary school teachers interested in learning how to use ICT in their teaching. It has been offered to four cohorts of students so far with annual enrolments of about 100 students a year each year from 1997 to 2000. About a quarter of the students have been from primary schools, nearly a half from secondary schools and the rest from other professions. In the group starting in 2000, about a quarter of students were from outside Chile and one special programme has been run for students from Colombia. The programme consists of seven modules, on education and on the application of communication technologies, and a project, requiring 1,068 hours of study on the part of the students over a period of 15 months. Satisfactory completion of the programme leads to the award of a diploma from the Universidad de La Frontera. Though valued by employers the diploma does not earn a title or lead towards a further degree qualification.

Chile

Population (millions)		15.0
Size ('000 km ²)		757
GDP per capita (purchasing power parity US\$)		8,652
Human Development Index		0.825
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force total '000	73,960	51,042 ^a
'000 female	53,593	26,762 ^a
Gross enrolment ratio		
All students	101	75
Female	100	78
Pupil teacher ratio	30	--

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996

Media and technology

The course is entirely computer-based. The institute chose this approach in order to reach a new audience of teachers who could not attend its face-to-face courses, for which demand was falling within the university's locality. It was influenced, too, by the provision of computers and Internet connections to schools through the Enlaces project. Teaching materials were developed by a team of instructional staff at the institute. Students obtain their teaching materials by downloading them from the Web. Their interaction with tutors and with other students is through 'Learning Space' software which replaced an earlier 'home-made' learning environment. In the last phase of the course students develop a collaborative project on the use of ICT in school. They have six months to plan and implement it. Their project proposal is reviewed by teaching staff of the institute and a mid-term and final project report is assessed by one of the institute staff and an external assessor. Some students reported that they would have welcomed opportunities for face-to-face contact but over 80 per cent reported favourably on their computer-based interaction with tutors.

Funding and costs

The programme is funded entirely by student fees. The programme fee is US \$860 which is about 10 per cent of the average student income. It includes costs for Internet access but in addition students spend about US \$15 per month on telephone charges. Some teachers gain an increment of about 3 per cent of salary on completing the programme. One problem in funding is the difficulty in getting students to pay their fees and a significant proportion of fees remain unpaid; improvements are needed in the system for their collection. The average cost per student of this programme and its face-to-face equivalent were about the same although the breakdown of expenditure was different. About 75 per cent of the costs of the Web-based version of the programme were fixed, with about 40 per cent being used for the work of the instructional teams who were developing the courses. Since the teams used existing print materials from the face-to-face programme, adapting them for Web use, the course development costs were fairly modest. The remaining 25 per cent of costs covered tutorial work, reproduction costs and software licenses. Thus there would be considerable scope to achieve economies if it were possible to increase the enrolment in the programme from its present modest levels.

Quality, effectiveness and outcomes

The programme has a good reputation, in part because of the status of the university which provides it and is responsible for quality assurance. Formal measures are in place to check the quality of the teaching materials as they are developed. Generally the fact that the programme is an exact parallel to a conventional, face-to-face one, demanding the same workload and credits and taught by the same instructors, is seen as a guarantee of quality. Completion and graduation rates are available for two cohorts of students. Of the total 169 students who enrolled in 1998 and 1999, 87 (51.5 per cent) dropped out, 7 (4.1 per cent) failed and 75 (44.4 per cent) graduated. There is some evidence that headteachers and students felt that the programme was rewarding and useful: almost all the teachers interviewed by the researchers reported favourably on what they had gained from the programme. In one respect the distance education programme was more effective than its face-to-face equivalent. Teachers participating in it made more use of the virtual working environment than those on the face-to-face programme and developed a 'network communication culture' through their constant use of it. Because of this there was better integration of theory with practice. However, there is little information on how much and how effectively teachers have used ICT in their teaching as a result of the programme.

REACHING TEACHERS THROUGH TELEVISION, CHINA

This case describes the provision of large-scale teacher education through a national distance teaching institution, the China Television Teachers College (CTVTC), a part of the China Central Radio and Television University (CCRTVU) since 1994. Distance education is included in China's strategic planning for teacher education and plays a significant role in initial teacher education and continuing professional development.

The context

China has about 1,100 institutions for pre-service teacher education and 2,200 for in-service (universities, colleges and secondary level training schools). Distance education is an established part of the provision through a number of specialised institutions as well as departments of conventional ones. Much of the provision is aimed at enabling unqualified serving teachers to gain initial qualifications or qualified teachers to upgrade. Though China has made huge strides towards a qualified teaching force and raised minimum qualification standards, all teachers are not yet qualified. About a million (11 per cent of all primary and secondary teachers in 1998, many in rural areas) lack initial qualifications and training. In addition, to improve quality, the government's 'Gardeners' Promotion Project Across the Centuries' (a component in the 'Action Scheme for Invigorating Education Towards the 21st Century') states an ambitious goal of providing 240 hours of non-degree in-service training, including computer literacy, to all kindergarten, primary and secondary teachers in most regions over three years. Altogether, these represent a considerable range and volume of teacher training needs and the Ministry of Education has emphasised a strong role for open and distance learning in meeting them.

The programmes

The China Television Teachers College (CTVTC) provides a range of distance education programmes for serving primary and secondary teachers, school principals and administrators. CTVTC is part of China Central Radio and Television University (CCRTVU), the apex institution of a nation-wide system of 44 Provincial Radio and Television Universities (PRTVUs). CTVTC is in charge of the compulsory (60 per cent) core courses in teacher education programmes; these have a unified syllabus, materials, timetable and assessment methods throughout China. PRTVUs are responsible for learner support and local organisation (enrolling students and putting into practice the teacher training plans set by CTVTC). Award-bearing programmes lead to initial and further qualifications (diplomas and, since 1999, degrees). There are also continuing education programmes (non-award-bearing) through television series (for example, 'Friends of Primary School Teachers') with an estimated viewing audience of two million teachers a year.

China

Population (millions)	1,264.8	
Size ('000 km ²)	9,597 ^a	
GDP per capita (purchasing power parity US\$)	3,617	
Human Development Index	0.718	
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force total '000	5,735,790	4,217,947
'000 female	2,718,842	1,537,605
Gross enrolment ratio		
All students	123	70
Female	123	66
Pupil teacher ratio	24	17

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Notes. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996; a: Figure includes Taiwan, China

Media and technology

The main teaching medium is television. Through the use of satellite technology, most areas of China can receive television. China has over 100 educational television channels operating at national and regional levels. CCRTVU transmits its programmes through China Central TV and China Education TV (about 9,000 hours per year). CTVTC programmes are part of these. Through CETV-3 (Channel 3 of China Education TV, dedicated to basic education), CTVTC provides 750 hours a year of continuing education programmes for teachers and school principals. Video-cassette recordings of television programmes are made at local levels (district and county) for use in face-to-classes or meetings at local centres. Face-to-face meetings are held at local study centres for registered students on award-bearing programmes. Some related printed materials are available, often in the form of regular textbooks. Audio-cassettes are used to a lesser extent and radio very little. Recently, some multi-media packages have been developed (print, audio- and video-cassettes). The government has also begun to implement national plans for the provision of ICT-based distance education and 31 universities have been granted licences by the Ministry of Education to offer online programmes. CTVTC will follow this trend as CCRTVU develops greater ICT use in the future, in line with Ministry and Government policy.

Funding and costs

Detailed information on funding and costs was not available. In general, the total public expenditure per student at China's RTVUs is about one-tenth that of students on conventional programmes. The annual cost per graduate of RTVUs is said to be one-third to two-fifths that of graduates from conventional institutions. Students pay tuition fees for award-bearing programmes. Fees for an RTVU college diploma programme are US \$399-544 (an annual average of US \$133-181). Tuition fees for a Bachelor's programme for students who already have a college diploma are US \$604-725 (with an average of US \$40-48 per course).

Quality, effectiveness and outcomes

Quality tends to be judged on the numbers of qualified teachers produced and the reputation of academics and presenters. The television presenters and textbook writers were all well-known professors and scholars in teacher education in China and this was taken as an indicator of the quality of the courses.

Annual figures for enrolment and completion rates were not available, but some cumulative figures were. Between 1987 and 1999, 717,300 unqualified primary teachers gained certificates (the award for secondary school level teacher training) through CTVTC and became qualified for primary teaching, and 552,000 unqualified secondary school teachers (mostly junior-secondary) gained diplomas. A new trial programme ('Open Entrance Programme') was begun in 1997 to upgrade qualified primary teachers from certificate to diploma level. This allowed teachers to enrol for the programme without taking the customary entrance examinations and giving longer to complete (8 years). For this, the diploma examinations are set and assessed by the Self-Taught Examinations Office (an independent examination body under the Ministry of Education) while CTVTC provide the programmes. Up to 1999, 85,000 teachers were enrolled. In 1999, a second new programme (and CCRTVU's first degree programme) was begun ('Pilot Programme of Open Education'), offering degrees and diplomas, similar to the 'Open Entrance Programme' but differing from it in locating control over assessment with CCRTVU. As part of this venture, CTVTC began in 1999 to offer a programme in educational management leading to a college-level higher diploma for primary school principals and administrators. By April 2001, 29,000 students were registered for this programme. Finally, the continuing education series of television programmes are estimated to reach two million teachers annually

Though efficiency, cost-effectiveness and quality is difficult to judge on the limited data available, there is wide acceptance in China that, without the distance education programme, numbers of teachers and school principals, especially in rural areas, would not have been able to qualify as teachers, or upgrade their qualifications, or have access to continuing education programmes.

DEVELOPING PRIMARY TEACHERS' KNOWLEDGE AND SKILLS IN CHILD GUIDANCE, INDIA

This case describes a programme in Child Guidance for primary teachers, parents and social workers, provided by the Indira Gandhi National Open University (IGNOU) in India. Using printed text, audio and video materials it provides a practically-oriented non-specialist programme which is not otherwise available. The numbers of students have been relatively small (less than a thousand per year).

The context

Though the study of child development and guidance has become a low priority subject in education in India, the need for it is increasingly recognised by teachers and parents. It is included in teacher education pre-service programmes and a small number of post-graduate ones of a theoretical nature, but easily accessible, basic level programmes of a practical nature were lacking. A perceived need for one by individual staff at the National Council of Educational Research and Training (NCERT) and some parent-teacher associations led to the development of the Certificate in Guidance. This was produced through a collaboration between NCERT and the Indira Gandhi National Open University (IGNOU), the apex distance teaching university in India). NCERT developed the curriculum, content and materials, first in English, then in Hindi, and IGNOU ran the programme.

The programme

The Certificate in Guidance programme aims to extend understanding about child development (ages 5-11) and to suggest practical strategies to facilitate children's all-round development. It takes about 480 hours of study over six months but students can extend this to two years. The four constituent courses are provided in two languages, Hindi and English (a limitation for speakers of other Indian languages). Printed materials (nine booklets) are supplemented by five audio-cassette and four video-cassettes. Twelve optional face-to-face tutor-led meetings are provided at weekends at local study centres. Students complete two assignments of a practical nature per course (a total of eight) and sit an examination. On successful completion they are awarded a Certificate in Guidance by IGNOU.

India

Population (millions)	992.7	
Size ('000 km ²)	3,288	
GDP per capita (purchasing power parity US\$)	2,248	
Human Development Index	0.571	
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force total '000	1,789,733	--
'000 female	584,953	--
Gross enrolment ratio		
All students	100	49
Female	90	39
Pupil teacher ratio	47	33

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996

Media and technology

IGNOU is equipped to use a variety of media and technology (radio and television, audio-teleconferencing, audio- and video-cassettes, phone-in radio programmes and print). However, for the Certificate in Guidance programme, appropriate technology choices were print, audio- and video-cassettes (low cost to produce and use, accessible by students). Print materials were the main medium for the programme and, for some students, the only one they used. Print alone was available in the early years of the programme and audio- and video-cassettes were added later as supplementary material. The video-cassettes are available at local study centres for viewing there, usually during the tutor-led sessions. In practice, a low level of use of audio and video materials is reported, mainly because of low student attendance at study-centre sessions. The materials have had no revision since their production in 1993 and some students have found the level of language difficult.

Funding and costs

The development costs of print (borne by NCERT) are estimated to be US \$10,000 in 1993. Programme delivery (including print costs, tutorial support, distribution, examinations and administration) is funded by IGNOU. The Certificate programme is a small half-year programme out of a total of about 50 larger and longer programmes provided by IGNOU and cost data on it is limited and difficult to disentangle from other IGNOU programmes and services. The cost per successful student is not available but the total cost per enrolled student is about US \$76. The costs of learning materials per enrolled student are about US \$3 for printing the booklets, US \$10 for developing them, and US \$4 for the set of audio and video materials. Teaching costs (tutoring and study centre facilities) are US \$36. Because of the low numbers, the Certificate programme costs more per student in teaching costs than other IGNOU programmes. Fees charged to students are Rs.500 (the equivalent of US \$16 in 1993 and US \$10 in 2001). Other costs borne by students are between US \$12 and US \$24, an affordable sum for primary teachers (whose salary is around US \$1,800 a year) or for middle-class mothers but not for those with lower incomes. Like other short-term updating or refresher programmes for teachers, the Certificate does not attract any financial increment to a teacher's salary.

Quality, effectiveness and outcomes

The programme is regarded by the providers (NCERT and IGNOU) as a good one, with high quality curriculum, assignment design and printed materials (purchased by those outside the programme too). It has been able to take advantage of its location in a large distance teaching university and the services and resources that this can offer. The providers see the programme as serving a useful social purpose and meeting needs otherwise neglected. However, they are also concerned at the relatively small numbers enrolling (less than a thousand each year) and low completion rates. Between 1993 and 2001 a total of 6,546 students enrolled for the programme (an average of about 700 students a year). Of the 5,659 students enrolling between 1993 and 2000, 887 (15.7 per cent) have successfully completed it. One reason for this appears to be the heavy study demands of the programme which is constrained by the assessment requirements of a credited course. The question of whether or not a course of this kind should be examined and accredited has been debated by the providers. Other reasons identified include weaknesses in the learner support provided, a need for simpler language in the study materials and speedier feedback to students on their written work, and the heavy workload involved. No evaluation has been done of the impact of the programme on teachers' work in schools. The programme has attracted more women than men: 68 per cent female and 32 per cent male for students enrolling 1999-2001; 15 per cent of students come from Deprived Sections of Society (according to the Government's classification; 50 per cent of places in educational institutions are reserved for Deprived Sections as affirmative action).

RE-ORIENTING PRIMARY TEACHERS TO NEW TEACHING APPROACHES, MONGOLIA

This case describes a 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 more often than traditional provision, to re-orient them to new teaching approaches and curricula.

The context

During the 1990s, Mongolia made the transition from a single-party socialist state and command economy to a multi-party democracy and market economy. This had a major impact on the education system. It resulted in new curricula, new teaching approaches and examinations, an inflow of ideas from other countries, reduced finances for education, a scarcity of information and learning materials for teachers, and the decentralisation of budgets and decision-making to the provincial level. Primary teachers were qualified but needed in-service development for a changing environment. The traditional in-service model of residential summer courses in the capital city, Ulaanbaatar, was no longer affordable or even appropriate, given the need for the rapid re-orientation of all teachers. A different approach was needed, one which could reach more teachers more quickly more often. Distance education was chosen as a means of doing this despite the challenges presented by the country's size, weak communications infrastructure and unfamiliarity with distance education.

The project

The project (1994-2001) was funded by UNICEF in partnership with the Ministry of Science, Technology, Education and Culture (MOSTEC) and implemented by the National Institute for In-service Teacher Education, the School of Educational Development (SED). Its aim was to help primary teachers adapt to changes in curriculum, pedagogy and management of learning in primary classes (Grades 1-4 for children from 8-12 years of age). Learning materials (mainly print and radio) were developed to provide information and guidance for teachers. Content focused on integrated subject-teaching, multi-grade and child-centred teaching, and active learning methods. Workshops were organised in provinces, regions and Ulaanbaatar. This was not a structured formal course with assessment and accreditation but had more of the characteristics of open learning, where learning resources are provided and teachers make choices about how they will use them.

Mongolia

Population (millions)		2.5
Size ('000 km ²)		1,567
GDP per capita (purchasing power parity US\$)		1,711
Human Development Index		0.569
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force	7,587	13,171
total '000		
'000 female	6,812	8,686
Gross enrolment ratio		
All students	88	56
Female	91	65
Pupil teacher ratio	31	15

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996.

Media and technology

The main media were printed materials and audio (radio and audio-cassettes) with a limited amount of video. Print was chosen because it was accessible, affordable, familiar and provided a permanent resource that several teachers could use. Radio was widely accessible through national and provincial radio stations and was affordable too. Programmes were made and transmitted at the national level by Mongol Radio and additional ones by provincial radio stations. Audio-cassette recordings of radio programmes were distributed on request and schools provided with equipment to make their own recordings. Television was available in population centres but development and transmission costs were high and access restricted. Five television programmes were made in 1998, four of them using content coming from teachers and schools. Video-tapes of these were distributed but access to video-cassette players was limited. Computers did not play a role because they are still scarce in most areas of the country and electricity supplies not always reliable or available; connectivity is limited and expensive. The media choices were shaped by four factors: their purpose (for example, telling, showing, illustrating through examples or motivating teachers), accessibility, development and delivery costs and infrastructural constraints. New kinds of uses were made of familiar media and existing technology. Teachers use the print most often and then audio.

Funding and costs

The main funding (about US \$30,000 most years, US \$60,000 in two of them) came from UNICEF though the salaries and institutional costs of staff taking part were carried by MOSTEC who collaborated closely. Work was carried out by staff already in post at SED and provincial education centres. There was no charge to teachers. The project's records for managing and auditing project finances do not allow much analysis of the costs of the distance education project. They were kept for a different purpose. It was also impossible to estimate the costs of people's time, especially in retrospect, where activities for this project were only part of their work or coincidental with it. However, some costs can be identified. The development and transmission costs of one 20-minute national radio programme with one repeat transmission was US \$110 (estimated costs of content preparation: US \$30; production and transmission costs US \$80). Printed booklets were produced for about US \$1 a copy.

Quality, effectiveness and outcomes

The project introduced a new approach to in-service teacher education. Materials were constructed with the input of teachers and methodologists and capacity built in operating distance education. The printed materials still have some way to go in achieving good quality as self-study materials and provide too small a resource so far but they represent an important beginning. Further development is needed with some technical assistance: the project had little and limitations in materials and strategic planning resulted, since distance education was unfamiliar.

Since there was no structured course or assessment, there are no completion and graduation rates to report. Over 5,000 primary teachers took part in project activities (and still more used the radio and print resources) though the extent of their participation is not known. There is no systematic data on the project's impact on teaching methods but plenty of anecdotal evidence and informal report and examples in schools around the country. The 'UNICEF Project' is well known in the country though it lacked a clear project title and is well-regarded by teachers.

The project began in four provinces and Ulaanbaatar in 1994 and by 2000 had reached over half of the country's primary teachers. The current funding for the traditional in-service model is only sufficient to provide a teacher with a one-week residential course every ten years. What the project demonstrated was a new way of using limited resources. Whereas the traditional model spent 85 per cent of its budget on travel costs and accommodation the distance education approach spent a much greater proportion on the provision of learning resources and workshop activities.

AN ALTERNATIVE ROUTE TO PRIMARY TEACHER QUALIFICATIONS, NIGERIA

This case describes the National Certificate in Education (NCE) programme offered by the National Teachers Institute in Nigeria. It provides an alternative but equivalent route to initial teaching qualifications for working primary teachers in a country very short of qualified teachers and where conventional college output cannot meet demand.

The context

An acute shortage of qualified primary teachers led to the establishment in 1976 of the National Teachers' Institute (NTI), a distance education college for teachers. Its mission was to provide initial teacher qualifications and upgrade the quality of teachers through distance education. Its courses and qualifications were equivalent to those of conventional teachers' colleges. NTI is a parastatal organisation, with headquarters in Kaduna and offices in 36 states. It has made a significant contribution to teacher supply (48,204 NCE graduates between 1990-1999) and is now an institutionalised part of the teacher education system. Though there is little government policy on distance education and no Ministry section with overall responsibility for it, distance education has played an enduring role in Nigeria's teacher education and, to meet EFA targets, is likely to do so in the future.

The programme

The NCE programme leads to the national standard qualification for primary teachers. It combines printed self-study materials, tutorials, field trips and supervised teaching practice over four years (the college-based equivalent takes three years). The curriculum covers general (50 modules) and specialist (36) academic subjects, education (36), communication and the use of English (4), field trips and four weeks of supervised teaching practice each year. Learner support is provided at weekends and in school vacations in 220 study centres around the country. Students attend them for tutorials, revision and examination sessions. Supervision of practical teaching in schools is carried out by educators from local higher education institutions who visit students three times during each four-week period and assess them against standardised performance-based assessment criteria. Continuous assessment, tests and practicals constitute 40 per cent of the final grade, examinations for 60 per cent. Teaching practice is compulsory but to qualify for it, students have to attain a grade of 60 per cent in coursework.

Nigeria

Population (millions)		110.8
Size ('000 km ²)		924
GDP per capita (purchasing power parity US\$)		853
Human Development Index		0.455
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force	435,210 ^a	152,596 ^a
total '000		
'000 female	201,905 ^a	54,949 ^a
Gross enrolment ratio		
All students	98	33
Female	87	30
Pupil teacher ratio	37	--

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996; a: 1994.

Media and technology

The NCE programme is print-based. Supplementary audio- and video-cassette materials are produced for use in study centres. Study centres are intended to serve as access points to telephone, radio and television, newsletters and mini-libraries but, in practice, most study centres are devoid of these facilities and resources. Given the country's infrastructure and resource levels, the choice of media and technologies is limited.

Funding and costs

NTI is funded directly by the Federal Ministry of Education. It generates some income through its printing press, publishing, resource and conference centre. Students buy their own course materials at the study centres or state NTI office but even these relatively low costs to students are not always easily affordable: recent teachers' strikes and slow salary payments by the government have affected trainees' ability to pay and may account for some drop-outs.

Limited data is available on costs but the evidence suggests that of 5,167 students completing in 1999, 2,872 passed the examination at a unit cost of US \$203 while the other 2,295 graduated, after retakes, at a unit cost of US \$259. This produces an average cost per graduate of US \$ 228 which includes loss through drop-out. This compares with a unit cost per graduate in a regular college of education of US \$317 (1998), US \$469 (1999) and US \$529 (2000).

Quality, effectiveness and outcomes

Accreditation and quality control for all NCE programmes in Nigeria, including the distance one, is undertaken by the National Commission for Colleges of Education (NCCE). This body visits centres, appraises the quality and quantity of tutors and sets the grading and assessment system. Teaching practice and examination scripts are externally moderated. The learning materials are acknowledged to have a value wider than the distance education programme alone and have been used in other West African countries (Sierra Leone, Gambia and Ghana).

The programme has steadily rising enrolment rates: 7,324 (1994-97 cohort), 7,581 (1995-98), 8,398 (1996-99) and 8,521 (1997-2000). However, these are matched by significant drop-out rates: 27 per cent (1994-97 cohort), 30 per cent (1995-98), 35 per cent (1996-99) and 39 per cent (1997-2000). Of those completing the course, only 56.5 per cent passed in the 1994-97 cohort, 66 per cent in 1995-98, 61.4 per cent in 1996-99 and 55.6 per cent in 1997-2000. Several reasons are given for high drop-out rates: the inability of trainees to afford course materials; the time needed for other income-generating activities; the disruption to the studies of female trainees as they follow a re-located husband; the demands of busy farming periods at examination time (especially in the northern states like Sokoto and Kano); late delivery of materials because of poor postal services; long distances to travel to study centres; failure to participate in the practical teaching element (a compulsory part of the course) and low pass rates in assignments and tests. Some problems in the quality of learner support play a role. Study centres are under-resourced and overstretched, dealing with more students than planned for when established; appropriate local tutors are difficult to recruit; and the activities provided at study centres tend to mimic the formal practices of conventional colleges or traditional ways of teaching, eroding the intention of providing opportunities for interaction between learners and learners and tutors.

Despite the problems, the NTI's NCE programme has made a significant numerical impact on teacher supply in Nigeria. 21,000 trainees graduated with the NCE qualification in 1994, a number comparable with the total admissions of the 58 regular colleges of education.

INTERACTIVE RADIO FOR SUPPORTING TEACHERS OF ENGLISH AS A SECOND LANGUAGE, OLSET, SOUTH AFRICA

This South African radio project has two audiences: primary school children and their teachers. Through a well-structured curriculum and active learning approaches, the children learn English while the teachers improve both their English and their teaching of it.

The context

In 1994 the new post-apartheid government in South Africa faced enormous challenges in redressing great inequalities in education. Wide disparities existed between schools for different ethnic groups in funding, resources, pupil-teacher ratios and teaching qualifications and skills. About 29 per cent of teachers were underqualified and 7 per cent unqualified. Since then the government has created a single unified system of education but schools and teachers still vary in quality. The in-service training of teachers is not well developed. This limits the possibilities for improvements in teacher quality and for implementing the many changes facing them, for example, the policy shift from a content-based to outcomes-based curriculum. The 'English in Action' programme has attempted to address these issues in the context of teaching English as a second language. In South Africa, English is an official language but for many children and teachers, it is their second or third or even fourth language. The project was begun in 1993 and is run by a non-governmental organisation, the Open Learning Systems Education Trust (OLSET).

The programme

'English in Action' is an interactive radio programme series. 'Interactive radio' is an approach used in several countries. It designs radio lessons to structure children's and teachers' learning activities as the radio lessons proceed, with pauses left for responses and action. In using it for English language teaching, it also provides a good model of pronunciation and language use if teachers have weak spoken English. In the OLSET project, the daily half-hour radio lessons introduce pupils (Grades 1-3 in primary schools) to English through activities such as stories, music and songs. The lessons involve teachers as partners in the teaching process by asking them to lead language development activities, such as games or pairwork, and to mediate content, if necessary in the mother tongue. The teachers, who may themselves have low levels of English or poor teaching methods, are supported by a structured and well-planned language curriculum which also introduces them to new teaching practices designed to foster active learning. Teachers are supported by visiting programme coordinators who organise training workshops and teachers' groups as well as supplying equipment and printed visual aids to the schools. From small beginnings in 300 classrooms in 1993-4, the project has grown to involve an estimated 11,000 teachers and 550,000 pupils in nine regions of South Africa in 2001.

South Africa

Population (millions)	42.8	
Size ('000 km ²)	1,221	
GDP per capita (purchasing power parity US\$)	8,908	
Human Development Index	0.702	
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force	224,896 ^a	113,215 ^b
total '000		
'000 female	165,398 ^a	71,452 ^b
Gross enrolment ratio		
All students	133	95
Female	131	103
Pupil teacher ratio	36	29

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996; a: 1995; b: 1991

Media and technologies

Radio is the main medium used, supported by printed materials. OLSET supplies participating schools with battery-powered radios and, in certain areas, wind-up or solar-powered ones. The radio lessons are supported by printed materials for pupils and teachers: a teacher's manual, pupil activity workbooks, posters and a comic reading book. The half-hour radio lessons are produced and recorded by OLSET, and are delivered through daily radio broadcasts by the national radio organisation, the South African Broadcasting Corporation (SABC), and some community radio stations. Where reception is difficult or broadcasting schedules unreliable, schools are provided with tape recorders and tapes of the lessons though this has added extra tasks and costs to the project. Negotiation of access and airtime for programme transmission has been a continual battle and created some problems for the project. Prior to a recent agreement with SABC to broadcast the programme nationally, the radio lessons were broadcast in some areas by SABC radio broadcasts and in others by community radio stations. This led to erratic implementation of the programme in some places and affected the regularity of lesson delivery. The programme has suffered from the lack of consistent policy on educational broadcasting at national and local level.

Funding and costs

OLSET is funded by the United States Agency for International Development, Norwegian Government aid and more recently, by the UK Government's Department for International Development (DfID). While this external funding has sustained the project since 1993, it leaves the project vulnerable to changes in funding policies and priorities as competing needs arise for international donors. The total costs of administration were estimated as US \$125,000 in 2001, and the costs of production and distribution US \$390,000. On these figures and at the current scale of operation, the cost per child is about US \$1 per year. Programme transmission and airtime are provided free of charge by radio stations, including SABC. Where there are problems in receiving the radio programmes, audiotapes and cassette-players are provided to schools and this is a more expensive (per capita) option than radio. There are no costs to teachers or pupils.

Quality, effectiveness and outcomes

The programme has had the benefit of ongoing formative evaluation from its inception in 1993 and is well-documented. After early positive evaluation findings in both urban and rural schools, the programme grew rapidly. By mid-2001 it was estimated that 'English in Action' was used in 11,000 primary school classrooms and that 550,00 pupils were regularly exposed to the radio broadcasts. Government education officials are said to endorse widely the project's practical, performance-based approach. There has also been firm support for the programme from teachers and school principals. This appears to confirm their (otherwise unmet) needs for in-service training and support and for practical assistance in planning and teaching a subject in which some of them have low levels of competence. There is a strong demand for the OLSET printed materials as well as for the OLSET radios, which are commonly used teaching aids in many South African primary schools. Pupils appear to be well motivated by the radio lessons and there is some evidence of learning gains in the use of English. Other evidence suggests that teachers, as second-language speakers of English themselves, have gained confidence in teaching English and are able to use the programmes effectively and to link what is taught in them to other areas of the curriculum.

So far, the project has worked with minimal staff and focused its resources on broadcasting to the maximum number of pupils and teachers. Its rapid growth has sometimes outstripped resources, resulting in problems in the quality of regional support and competing demands on scarce staff time. Expansion has greatly increased administrative demands without an accompanying increase in staffing. However, with the agreement by the SABC to provide airspace for the programme nationally, and with promises of increased funding from the international donor community, the project hopes to increase its scale even further. To achieve this, the project will need to employ additional staff and develop a more substantial administrative and regional infrastructure. More formal systems of evaluation and quality control will also be necessary. OLSET is also working with the British Broadcasting Corporation to share teachers' experiences of working with interactive radio with other teachers in the developing world.

NEW ROUTES TO TEACHER EDUCATION DEGREES, SOUTH AFRICA

This case describes degree programmes in teacher education provided by the University of South Africa (UNISA), one of the world's largest distance teaching universities. Distance education plays a prominent role in teacher education in South Africa – more than a third of its primary and secondary teachers were involved in distance education in 1995. The programmes in this case began as in-service ones but later diversified to include a pre-service target group too, in response to government policy change.

The context

UNISA has been a major provider of distance education and teacher education at tertiary level throughout the southern African region from the 1940s. It has a well-established centre and structure. The main campus is in Pretoria with regional offices in Cape Town, Durban and Pietersburg. In the early 1980s and 1990s UNISA's main role in teacher education was to provide upgrading programmes for serving primary and secondary teachers at the diploma and graduate levels. From the mid-1990s, UNISA has undergone a period of change in attempting to respond to new national priorities in teacher education and to improve the quality of some of its services (such as learner support). One response by the university has been to offer its teacher education programmes to a more diverse audience. The two programmes here, for primary and secondary teachers, have provided a means for non-graduate serving teachers to gain a teacher education degree equivalent to those offered by conventional universities. Until recently, UNISA offered mainly in-service teacher education but has diversified into pre-service initial teacher education through offering the same programme to both target groups of students. These will shortly be revised as South Africa moves towards a standardisation of teacher qualifications.

The programme

Since 1998, UNISA has offered two teacher education programmes at Bachelor's degree level, for primary and secondary teachers (BPrimEd and BSecEd). These can be taken as in-service or pre-service programmes by students with appropriate levels of entry qualifications. They combine printed self-study materials, assignments, discussion classes and supervised teaching practice over four years (480 credits in total, 120 required credits and 1,200 notional hours of participation per year). The curriculum in each programme has three components: Educational Themes (Pedagogy), Professional Studies and selected areas of specialisation or school subjects. There are five weeks of teaching practice annually (20 weeks over the four-year programme). Pre-service students are responsible for arranging their teaching practice in schools of their choice and are supervised by senior teachers there. Supervising teachers assess students' practice according to criteria provided by UNISA and report to the UNISA organiser. Students attend the main campus in Pretoria twice a year for assignment and examination orientation and examinations are held at one of 442 examination centres around the country. Course assignments are normally compulsory and a condition of entrance to the examinations, though do not contribute to the final grade.

South Africa

Population (millions)	42.8	
Size ('000 km ²)	1,221	
GDP per capita (purchasing power parity US\$)	8,908	
Human Development Index	0.702	
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force total '000	224,896 ^a	113,215 ^b
'000 female	165,398 ^a	71,452 ^b
Gross enrolment ratio		
All students	133	95
Female	131	103
Pupil teacher ratio	36	29

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996; a: 1995; b: 1991

Media and technologies

The main medium used is print. On registration, each student receives a print 'tutorial package' containing a tutorial letter, self-study materials (known as study guides), information on prescribed texts (not included) and some audio and video tapes where applicable. In most cases the study guides are designed as 'wrap-around' guides to the textbooks or tutorial materials. UNISA maintains contact with students through regular tutorial letters (6 per year). These provide guidance on assignments and examinations (including past papers), tutor contact names and venues for forthcoming discussion classes. Study guides contain compulsory units and also refer the student to selected parts of accompanying textbooks. These print materials are supplemented by face-to-face contact sessions (discussion classes), practical work and some on-line learning activities. UNISA is in the process of integrating Computer Mediated Communication (CMC) and World Wide Web (WWW) technologies into their programmes and this is expected to grow. However, the print-based delivery mode continues at present, with varying optional amounts of on-line use, playing a small optional role in these teacher education programmes.

Funding and costs

It was estimated (in 2000) that each of the programme modules of the programme had been developed at a total cost of approximately US \$26,078. The number of students enrolled for each module has varied, with a unit cost per student of between US \$1,222 per module (where only two students had enrolled for a module) to just over US \$9 where the enrolment per module was 259 students. The average delivery cost per student per module was estimated at US \$30. All formal teacher education programmes are state-funded so UNISA received grants for these programmes.

Student fees for each individual module (in 2000) were US \$67. Given that each qualification comprises 40 modules, the total cost to a student for a complete Bachelor's programme is about US \$2,682. Similar modules at residential universities are around US \$128 each.

Quality, effectiveness and outcomes

Quality assurance measures include the external assessment of courses and modules, the external moderation of question papers and examination scripts. To keep the materials up-to-date, the study guides are revised every three years and reviewed by external assessors. Turnaround of assignments takes three weeks to give students' feedback within a specified time. Quality assurance for teaching practice is provided by the students' workbooks recording their activities and lesson plans and the assessment of teaching practice according to a common set of criteria plus a report by the supervising teacher to UNISA. The differences in the two target audiences, in terms of their teaching experience and the role it plays for them within the programme, raises some issues for the management of the teaching practice of the two groups and the kinds of support materials provided. However, there was no information available on this in the draft materials available for this summary.

The annual pass rates for the individual modules vary between 40 per cent and 65 per cent. Almost 70 per cent of all enrolments ultimately graduate though taking more than the minimum time allowed to do so. UNISA as a whole has experienced an overall drop in enrolments in its programmes and this has limited the amount of funding available to support new initiatives in general and the development of student support in particular. This has been offset to some extent by improvements in government subsidy earned by increased pass rates.

USING ICT TO SUPPORT SCHOOL-BASED INITIAL TEACHER EDUCATION, UNITED KINGDOM

This case describes the use of ICT and distance education to support the school-based training of graduates in the United Kingdom. The programme is provided by the Open University, UK and reflects government policy to increase the role of school experience and the use of competency-based approaches in the initial preparation of teachers.

The context

Teaching in the United Kingdom is an all-graduate profession for primary and secondary teachers. In addition, teachers are required to take a recognised training programme leading to qualified teacher status. The programmes take two principal forms: a Bachelor of Education (B.Ed.) with professional training incorporated during the four-year programme, and a one-year full-time Post-graduate Certificate of Education (PGCE) taken by university graduates. In the PGCE, the focus is on education, pedagogy and practical skills since student-teachers already have degrees in academic subjects. In the 1990s, there was a shift in government policy on teacher education, giving a new emphasis to school-based training and the development of teachers' competencies. There was also a growing teacher shortage, especially in mathematics and science, which led to a search for new sources of potential teachers (e.g., women graduates with young families or qualified professionals wanting to change careers). After some research on the need and potential audience for a part-time distance education programme, the government's Department of Education (DES) decided to support one and invited tenders for it. The Open University was successful in winning this and the result was the Open University's PGCE.

The programme

The programme (part-time over eighteen months) led to the same PGCE qualification for primary and secondary teachers as a one-year full-time programme provided by other universities. It was accredited by the Open University and used an assessment framework developed from national regulations. It was planned around three stages of student experience with a period of full-time teaching by students in each. Assessment of learning was based on work produced for a student portfolio and a competency-based assessment of practical skills. There were no written examinations. Part-time tutors and school-based mentors were jointly responsible for the formative and summative assessment of students, with moderation and monitoring by the programme team and external examiners. Teaching practice and was supervised and assessed primarily by experienced teachers within an agreed system. ICT played a large role in enabling interaction between students, tutors, regional support centres and programme providers while based in schools. Contracts were made with schools for the services they would provide, a payment made for these, and materials and training provided for mentors.

United Kingdom

Population (millions)	59.3	
Size ('000 km ²)	245	
GDP per capita (purchasing power parity US\$)	22,093	
Human Development Index	0.923	
<i>Educational data</i>	<i>Primary</i>	<i>Secondary</i>
Teaching force	283,492	464,134
total '000		
'000 female	228,677	255,669
Gross enrolment ratio		
All students	116	129
Female	116	139
Pupil teacher ratio	19	13

Source: UNDP 2001; UNESCO 2000; UNESCO 2001

Note. Population, Size, GDP, and HDI figures are for 1999; Education figures are 1996

Media and technology

A combination of media was used in an integrated way by programme course teams. The materials included specially-designed printed self-study texts, study guides and course readers containing a variety of selected articles; course resource packs for each student, containing print, video-cassettes and audio-cassettes for each course stage. Computer communication between students and students and tutors played a key role, using the Open University's First Class conferencing and e-mail system. All students were provided with a computer and modem for the duration of the programme to enable them to develop ICT skills, to provide a means of communication while located in schools and to give them access to a range of electronic resources. Competence in the use of ICT is a statutory requirement for newly qualified teachers in the UK. Since many of the Open University PGCE students were older (average age, 33) than those on the full-time programme and less familiar with computers, access to computers and support in learning to use them was seen as important.

Funding and costs

The Open University received a government grant of about US \$3.5 million (£2.2 million) to develop the programme. It also received US \$6,000 (£3,900) per student in fees and recurrent grants at the outset of the programme; 75 per cent of this was allocated to the PGCE programme and 25 per cent retained by the Open University to cover overheads. Two elements of the costs accounted for 45 per cent of the total cost generated by each student: a payment to schools of US \$1,560 (£1,000) per student for their training role, and the cost of computer purchases. These costs are specific to the PGCE programme within the Open University. The cost of an Open University PGCE to the national exchequer is said to be about 50 per cent of a conventional PGCE, though no detailed cost studies were available. All PGCE students in the UK receive a mandatory grant to cover tuition fees but Open University PGCE students do not receive the maintenance (subsistence) grants paid to full-time PGCE students (about US \$ 6,200 or £4,000), a factor in reducing the cost of the distance education programme to government. The initial development costs (for the development of materials and an institutional infrastructure) were not recouped through fees so any re-development of the programme, without such a grant, would need to take this into account, though could build on the earlier experience.

Quality, effectiveness and outcomes

A strong quality assurance framework was put in place to satisfy three sets of requirements: those of the national body responsible for teacher education (the Teacher Training Agency), those of the Open University for all its programmes, and those created by the need to manage and monitor a complex operation with many players (students, schools, mentors, tutors, headteachers, regional centres). The programme, like those from conventional institutions, was inspected by the responsible government agency who also make the results of all inspections publicly available on their website. The programme and materials were developed with the input of external assessors, as is usual in Open University UK courses, and external examiners were involved in assessing students' work and performance. The materials were of high quality and widely used outside the programme by schools and other training providers.

In 1995-6, 21,000 students entered a full-time PGCE programme in the UK and 14,300 a B.Ed. programme. In that year, the Open University's PGCE enrolled about 1,500 students, just over 7 per cent of the national total. A survey of three cohorts of primary PGCE graduates (1994-6) found that only 21 students (2 per cent) had not entered teaching (better than the national average). A total of 6,272 students enrolled for the programme during its life but no data was available on completion rates. The programme was particularly successful in recruiting mathematics and science graduates (shortage subjects in the United Kingdom) and there is some evidence that the graduates from the PGCE programme stayed in post longer than younger equivalents from traditional PGCE programmes. In 1999, the Open University withdrew the primary teacher programme because, as a large distance-teaching institution with long preparation times for course production, it could not respond quickly enough to the Teacher Training Agency's new national curriculum for teachers in mathematics, English and computer training.

3 CONCLUSIONS

These ten case studies provide us with a significant body of data to further our understanding about the use of distance education for teacher education. Although the case studies were limited in their scope and took place in only nine countries, they make it possible to draw some conclusions about the appropriate uses of open and distance learning, its effectiveness and costs. The evidence also provides some guidance on key aspects for planners – on technologies, management and funding structures.

As we begin to assess this data, one general observation can be made about most of the studies. They are strong on description but weak on evaluative data, both quantitative and qualitative, on which to make judgements about effectiveness. The reasons are varied. However, the shortcomings in evaluation data are not only a feature of distance education provision. We should note too that this can also be said of most teacher education provided through conventional pre-service teachers' colleges and in-service provision, including projects for curriculum reform.

In this particular research, the short time-scale of the case studies limited the possibility for much original empirical research. Most researchers were dependent on drawing from existing evaluative literature and data where it existed. More generally, there are also difficulties in researching a complex and interrelated range of factors related to effectiveness. The way that distance education disperses responsibility for a programme among a range of partners, sometimes on a large scale over distance – for student support, administration, tutoring, course production, delivery and assessments – presents a number of logistical and methodological challenges for researchers.

Why is evaluation data so limited? A range of reasons emerges from the particular case studies. In some the generally restricted research capacity of a programme is due to lack of funding, or time, or an education tradition and structure which leaves the evaluation of programmes to another division or institution. In others it results from a lack of a research culture and skills in evaluation. In programmes with a wide geographical reach, data from the centre could not tell us how well it is working at more local levels. Often, the means for gathering data was problematic:

The main constraint for researching the programme is the lack of an organised database with information about it. Even though the staff was open and willing to help, they did not have an easy way of getting some information and in some cases their memory was the only source available. The teaching unit is now designing a database.

Cerda, Leon & Ripoll, *Teachers learning to use information technology*, Chile

It follows, then, that while the data from the case studies advances our understanding it can only be considered as partial. Nonetheless it points us towards those aspects where further research is needed as well as highlighting the practices needed for better management of information and evaluation data. We now turn to examining the data.

3.1 What is it being used for?

The case studies show that, as discussed in 1.3, distance education is playing a role in four different but sometimes overlapping areas of teacher education: initial professional education, continuing professional development, curriculum reform and change, and teachers' career development.

Three case studies in three very different countries play a role in **initial teacher education** – the China Television Teachers College, the National Teachers' Institute in Nigeria, the PGCE programme of the UK Open University. The programmes in China and Nigeria take in large numbers of entrants and make a substantial numerical contribution to increasing qualified teacher supply. In contrast the British Open University programme makes a contribution towards providing alternative opportunities for trainee teachers but in comparison to the Nigerian and Chinese cases, its numerical impact on UK teacher supply is small. The 1998 figures reveal an intake of 1,933 trainee teachers (224 primary level, 1,709 secondary level) compared with a national annual intake of new teachers of some 30,000. However, there is some evidence from other research that twice as many teachers trained through the UK Open University's PGCE stay in the profession as the national average (up to 40 per cent of newly-trained teachers in England leave teaching within three years of qualifying). So while its numerical impact on supply may be small at the point of qualification (less than 7 per cent of all newly-qualified teachers), it may constitute a slightly larger proportion in the longer term in the light of teacher retention rates. This finding is also reported informally in some other countries though empirical evidence is lacking. There has been little study of the employment patterns and careers of teachers, those trained by distance education and by conventional programmes. We need more information on returns over time to investment in teacher education.

The three programmes provide initial training for different levels of learners, for those with secondary-level entry qualifications in China and Nigeria to graduate entry in the United Kingdom. It shows that distance education can accommodate these differences. The programmes also handle the management of teaching practice in different ways, reflecting the regulations and norms of the different countries and the importance placed on it within different teacher education systems. While the whole programme from the UK Open University is designed around school experience, in the China programme it is minor and given little emphasis. In the UK programme, contact with students on teaching practice in schools and a reduction of their isolation – a problem area in all initial teacher education programmes – is facilitated by the employment of ICT. The labour-intensive nature of the management of school practice in the UK, together with the use of ICT and a use of several media in combination is likely to increase the quality of teacher preparation but perhaps at a cost.

Continuing professional development is characterised by a diversification of provision, in terms of types of programmes, duration, management, technology and audience, and is an area in which distance education can play a significant role. Two of the cases (A-Plus in Brazil and the Certificate in Guidance in India) illustrate the range and both include the broader community. The A-Plus television programme uses mass media on a large scale to reach a wide community of viewers while at the same time using the series as a launching pad for further activities by groups of teachers. This case illustrates how mass media like television or radio can provide a responsive means of meeting teachers' needs within relatively short timelines. They can be topical, 'of the moment' in ways that are more difficult for print to achieve alone (in combination these two media have the potential to be greater than the sum of the two parts). The Certificate in Guidance has a less wide reach and provides a structured course which shows both the strengths and limitations of centrally-produced print materials: a high quality resource in the eyes of providers but not wholly appropriate from the perspective of users, less easy and slow to up-date by itself. It also illustrates a different approach, bringing the academic context of its location (a university) to bear and demanding a heavy workload from learners – perhaps too heavy to retain their participation. These two cases also have very different funding sources and costs.

Other cases in this set of ten also have a professional development function too, so we would ask readers not to restrict their comparisons to these two cases only. For example, some in-service programmes play an up-grading role in countries where individual teachers and government policies are trying to improve the standard of qualification. China and South Africa (UNISA) illustrate this. What emerges overall is the flexibility of open and distance learning in meeting different kinds of needs in a variety of ways, but also the need for planners to make appropriate choices taking a number of factors into account (for example, nature and needs of audience, purposes of provision, function within overall provision for professional development, other options available to teachers, appropriate and affordable media, capacity of providers, the acceptable compromises and trade-offs of different choices).

Curriculum reform and change

Major problems in curriculum reform and change have been informing teachers in time, involving them sufficiently in the change process and supporting them as they change their beliefs and practices either as individuals or groups. This is frequently neglected. Solutions have often resulted in slow information flows, inadequate or scarce support materials and slow, expensive cascades of increasingly diluted information with insufficient support for applying new approaches and practices in teaching. Three cases here showed different approaches in the use of open and distance learning to support change.

The Universidad de la Frontera programme, supporting the teachers involved in the Enlaces project which introduced ICT to schools in Chile, provided an online programme for teachers, as an alternative option to face-to-face programmes and ensured that the course assignments were of an applied nature. Though the cost of the two alternatives (face-to-face and online) were about the same, the online programme appeared to achieve more change, in fostering more familiarity with ICT and the development of a 'network communication culture' missing from the face-to-face version. The OLSET programme in South Africa has been effective in reaching large numbers of teachers not only with prescription and advice on how to teach English as a second language but with well-designed lessons, provision of models, guidance in using the radio or audio-cassette resources and support for changes in teaching methods. There is some evidence that not only has the programme reached large numbers at low cost, it has been effective in helping young pupils to improve their English and teachers improve their teaching as well as their English. Using radio in a different kind of way, as a topical magazine and involving teachers in topic identification and programme construction, primary teachers in Mongolia became familiar with new ideas about child-centred teaching and other new approaches and were able to apply them to their teaching. The radio programmes were linked to print materials which served a different kind of function. This case showed that open and distance learning could reach more teachers more often more quickly by changing the way the in-service funds were used.

If *continuing* professional development is to have real meaning, it has to provide the opportunities and resources which translate into more than one week per teacher every 10 years. So in terms of scale, variety of purpose and ability to support change, there are some indications that open and distance learning has considerable potential. Of course more research and evaluation are needed. The OLSET programme has benefited from several formative evaluations, using the findings to varying degrees. The Chile and Mongolia cases both rely on informal reports of positive impact on teaching and again point to the need for evaluation to be planned into project activities from the start.

Teachers' career development

One example of career development is given here though teachers may also further their careers through the professional development opportunities described in the other categories. In Burkina Faso, over a quarter of the country's headteachers (whose professional development is increasingly seen as a key element in school effectiveness) developed new knowledge and skills within four years. This served at least three functions: it furthered their careers, built capacity in the headteacher cohort and provided professional development. The upgrading programmes mentioned in this report also serve to further teachers' careers, especially where they are accredited.

3.2 How effective is it?

What can we say about effects and effectiveness, completion rates and classroom effectiveness? Some programmes reached large numbers (millions) of teachers and educators, others comparatively small numbers (less than 100) though context plays a role in making these judgements. In the context of India, an annual enrolment of 1,000 for a course is small, in some other countries this would be large. In general, we can conclude that distance education can reach more teachers than conventional programmes and where mass media are involved, can reach very large numbers. The numbers reached by the one wholly online programme (in Chile) were relatively small and while this form has the capacity to expand, we have little information on the cost implications of the addition of more tutors or staff for expanded numbers or the comparative workloads involved.

Reaching teachers is one thing, generating teacher activity and application of ideas and knowledge to teaching and schools as an outcome is another. The case of Brazil showed how the reach of mass media could be partnered with support for local action to achieve the best of both worlds. In China, delivery appears as the main goal (again using mass media to reach large numbers) and the mobilisation of recipients less emphasised. This may reflect different cultural perspectives on the roles of learners and the balance between supply and demand in providing training and professional development. The reach of programmes cannot be considered in isolation from time-span. Some cases, such as Mongolia, showed that distance education was able to reach more teachers more quickly than traditional alternatives. There it reached over half of the country's primary teachers, and so had the potential to influence the rate of change of teachers' or headteachers' beliefs and practices within schools. This too could be seen in OLSET, South Africa, where the programme reached over half a million pupils and their teachers within eight years and there is evidence of its positive impact. The programme in Burkina Faso reached a quarter of the country's headteachers so affected a significant proportion of them. There is another sense in which distance education has 'reach'. It was used to reach new constituencies of potential teachers who would otherwise not have entered teaching (the case of the UK Open University illustrates this) or received in-service development or support for teaching (as the cases of OLSET, Mongolia and Burkina Faso show).

We can say a little about completion rates but not much. The case study researchers were not always able to obtain the information (at times it was not clear if the providing organisations themselves knew them or were simply reluctant to reveal them). Also, some provision was not in the form of formal courses but more like open learning where teachers participated as and when they chose. It was difficult too to get programme completion rates for the conventional system for comparison. For the formal distance education programmes, completion rates varied widely. In Burkina Faso, very few headteachers dropped out, in Chile's ICT programme 51 per cent failed to complete, mainly because of problems with fee payment. In the case of Nigeria, drop-out rates varied from 27-39 per cent and the pass rates of those completing the programme varied from 55 per cent to 64 per cent. These indicate some inefficiencies in the system or flaws in programme design since these drop-out rates are high in relation to the average rate for other distance education programmes. In the Certificate in Guidance (India), the completion rate was about 15 per cent suggesting the need for major review. In the UK Open University case, completion rates appeared to be relatively high but no specific information on them was available to the researchers.

Overall, the main reasons identified for drop-out were fee-problems, heavy and sometimes inappropriate workload, operational failures or weak management in the distance education system and, very importantly, weak learner support systems. For teachers, tangible rewards at the end of programmes play a role too. Generally, experience and research shows that drop-out from distance education programmes tends to be higher than for traditional alternatives (though recent studies of conventional programmes at higher-education level indicates that the gap is much less than previously thought and in some cases, is comparable).

In some of the cases (China, Nigeria, South Africa (OLSET)) distance education for teachers is a significant part of the system and a part of national strategic planning for teacher supply and upgrading quality. In others, it has provided an alternative (Chile, United Kingdom) or supplement (Brazil, India). In some countries it has filled a gap that would otherwise have continued unfilled (Mongolia, Burkina Faso) and has introduced innovative approaches, more appreciated by governments in some countries (Mongolia) than others (Burkina Faso) as a possible productive strategy to support. In general, policy makers need to consider more often the option of distance education as a way of providing initial and continuing professional development but to do this well they need more information on its potential outcomes, strengths, limitations, constraints, media choices, costs and operational and policy requirements. While some of this information is available, much is still not because of weaknesses in the research and evaluation base and inadequate dissemination of existing information. Mistakes get repeated or opportunities missed because planners are not always well-informed.

One focus of concern in all teacher education programmes, whether distance education or conventional, is to turn what teachers know and believe into what teachers do to support children's learning. Weaknesses in achieving this apply to conventional programmes as well as to distance education ones. Many conventional programmes fail to attend to this and some produce 'qualified teachers' who have had only a token or minimal of supervised school experience. In some countries, practical teaching forms no part of the final assessment of teachers. The issues for a distance education provider are how to manage the supervision and assessment of students in distant locations and how to design materials and activities in ways which integrate knowledge or theory with practice. In these cases we have examples of different strategies: a support structure for local action-groups of teachers (Brazil), delegation of supervision and assessment to school staff, with varying degrees of prescription and support (Nigeria, UK, UNISA South Africa), the provision of teaching content, models and sequenced structure in the lessons provided for children (OLSET South Africa), the design of course-work to require a practical application (Chile and UK), the exchange of practical experience in workshops and newsletters (Mongolia and Brazil) or through websites (Chile and UK), the demonstration of model lessons through television or video (China), the use of applied projects rather than examinations on theory and the inclusion of the assessment of performance in the final grade on formal programmes (Nigeria, UK). Some of the ten cases place the practice of teaching as the central focus in programme design and organisation, others assign it a relatively minor, or even marginal place, not because of the logistical difficulties involved for a distance education provider but because of the traditions and perceptions of teacher education in the different countries, and its role in conventional teacher education programmes.

In general, the strategies to integrate theory with practice in these case studies fall into the three categories identified by Robinson (1997):

- *knowledge about practice* (a teacher is able explain what multi-grade teaching is and produce an essay or examination answer on it);
- *knowledge applied to practice* (a teacher can plan the organisation of multi-grade teaching or materials for it and show how these might be used in the situation or report and reflect on work done);
- *demonstration of knowledge and understanding through performance* (a teacher shows the use of multi-grade teaching through the conduct of teaching and learning activities, observed by others).

The different categories have different logistical and cost implications for distance education. One danger here is that activities in the first category are (wrongly) assumed by programme providers to result in the outcomes found in the third (competence in performance) as a matter of course. They do not. However, for most of our ten cases, we lack sufficient evidence of the extent to which knowledge gained translated into knowledge applied in fostering children's learning. This lack of evidence is to be found in traditional teacher education too but is an aspect of research and evaluation much needed in distance education programmes, to aid designers and policy-makers.

3.3 What does it cost?

The case studies confirm the existing finding that distance education can be at an economic advantage over conventional provision but it is not always so. The reasons for this are to do with scale, choice of media and technology and programme design.

Some lower costs are reported. Initial teacher education in Nigeria by distance education has lower costs than conventional programmes. The UK Open University claims costs to the exchequer are lower than conventional programmes though some of the cost-savings come from the absence of subsistence grants to distance mode students. The ICT online programme in Chile cost about the same as its face-to-face equivalent though the cost structure was used differently. The true costs of it were difficult to establish (since some costs were absorbed by the parent institution) and cost-recovery was not possible because the system for collecting students' fees was ineffective.

Some distance education programmes have no traditionally-delivered equivalents for comparison, especially in continuing professional development programmes. What is possible in some cases is to compare differences between similar programmes within the same institution. For example, because of low numbers, the Certificate in Guidance (India) programme had higher student support costs (tutoring and study centre facilities) than other larger-population programmes within the same institution. Attendance at study centres was low so the services were underused so it can be argued that the most costly component yielded the least benefit to learners, in this case.

As with other programmes using television, the A-Plus programme typically had high development and production costs and low per user costs (less than US \$0.10 per viewer per television programme). The annual costs of supporting a teacher in its Community Mobilisation Network was US \$18 per teacher, and US \$84 per school or institution. Similarly the development and transmission costs of interactive radio provision in South Africa's OLSET programme were low: US \$1 per pupil per year and slightly more for teacher support. A similar picture emerges for Mongolia. The costs of radio are affected by the salary costs of producers and technicians in different countries and the regulatory framework affecting broadcasting. The cost of preparing, transmitting and repeating a 20-minute national radio programme in Mongolia was US \$110 but the cost of electricity for transmission was high and access to airtime for local radio stations was heavily regulated, limiting the use of local radio. In all of these cases, the delivery of television or radio programmes is not the end point but the beginning of other activities by teachers, with the programme providers giving the support.

The use of distance education in at least one case allowed limited funds to be used in different and more effective ways. Whereas traditionally in Mongolia, 85 per cent of in-service funding for continuing professional development had been used for travel and subsistence, the use of distance education enabled a higher proportion of the budget to be used on the training element, that is, the creation of learning resources for teachers and more local workshops. This altered the amount of access teachers had to learning opportunities. Instead of one week's professional development per primary teacher once every ten years distance education enabled regular ongoing input through radio, printed materials and group meetings for over half of the country's teachers in six years. Given the range of professional development needs facing policy-makers and planners, new uses of available funds need to be explored if needs are to be met. Not all countries are in the position of Brazil where many opportunities and channels of provision for continuing professional development exist and at little or no cost to the teachers.

We are limited in the conclusions we can draw about costs. The data available in the case studies was often limited and partial for several reasons: cost data was not kept or known to the programme provider; information about costs was confidential or too sensitive to reveal or make public; costs were not recorded in ways which allowed the researchers to analyse the costs of the distance education programme; the complexity of the cost identification and analysis for some programmes was beyond the scope and time available for this study.

In pointing to the limited information on costs here, we also need to remember the similarly limited information on conventional teacher education programmes in many countries – one reason why the case researchers were not always able to draw comparisons. We also need to remember that the cheapest medium may or may not be the most appropriate one, so factors other than costs enter into media choices. One outcome of this exercise was that in several cases programme providers said that they were surprised at what they did not know about the costs of their own programmes and saw the need to improve their recording and analysis of costs. If they did, it might influence some of the choices made.

3.4 What media and technologies is it using ?

Printed materials continue to be a mainstay of distance learning provision, even for programmes like the UK Open University's PGCE which has a major ICT element. Print plays a variety of roles, either as lead or supporting medium, and is valued for its durability, convenience, low cost, familiarity and suitability for combining with a variety of other media. Where print is the only medium available, especially for programmes focusing on teaching methodology, it has its limitations and can lack the immediacy of video or audio and the production process is slower than ICT delivery allows. Despite its familiarity, there is also scope for improvement in the design of self-study materials and existing textbooks are not always an adequate substitute though they have some role to play. In these ten cases, printed materials were used to varying extents in nearly all of the programmes in some way, the exception being the Chile case, where text materials were delivered on-line.

In two of these cases (OLSET South Africa and Mongolia) radio (with back-up audio-cassette use) has played a major role. It has provided an accessible, appropriate and low-cost technology, using a familiar medium in new ways to stimulate further activities. It can partner print effectively. In two cases (China and Brazil) television has been the main medium though used in very different ways. In China it was to deliver more formal talks or discussions or to show recordings, often made in studios, of classroom lessons taught by 'master teachers'. In Brazil it provided examples of applications in field settings with expert comment designed to challenge assumptions or stimulate argument as well as providing a core item around which other activities develop. In both cases, the countries, have a strong infrastructure for television with educational channels available. Where radio and television are used, programmes often face the constraints of regulatory frameworks. In many countries, there is little enabling policy which facilitates the use of mass media for distance education and in some, the move to a market economy has eroded previous access.

Most cases relied on one or two main media plus face-face-meetings; in some cases other media played a small role. Few combined several in an integrated way (the UK Open University case was unusual in doing this). No single medium can effectively provide (in a stimulating and illustrative way) the kinds of things teachers need to learn or see, especially when learning about teaching approaches and processes. Though there are great expectations of the role that ICT will play in teacher education, and though it opens up new possibilities, other media are capable of providing good quality teacher education programmes if well designed, appropriate, accessible and affordable. The use of ICT will grow gradually alongside other media use as infrastructure, costs and access make it more possible and is already playing a supplementary role in programmes. Because of the huge current interest in the use of ICT, we will explore its use in teacher education in the next section.

The use of ICT for teacher education

ICT in teacher education refers to two sets of activities or roles. One is training teachers to learn about ICT and its use in teaching as computers are introduced to schools. In many countries this is being done through face-to-face training programmes, often as part of initial teacher education. Some countries (such as the United Kingdom and Singapore) have developed policies which require all initial teacher education programmes to include compulsory courses in ICT as a strategy for building capacity in ICT. In other countries, no policy yet exists and teaching teachers about ICT is at best an option within teacher education programmes. In some cases, the facilities and equipment for supporting a strong policy are inadequate.

The other role of ICT is as a means of providing teacher education, either as a core or main component of a programme, or playing a supplementary role within it. The case of Chile illustrates both kinds of activities within one professional development programme: teachers on the programme learn to use ICT and to use it in teaching their different subjects by means of a wholly online programme which has, as its core element, online delivery and activities. In the case of UK Open University's initial teacher education programme, the materials are not delivered online, but online communication plays a key role in supporting student-teachers during school-based training, providing interaction with tutors and other students and feedback to programme providers.

Research and experience so far show that where ICT is offered as an optional supplement in programmes, it is less likely to be used by student-teachers than when it is a required activity for a purpose. As the Chile case showed, teachers who took the online version of the programme developed more use of the virtual working environment than those on the face-to-face programme and developed a 'network communication culture'. So the outcomes of training programmes for teachers on the use of ICT appear to be affected by how the programmes are delivered. A common problem in programmes where ICT is a supplementary component is in getting students and tutors to use it.

In looking for established cases of ICT use for teacher education when planning this study, we found fewer than we expected. While many new initiatives have begun, there are few completed programmes with experience to report. There are many examples to be found of ICT forming part of a conventional programme of initial teacher education and whether this is a compulsory or optional part depends on government policy in a country. Sometimes this is taught as an on-campus subject or in some cases (as in Australia) it can be taken in an alternative distance learning mode. There were far fewer examples to be found of ICT as a core means of delivering or supporting initial teacher education programmes (not just ICT courses), especially in developing countries. There were more examples of online use for continuing professional development programmes at diplomas and higher degree level and for short courses. A great deal of activity is to be found at present in the use of ICT in providing informal professional development for teachers through online activities ('chat rooms', specialist subject conferences, virtual classrooms, networks, professional development websites, peer group discussions, bulletin boards, resource sharing). This gives teachers access to people and resources as well as putting more choices for professional development (formal and informal) into teachers' hands.

Out of experience so far some issues and lessons emerge for planners:

- Building teachers' capacity in ICT and using ICT as a means of teacher education and professional development cannot happen in isolation from its use elsewhere in the education system and wider environment.
- National policies, strategies and plans need to be integrated into the teacher education curriculum for initial teacher education and in priorities and funding allocation for continuing professional development.
- Teacher education cannot develop the use of ICT without the infrastructure and funding to support it and major investment and strong government policy is needed for this as the experience of some countries has shown (for example, Chile, the United Kingdom and Singapore).
- Experience shows too that teacher educators are a key element in establishing the use of ICT in education and teacher education but many teacher educators themselves lack skills and training in the use of ICT or the equipment to apply and develop their knowledge and skills, once gained.

The very limited evidence available on costs so far shows that, assuming an existing infrastructure, the development and teaching of online programmes may cost as much or more than face-to-face equivalents, though the cost structure will be different from that of face-to-face teaching or other kinds of distance education. Since students will often need to bear some of the costs, this may affect their access.

The advantages of ICT lie in its potential for increased interaction with and between learners, speedier delivery and response times to queries and feedback on assignments, greater access to communities of teachers and quicker lead-in times for updating course materials while at the same time needing the establishment of effective quality assurance procedures. The use of ICT and CD-Roms, is becoming more common for materials developers of distance education programmes of all kinds and for supporting administrative processes and staff involved in tutoring or learner-support.

3.5 How is it managed?

Distance education programmes are provided through a variety of organisational arrangements. Some are located in universities or institutions, some are provided through consortia or collaborations, and others are time-limited projects, often donor-funded. The categories of providers in this set of case studies are given in table 2. Five of the programmes are made available through universities (four distance teaching universities and one traditional one). One programme is provided by a distance teaching teachers' college (an unusual form of institution). Three are donor-funded projects and one more is a programme provided by a consortium of private agencies, managed by the philanthropic division of a commercial, national communications network and privately funded.

Table 2: Types of providers

<i>Category</i>	<i>Case</i>
<i>Universities</i> Distance-teaching university	UNISA, South Africa Open University, UK China TV Teachers College Indira Gandhi National Open University, India
Traditional university providing an online distance education programme	Universidad de la Frontera, Chile
Distance teachers' college	National Teachers' Institute, Nigeria
Donor-funded projects	Open Learning Systems Education Trust, South Africa, with its own project structure and staff. UNICEF in partnership with the Ministry of Science, Technology, Education and Training, and the School of Educational Development (a national institute). RESAFAD (the African Network for Education at a Distance), Burkina Faso. A collaboration between several countries in West Africa and a development agency in France.
Consortium of private and public agencies	TV-Futura, Brazil

Some of the differences between the types of providers spring from different views about the role and functions of the state in educational provision. Brazil, for example, has a strong pluralist tradition which leaves space for the private sector to play a significant role in education. South Africa's ambitious reconstructionist aims can only be adequately met by a range of both governmental and non-governmental agencies. But there are strengths and limitations to operating outside the state educational system. The outsider status of TV-Futura and OLSET has given them independence from some political and pedagogical constraints that often accompany formal programmes. This has allowed them to research teachers' expressed needs more closely than many programmes offered by state providers and to create support for teachers of a directly practical nature, the sort of provision that is often unavailable through state provision. The private ownership of TV-Futura has also brought the benefits of high TV production standards. OLSET and TV-Futura have, with varying degrees of success, had to set up their own structures in curriculum development and materials production and in developing their outreach infrastructures. TV-Futura has had the benefit of high levels of private funding to develop an impressive outreach network. In contrast, the detached status of OLSET has led to a constant struggle for funding, particularly state funding, and for air-time on the national radio broadcasting station. This has often compromised the quality and consistency of its provision.

The donor-funded project is frequently used as a vehicle for teacher education but they have their strengths and limitations too. While they have more scope to innovate, bypassing the inertia of the traditional system, and demonstrating the feasibility of distance education, they are also more vulnerable, frequently dependent on external funding. Their sustainability depends on whether the project, usually a time-limited initiative, becomes institutionalised. The history of distance education for teachers, especially in developing countries, is littered with the bones of short-term projects which have served their purpose and been discarded (until the next crisis in teacher education).

The established distance teaching universities here have provided teacher education programmes alongside others. Through their regional infrastructures, they have increased access to programmes and professional development opportunities for teachers. They have administrative framework and logistical systems which can accommodate a range of different programmes and, sometimes, because systems are in place and shared, they can afford to run programmes that are not strictly cost-effective but are seen to have social worth (for example, the Certificate in Guidance programme). However, there are some challenges too: the provision of local support which is accessible, the monitoring and management of student support at the local level, the responsiveness of central providers to local differences or languages, the organisation and assessment of teachers' practical work, and the provision of timely feedback on student's coursework. Distance teaching universities may also have inflexible requirements as a way of ensuring standards. As a result, they may have inappropriate requirements for some non-formal programmes (as may be the case with the Certificate in Guidance or other similar programmes which do not fit neatly into an accreditation system). In addition, teacher education programmes often involve partnerships: with schools, local education officers, teachers' colleges, school inspectors, headteachers and district authorities. In the case of initial teacher education, the management of courses and student progress is shared with partners such as these to varying degrees and especially in the management of practical teaching. In some cases responsibility is delegated altogether for the management of students' teaching practice (as in China). In others it is a specified and contractual partnership between the school and the distance education provider (as in the UK Open University). Most other arrangements fall somewhere between these two but, in all cases, they present challenges and have costs for a distance education provider.

3.6. How is it funded?

The case studies show that distance education for teachers receives funds from all four of the most usual sources of funds for education: from government budgets, from student fees, from the private and NGO sector and from funding agencies. Several programmes receive funding from a combination of sources so that, for example, the programmes in both China and Nigeria are funded partly by government, partly by student fees. Funding source is mapped onto the ten cases in figure 1.

In general, governments have proved willing to fund not only initial teacher education, but also some programmes of continuing professional development, especially for curriculum reform, or for some upgrading programmes in countries trying to raise the minimum standard of teacher qualification. Students are often expected to pay fees where they enrol on a course which will benefit them in terms of career advancement or salary increment. The NGO sector is involved in the projects in Brazil and at OLSET in South Africa, but there are significant differences between the two. The provision in Brazil is through funds generated within the country by an established consortium, while OLSET is dependent on external donor funding and, despite its successes, seems unable to attract government funding. Like other long-term projects, questions about sustainability inevitably arise in relation to the future of the OLSET project and others like those in Mongolia where the support to in-service teacher education was intended as a temporary measure until the economic situation improved.

A number of policy issues emerge from the cases: how to find the appropriate balance between government funding and student fees for some kinds of teacher education programmes; the role distance education should play in both initial training and continuing professional development and in relation to conventional provision; how to maximise returns to training investment; where to locate responsibility for distance education within the education system; how to build a better information and evaluation basis for decision-making. In relation to policy formation, it can be said that distance education is not often considered enough as a strategic option when planning the provision of teacher education.

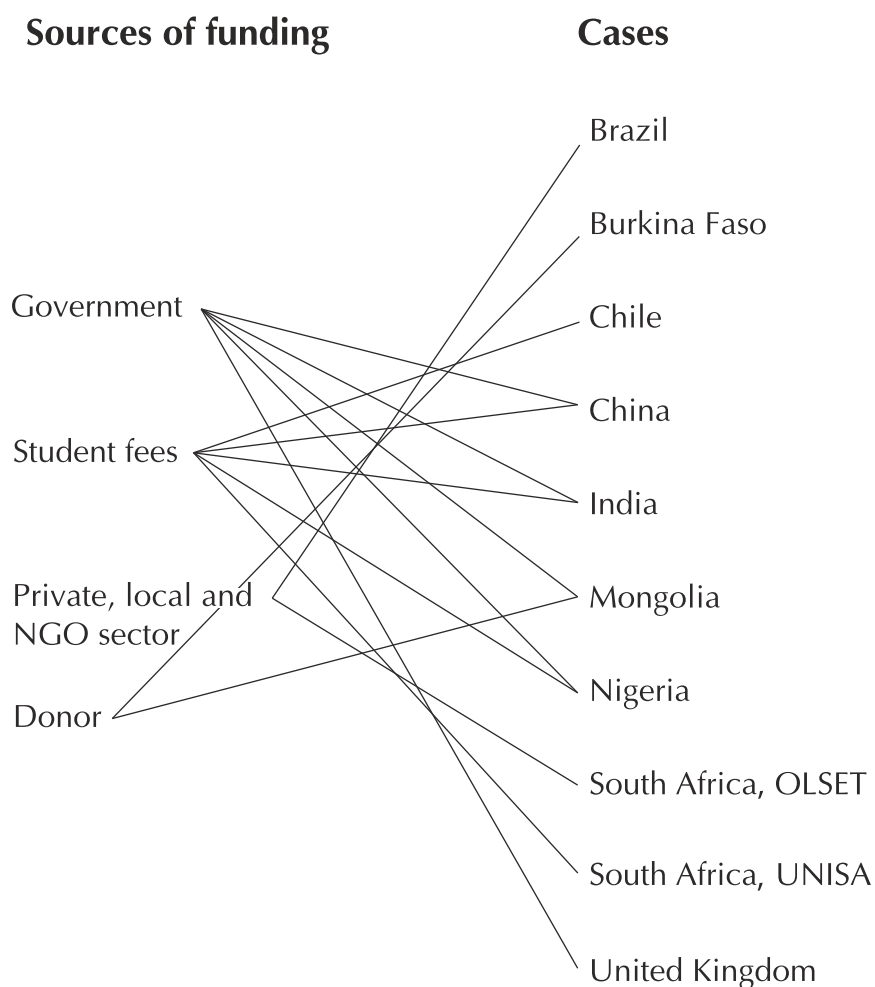


Figure 1: Funding source

4. WHAT DO WE STILL NEED TO FIND OUT?

The ten case studies have provided a valuable resource which adds to our knowledge and understanding about the use of distance education for teacher education, both initial and continuing. They provide new studies, many of which have not previously appeared in the literature, and illustrate a range of different purposes, approaches and technologies. We reviewed key aspects of them in earlier parts of this report and finish now with one more. This is that the case studies have helped to highlight what we do not know and what we still need to find out.

We need to learn more about the costs of teacher education, whether conventional or distance education. Although the data on costs is slowly accumulating, this continues to be a neglected area. Some of the data is not available to the providers of distance education programmes, either because they have not recorded it at all, or in ways which would permit analysis. Some costs are known but confidential since they are a sensitive topic, and some providers are unwilling to reveal them. Some costs are not known because providers, though willing, are not sure how to record and analyse them for distance education programmes. However, without knowing costs, it is impossible to tell how cost-effective programmes are and assumptions about cost-savings in distance education continue without evidence either to support or disprove them. This provides a shaky base for policy-makers.

We need to find out more about efficiency rates (enrolment, completion and success rates). It was sometimes surprisingly difficult to obtain data on these basic aspects. In some cases, the data exists but not in a way that is easily accessible in records. In others, the data does not exist or is not available even to members of the organisation who need to know about their own programmes. It appears that such data is used less than it might be in managing programmes. In traditional institutions, the adoption of distance education programmes can generate new demands on existing record systems and create the need for improved ones, as the case of Chile highlighted. However, some continuing professional development programmes do not have a sequenced course with assessment at the end and are more like open learning. In these circumstances, appropriate measures need developing to find out what the participation rates are and what they signify and what kinds of record keeping would be both manageable and informative.

We need to know more about effectiveness and the impact of programmes on teaching and learning. For some distance education providers, their task ends at the point of delivery. For others, like Brazil's A-Plus programme, delivery is the starting point for further activities. So we need to learn more about different kinds of outcomes and the kinds of linkages between programmes and outcomes and the translation of things learned by teachers into improved teaching, and ultimately, improvements in children's learning. We also need to know more about the benefits and drawbacks of different options and outcomes in deploying resources and focussing effort in teacher education, not just within initial teacher education or continuing professional development, but in the balance between them. We need to keep monitoring and evaluating applications of ICT in teacher education in order to build a realistic picture of its strengths, limitations and costs and to identify effective strategies for introducing it.

We need to find out more about the policy environment of distance education for teacher education, both within teacher education and in relation to the wider environment of regulatory telecommunications or media policies. Some countries, in their policies and plans, have distance education as an explicit strategy for training teachers. Others have no mention of it and continue to think within the box of traditional models and customary allocation of resources while unable to meet pressing needs. Some of the traditional models no longer fit new needs. So we need to learn more about effective and enabling policies for the provision of teacher education using distance education.

Finally, we need to find out more about the evaluation of teacher education through distance education: the methods and approaches that would be most useful as well as manageable, the kinds of practices that already take place, the tools that would be useful and ways of evaluating programmes to take as much account of teachers' voices in remote village schools as of specialist curriculum developers in capital cities. As distance educators, we also need to find better ways of disseminating what we already know.

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