



COMMONWEALTH *of* LEARNING

Teacher Education: the Role of Open and Distance Learning

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September 2010



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The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to encourage the development and sharing of open learning and distance education knowledge, resources and technologies.

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Published by:
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Preface

In recent years the Commonwealth of Learning (COL) has convened an annual meeting with partner agencies working in the field of teacher education. Its purpose is to share updates on our activities and to explore ways of expanding and improving teacher education, notably through the use of new approaches and technologies.

The 2010 meeting was convened in Vancouver on July 26th by COL's Education Specialist for Teacher Education, Dr. Abdurrahman Umar. It brought together representatives of the Commonwealth Secretariat, the Central Institute of Educational Technology (India), the Joint Board of Teacher Education (Jamaica), the Ministry of Education of Sri Lanka, the National Commission for Colleges of Education (Nigeria), the University of Papua New Guinea, the UK Open University (TESSA programme), UNESCO, UNICEF and COL.

During their discussions members of the group noted a widespread lack of awareness within Ministries of Education about alternative approaches to teacher education. In particular, the major role that open, distance and technology-mediated learning has played and continues to play in both pre-service and in-service education is not fully appreciated.

To apprise Ministries of Education and the wider higher education community more fully about the potential of these alternative methods, the partners agreed that the Commonwealth of Learning should commission a short critical review of the role of open and distance learning in teacher education worldwide. They believe that this information will be helpful in governmental and institutional policy making.

COL commissioned one of its honorary fellows, Dr. Hilary Perraton, who is recognised internationally as an authority in the field, to conduct the review. I welcome his very thorough report and am grateful to UNESCO for giving me the opportunity to present it as part of the programme of 2010 World Teachers' Day on October 5th.



Sir John Daniel
President and Chief Executive Officer
Commonwealth of Learning

1. Introduction

The world still needs more and better teachers. Despite progress made since the Dakar conference on education for all in 2000, some 57 million children may still be out of school in 2015. And “denying children an opportunity to put even a first step on the education ladder puts them on a course for a lifetime of disadvantage” (UNESCO 2010: 54-5). Governments have responded by adopting a variety of strategies of which open and distance learning is one.¹ It is relevant to four problems confronting schools, the teaching profession, and ministries of education.

First, there remain shortages of teachers. Teacher numbers barely kept pace with rising pupil numbers in the 1990s. Second, in many but not all countries female teachers are in a minority which, in some cultures, holds back the enrolment of girls. While progress has been made since 1990, women made up only 45 per cent of primary school teachers in south and west Asia and only 44 per cent in subsaharan Africa in 2007. Third, even where there are enough teachers too many of them are untrained or undertrained. In 2001 it was reported that “About half of the teachers in developing countries are unqualified in terms of their own country’s formal standards for teachers’ education. Many teachers have little more than secondary education themselves. Teaching methods are often old fashioned, with too much focus on rote learning” (DfID 2001: 9). Fourth, many countries want to change teachers’ jobs as their host societies are changing: inclusive education, education for democracy, education for the information age, political transformation, all make new demands on the teaching force.

2. Teacher education: purpose and content

In comparing international experience it is useful to draw two distinctions: first between the initial education and training of teachers and their continuing professional development, and second between preservice and inservice activities. The two sets of distinctions do not overlap: while many teachers are trained before they start their service, others begin work without teaching qualifications and get their initial training inservice. Programmes of continuing professional development have been offered for various different purposes that include raising the skills of the teaching force generally, supporting curriculum development, and enabling teachers to undertake new roles. In practice, some of these distinctions may be blurred: in Pakistan, for example, a Primary Teachers Orientation Course was run in the interests of curriculum reform, served as continuing professional development for many teachers, but provided initial training for unqualified teachers already at work. The purposes of teacher education are set out in Table 1.

Table 1: Purposes of teacher education programmes

<i>Categories</i>	<i>Subcategories</i>
<i>Initial training</i>	
May be preservice or inservice	Post-primary
	Post-secondary
	Postgraduate
<i>Continuing professional development</i>	
Upgrading of teachers who already have a qualification	For subqualified teachers
	For qualified teachers
Reorientation of teachers for curriculum change	
Teachers’ career development	For classroom teachers
	For educational leadership (e.g. head teachers)

Teacher education generally includes four elements: improving the general educational background of the trainee teachers; increasing their knowledge and understanding of the subjects they are to teach; pedagogy and understanding of children and learning; and the development of practical skills and competences. The balance between these four elements varies widely. An early distance-education programme in Kenya, for example, concentrated on raising teachers’ own educational background, seen as the highest priority. A much more recent

programme in Chile, designed to support the increasing use of information technologies in schools, was entirely concerned with reorienting teachers for the changed curriculum. Strengthening teachers' practical classroom skills has often been seen as a priority, but as one that is administratively difficult and likely to be costly to achieve.

3. Open and distance learning for teachers

The evidence on open and distance learning for teachers goes back two generations. In 1963

“Nearly 200,000 children of Palestinian refugees were in primary or lower secondary schools, where they were taught by 4,648 teachers. But of these only 450 had received any teacher training; most had done a course of secondary education and nothing more. ... The United Nations Relief and Works Agency looked at the problem and saw that it could not be solved by the classic method of pre-service training: if you took the teachers out of the schools to train them, you would have to replace them with less experienced, and no better qualified, teachers. So it was necessary to devise a kind of in-service training that was as good as pre-service.

In 1963 UNRWA and Unesco set up a joint Institute of Education to do the job. All students were sent correspondence lessons which covered both academic subject matter and teaching methods. They had written assignments once a fortnight which were based both on their correspondence lessons and on their classroom experience. ... These assignments ... were used mainly as the starting point for fortnightly seminars organised by the 20 field supervisors on the staff of the Institute.”

Young et al. 1980: 28

The programme was successful in reducing the proportion of untrained teachers from 90 per cent to 9 per cent within five years. It illustrates methods that have been widely replicated: students are able to work at a distance, without attending an institution; they submit assignments and get guidance from a tutor on what they have written; in some cases opportunities for face-to-face teaching and discussion are built into the system. While the UNRWA/ UNESCO programme was soon used as an exemplar for a handful of projects in southern Africa, open and distance learning remained for most educators at the fringes of educational practice. International legitimacy came with the founding of the Open University in Britain in 1969, and its demonstration that it could produce graduates whose degrees were accepted on a par with those of conventional universities. Within 25 years there were more than 25 open universities, seen by governments as a useful tool of educational expansion and an established part of the education service.

Their activities, and those of comparable institutions, have built up a body of experience from which we can draw a threefold case for the relevance and legitimacy of open and distance learning. First, the record of open universities and dual-mode universities, teaching both conventionally and at a distance, shows that students can achieve results comparable with those of conventional institutions. Second, distance education has been powerfully effective in reaching large audiences who could not meet their educational needs by attending conventional institutions. Third, where open and distance learning offers opportunities for student interaction with tutors, it allows open-ended dialogue, often regarded as the touchstone of legitimate education (cf. Perraton, Creed and Robinson 2002: 12).

Arguments of this kind have been sufficiently persuasive for open and distance learning to be used for the various forms of teacher education identified in Table 1.

4. Initial teacher training through open and distance learning

Open and distance learning has been used for the initial training of teachers who enter programmes with primary, secondary or tertiary qualifications.

With the exception of the programme for Palestinians (see above) the early and documented examples are from sub-Saharan Africa. Newly independent countries that include Botswana, Kenya, Malawi, Swaziland and Uganda launched distance-learning projects in the 1960s, with student numbers usually in the hundreds. Their common aim was to respond to the shortage of primary-school teachers, often by raising the capacity of trainee teachers

who had themselves no more than primary schooling. They followed a similar pattern, using a combination of correspondence teaching, radio programmes and some supervision of teaching practice. College tutors would, in principle, visit trainees in their classrooms to guide and strengthen their teaching practice. Where data are available we know that these projects had high pass rates of between 83 and 97 per cent which can be attributed in considerable part to the promise of a salary increase on completion. The projects were generally seen as one-off activities designed to eliminate untrained teachers from the system. Kenya followed a slightly different approach in basing its programme for unqualified teachers in a correspondence unit at the University of Nairobi and concentrating just on the general education of trainees (Young et al. 1980: 29-34; Perraton 2007: 60-1).

About a decade later, Tanzania, Zimbabwe and Nigeria demonstrated that it was possible to use open and distance learning on a larger scale, again to expand primary education. Tanzania calculated that it needed an extra 40,000 teachers although existing teachers' colleges could produce only 5,000 new teachers a year. To make up the shortfall secondary-school leavers were recruited to be trained on an apprenticeship model, partly on the job and partly through distance education. Trainees were posted to schools, given a reduced teaching load, and trained through correspondence courses backed by radio programmes. Their classroom practice was supervised and tested and the programme ended with a six-week residential seminar. 38,000 trainees completed the course and passed their examinations. Zimbabwe followed a similar approach after independence, recruiting 7,400 trainees to its ZINTEC project of whom 80 per cent passed the course and gained their qualification. Similar projects have continued in other countries, often on a one-off basis. Malawi, for example, used open and distance learning for teacher training from 1997 to 2004 (Lewin and Stuart 2003, Mulkeen 2010: 75) and is reported to have started using it again. In an organisationally different approach Nigeria set up a single-purpose, distance-education, National Teachers Institute in 1976, which has become a permanent part of the federal education system. It has been involved both in initial training and in upgrading qualified teachers (Bako and Rumble 1993, Perraton 2007: 64-5).

Post-conflict countries have used open and distance learning to overcome teacher shortages. Rwanda, for example, has trained secondary teachers at a distance through the Kigali Institute of Education (Mukamusoni 2006). As Uganda was coming out of war, it began to experiment with distance education as a way of upgrading serving but untrained teachers. The Northern Integrated Teacher Education Project ran from 1993 to 1997 in northern Uganda where it integrated its distance teaching with the work of ten conventional teachers' colleges where trainees attended two residential courses each year. They also attended twice-monthly tutorials and got help, guidance and support from tutor-counsellors. In contrast with the Nigerian and Tanzanian examples, the programme gave relatively heavy weight to pedagogy, which took up about 40 per cent of the time, with subject matter knowledge taking up most of the other 60 per cent. About 88 per cent of students completed the course which had a pass rate of about 75 per cent (Wrightson 1997, Perraton 2000: 69-70).

The establishment of open universities has provided a mechanism for large-scale programmes of initial teacher training. In China, for example, 11 per cent of primary and secondary school teachers were unqualified in 1998 but were able to qualify through the China Television Teachers' College. Between 1987 and 1999, 717,300 primary teachers gained certificates and 552,000 secondary teachers gained diplomas. As the title implies, the college made heavy use of satellite television but has moved towards multi-media packages (Zhang and Niu 2007, Perraton 2007: 67). The Open University of Tanzania runs programmes for teachers using a different organisational mechanism from that used in the earlier project. Britain, too, has used its Open University as a means of initial teacher training. In 1994, with a government grant, it introduced a postgraduate certificate in education for graduates who wanted to teach in primary or secondary schools. In order to facilitate computer conferencing students were provided with a computer, but the course also made use of printed materials. The course was school-based and students spent thirteen weeks doing teaching practice which was supervised by a mentor from the school staff. Examination success rates, and the achievement of qualified teacher status, were in the range 71 to 77 per cent for the first five cohorts. The primary level version of the course was criticised by the Office for Standards in Education (a national inspectorate) and subsequently abandoned by the university but the secondary-level version has continued. (Walker 2007).

To sum up, open and distance learning has been widely used for initial teacher training, for students who enter the profession with a background in primary, secondary or tertiary education, but has often been organised on a one-off basis rather than as part of the established structure of teacher education.

5. Continuing professional development through open and distance learning

Programmes of continuing professional development have been used for upgrading teachers, to help support curriculum development and for teachers' individual career development. Some have been structured, with a formal system of enrolment and regular study, some unstructured, providing opportunities for teachers without any enrolment requirements.

5.1 Teacher upgrading

Open universities, particularly in Asia, have provided a mechanism for reaching large audiences of teachers. In India they have seen teacher education as a priority: a third of students at Yashwantrao Chavan Maharashtra Open University, for example, were teachers (Manjulika and Reddy 1996: 101-4). In Indonesia government raised the level of the qualification needed for primary-school teachers with the result that some 273,000 teachers needed an upgrading course. The Indonesian open university, Universitas Terbuka, responded with a distance-education programme using printed materials, radio and television, which had three elements: general education, the subject knowledge that trainees were teaching in school, and pedagogy. By 1996 over 76,000 students had graduated from the course, while 244,500 were still enrolled in it (Asian Development Bank 1997: 363). In a programme that ran for more than twenty years the federal ministry of education in Pakistan used the Allama Iqbal Open University to provide inservice education on a new curriculum for primary-school teachers. The university's Primary Teachers Orientation Course was launched in 1976 and, in its initial ten-year phase, reached nearly 84,000 teachers; 56 per cent of these completed the course and 38 per cent qualified for a university certificate. By 1999 a further 50,000 teachers had been recruited on to a revised course which had a higher completion and pass rate (Perraton 2007: 68-9, Allama Iqbal Open University 1999: 38).

Different mechanisms have been used in other parts of the world. In Brazil, for example, an unstructured programme "A-Plus" was developed by a consortium including the non-profit television channel, TV-Futura. The programme has three elements: broadcasts, a printed magazine to support them, and a network of community officers to visit schools. In 2001 some 40,000 teachers were involved with the programme while the general audience for the television programmes was estimated at 2 million. A-Plus was intended to influence classroom practice:

"Unlike the majority of teacher training programmes, A-Plus allows teachers to observe, discuss, probe and interact with what other teachers are doing or trying to do. In general, teacher training is confined to situations in which teachers are exposed to theories about teaching, abstract discussion about general issues, or are being directly taught. Seldom do they have the opportunity to watch and interact with their peers – a fundamental tool for the creation of a learning community."

Oliveira 2007: 101

Teacher upgrading has also formed a component in programmes of curricular change.

5.2 Curricular change and innovation

Open and distance learning has been used both for projects affecting the whole of the curriculum and for narrower purposes.

Mongolia, China and South Africa illustrate approaches that have been used for major curricular change. As Mongolia changed from being a one-party state in the 1990s it introduced new curricula and teaching approaches and ran a radio-based project to reach teachers throughout the country. Radio programmes, appropriate for the country's scattered population, were backed by print and some residential sessions; by 2000 the programme had reached over half of the country's primary teachers (Robinson 2007). A wider range of media was used in the Gansu Province of China, in a basic education project run through cooperation between the government and the European Union. The aim was to support curriculum reform, upgrade underqualified teachers and use communication technologies as a means of modernising education. The project reached over 100,000 teachers and was organised through 686 teachers' learning resource centres, equipped to allow for the use of satellite television and computer

resources. Staff members were trained to provide face-to-face support for teachers (Robinson and Yi 2009). South Africa has used a range of technologies as it reformed its curricula. The Shoma Educational Foundation, whose origins lay in educational broadcasting, worked with two universities to provide satellite television broadcasts for teachers which were backed by computer-based lessons. The project's aims included developing teachers' computer literacy and helping them adapt their teaching strategies to new curricula (Capper 2002). South Africa has also used radio for schools, with teacher development as a by-product. Techniques of "Interactive Radio Instruction", developed internationally over twenty-five years, were adapted in South Africa after transformation and used to strengthen teaching in English. Radio lessons were interactive in encouraging learners to respond to the broadcasts, taking an active - and noisy - part in the classroom. Between 1994 and 2000 the numbers reached grew from 14,500 to 680,000. While seeking to strengthen classroom teaching, the Open Learning Systems Educational Trust (OLSET) also saw its work as a means of offering inservice teacher education (Potter 2007).² Zambia followed suit and launched a comparable radio project "Learning at Taonga Market", addressed to both in-school and out-of-school audiences which was reaching 74,000 learners by 2006 with the prospect of being extended to all Zambian schools. As in South Africa, the programme provided support to teachers as well as teaching their pupils. (Sitali 2008).

Distance-teaching techniques have also been used to support curricular change in individual subjects and have played a major role in familiarising teachers with information and communication technologies. We have evaluation data, for example, from Chile's *Enlaces* project which used a web-based course to enable primary and secondary-school teachers to use information and communication technologies in their teaching. The programme was demanding, requiring over 1,000 hours of study spread over fifteen months, and led to a university diploma (Cerdeña et al. 2007).

5.3 Career development

Open and distance learning has been used to support teachers' career development both through structured programmes, designed for specific groups of teachers, and by providing opportunities for individual teachers to raise the level of their own qualifications. Highly targeted programmes have been used for teachers who have gained, or are seeking, a new role. In Burkina Faso, for example, with the aid of the international network RESAFAD, three cohorts of head teachers were trained between 1997 and 2001. The project used printed materials linked with face-to-face seminars, appropriate for the more remote teachers in villages without mains electricity or telephones (Terret 2007). In India, a number of targeted programmes have been run by open universities. The Indira Gandhi National Open University, for example, offered a programme in child guidance, for teachers wanting to specialise in guidance and counselling (Mehrota 2007). Larger numbers of teachers, seeking higher qualifications in their own career interest, have been enrolled by open universities on BEd and MEd courses. Universities have increasingly made online courses available internationally with the result that some teachers are now pursuing a crossborder degree. The University of London's Institute of Education, for example, offers a master's degree in education: one cohort of its students who were studying through a partnership with the Aga Khan University in Pakistan and were funded through a scholarship programme, achieved a remarkable 100 per cent success rate. They took the master's course over two years, studying online, with a one-term full-time residential component in London towards the end of the period (Anderson et al. 2006).

6. Open educational resources

Since the Massachusetts Institute of Technology announced that it was making its teaching materials freely available on the internet, there has been considerable interest in the possibility of using open educational resources at various levels of education. As one of the constraints on the development of open and distance learning is the need to invest in the development of teaching materials, there is a case for the sharing, or cooperative development, of materials. They can be used both for open and distance learning and as resources within conventional teaching institutions.

Two examples illustrate its potential for open and distance learning. First, in the late 1990s, the Commonwealth of Learning worked with teacher-training authorities in southern Africa to develop teaching materials in science, technology and mathematics. The materials were in due course uploaded on to the World Space satellite but it appears that little use was in practice made of them (Kanwar, Kodhandaraman and Umar 2010: 68-9). More recently a consortium of fifteen educational institutions in Africa, together with the Open University in Britain, the BBC and the Commonwealth of Learning, has set up a Teacher Education in subsaharan Africa project (TESSA). Its aim, over

a planned ten-year period, is to develop open educational resources and make them available free of charge on the internet, to be adapted and used within teacher education. Much of its energies have been given to the development and adaptation of teaching materials at workshops throughout Africa; intended to strengthen the teaching of universities and colleges that are themselves training teachers. TESSA has worked principally with universities and has involved anglophone, francophone and Arab-speaking Africa (Thakrar, Zinn and Wolfenden 2009, Wolfenden et al. 2010).

7. Technologies

In a rapid evolution, open and distance learning has changed and has embraced a changing mix of technologies. These have been used for two purposes: to distribute teaching material to learners, and to allow interaction between learner and tutor or among learners. Print, used as the main teaching medium from the days of the UNRWA/ UNESCO Institute, has remained a staple and printed materials are still used even for online courses, for learners with restricted internet access. Radio and television have been valuable in reaching large audiences and in providing an immediacy and a stimulus. Both print and broadcasts can be used to provoke responses by students but are necessarily one-way media. In contrast, face-to-face contact has proved its worth in maintaining learners' interest, in promoting dialogue and, crucially for teacher education, in allowing for the supervision of teaching practice.

Computer-based technologies have been used with four different functions in teacher education. First, they have been used to distribute teaching materials, avoiding mailing costs or the time constraint of broadcasts, though transferring reproduction costs from the teaching institution to the learner. Second, computer-based learning allows simulated two-way communication. Third, where there is internet access, learners can communicate with their tutors or with fellow students, taking part in e-learning. Fourth, teachers or trainers with internet access, can download and use open educational resources. We return, below, to the differing cost implications of these uses.

The extent to which it is practicable to use the more sophisticated communication technologies depends on the state of development of the technology within the country concerned. In Burkina Faso, print and meetings of head teachers were the only feasible technology; radio was appropriate for the scattered audience in Mongolia; in contrast China's technological development meant that it was feasible to use video, satellite television, and internet links to support teacher education in Gansu.

8. Outcomes, effectiveness and quality

The range and variety of international experience should make it possible to assess how effective open and distance learning has proved, and how it compares with conventional alternatives.

But there are a number of difficulties in the way. Some developing-country studies have found little difference in effectiveness between trained and untrained teachers (Torres 1996: 449; UNESCO Institute for Statistics 2006: 54). Recent industrialised-country data have found little evidence of the impact of qualifications on teacher effectiveness (e.g. Rivkin, Hanushek and Kain 2005). And the assessment of effectiveness is not straightforward: it would be inappropriate to use the same criteria for programmes that were just concerned with teachers' own academic education as for those concerned with teaching practice. Criteria for assessment in their turn depend upon contested educational values. In South Africa, for example, conventional indicators have been seen as inappropriate and "democratic values, safety and non-violence are possibly the most important measures of the effectiveness of schools and school systems" (Fleisch 2007: 343). Data on measures of this kind are not easy to collect. Similarly, data may lack information on gender, crucial if the availability of education to girls is to "be taken as a central index of educational quality" (Welch 2000: 7).

We would like to be able to relate teachers' own training to the eventual outcomes of their own pupils. But few studies do this. And there is no simple way of evaluating the contribution of teacher education when it is one component of a broader programme of educational reform. In practice, three kinds of measure have been used in evaluating programmes of teacher education: the audience reached, completion or qualification rates or occasionally measures of learning gain, and evidence on teachers' performance in the classroom. Summary details and references are in Table 2.

Table 2: Outcomes and costs of some teacher education projects

currency: constant 2005 US\$

<i>Project, date, purpose^a</i>	<i>Numbers</i>	<i>Outcomes</i>	<i>Costs</i>
INITIAL TEACHER TRAINING			
<i>Botswana, Swaziland, Uganda</i> Inservice upgrading of unqualified primary school teachers 1967-78	Each in range 600 to 1,000	Successful completion rate 88-93%. Anecdotal evidence of impact on classroom performance	n/a
<i>Kenya</i> Programme for unqualified primary school teachers, to improve general educational background and achieve secondary examination passes 1967-73	8,433 over 7 years; annual enrolment 850 to 2,000	91% passed examination and gained promotion. No firm evidence on classroom performance.	Cost per enrolment relatively high in comparison with alternatives
<i>Tanzania</i> Training of primary school teachers for introduction of Universal Primary Education 1976-84	45,534 in three annual cohorts	83% qualified. Positive evidence on classroom performance. Weaknesses in science teaching and self-confidence among female teachers	Cost per successful trainee about half cost of residential course
<i>Zimbabwe</i> Integrated Teacher Education (ZINTEC) for secondary-school leavers, trained on the job for expansion of primary schooling 1981-8	7,353 over four years	80% pass rate. Positive evidence of classroom performance but difficult to draw comparative conclusions	n/a
<i>Nigeria</i> National Teachers' Institute training primary school teachers TCII course after 2 years secondary education 1984-90 NCE course after 5 years 1997-2000	186,713 over period Enrolment of 14,909 on 1st cycle and 26 657 on 2nd cycle	Success rate thought to be in range 25 to 30% of those entering; compares favourably with alternative; no evidence on classroom practice 21,000 students graduated 1994	Cost probably lower than conventional college
<i>China</i> Courses for unqualified primary and secondary teachers from China Television Teachers' College 1987-99	n/a	717,300 primary teachers gained certificates; 552,000 secondary teachers gained diplomas	Cost per graduate for parent university reported at 1/3 to 2/3 cost at conventional institutions
<i>Uganda</i> Northern Integrated Teacher Education Project for primary school teachers 1993-95	3,128 enrolled	88% completed course; 57% of original enrolment passed examination; some evidence of improved skills in teaching competencies	Cost per student about \$2,000 compared with \$2,500 in conventional college
<i>Mongolia</i> UNICEF inservice teacher education radio and print based project 1994-2001 ^b	>5,000	Reached half of country's primary school teachers. No formal evaluation but anecdotal evidence of effectiveness	n/a
<i>United Kingdom</i> Open University postgraduate certificate in education 1995-2--1 ^c	6,272	Annual successful completion rate 71-77%; primary level course criticised by inspection agency and withdrawn; survey of 3 cohorts showed 98% of graduates entered teaching	Cost of course fixed at same level as conventional course at \$7,160. Government saved on costs of student grants available for conventional teacher education
<i>Malawi</i> Inservice Integrated Teacher Education Programme 1997-2000	Aimed at 18,000 untrained teachers with annual cohorts of 7,500	Apparently no formal evaluation	Cost per student \$654. Cost of two-year full-time training would be 3 to 4½ times as expensive

<i>Project, date, purpose^a</i>	<i>Numbers</i>	<i>Outcomes</i>	<i>Costs</i>
CONTINUING PROFESSIONAL DEVELOPMENT			
<i>Pakistan</i> Primary Teachers Orientation Course (Allama Iqbal Open University) introducing new curriculum to primary school teachers 1976-86 New PTOC 1991-8	83,658 total 50,138 enrolled	56% completed course; 38% of original enrolment passed examination; Positive self-report on usefulness. No direct evidence of classroom effects 79% completed, 66% of original enrolment passed	\$128 to 178 per successful completer. AIOU graduate costs 45-70% of conventional university costs
<i>Indonesia</i> Universitas Terbuka upgrading course for lower secondary teachers 1985-	c 5,000	Positive effects on subject mastery and in theory and practice in skills; relatively poor results in mathematics; apparent decline in attitudes towards teaching	Cost about 60% of equivalent
<i>Sri Lanka</i> National Institute of Education training primary school teachers with secondary level qualifications 1983-88	c 5,000	Positive effects on subject matter and in theory and practice in skills; less successful than conventional college in mathematics	Cost one-sixth to one-third of alternative
<i>Brazil</i> A-Plus television-based programme of continuing education for teachers	TV audience of 13 million; 40,000 teachers have participated in training activities	Anecdotal evidence that programme seen as useful by teachers	Annual unit costs around \$20 per teacher, <10¢ per viewer per programme
<i>Burkina Faso</i> Professional development of head teachers 1997-2000	1,275 head teachers	High completion rate. Positive self-report and some evidence of more efficient school management	Costs lower than face-to-face alternative
<i>India</i> Indira Gandhi National Open University Certificate in Guidance course 1993-2001 ^d	700 p.a.	No formal evaluation 16% successful completion rate	Cost per student \$91
<i>Chile</i> Diploma in Information Technology course 1997-2000 offered online in support of Enlaces project ^e	100 p.a.	49% completion, 44% pass rate. No formal evaluation. Anecdotal evidence of effectiveness	Student fee \$971
<i>South Africa</i> Shoma Project 1998-2002 using satellite television and computer based learning for teacher upgrading ^f	13,500	Informal evidence and self report of teachers adapting new approaches. Dropout rate 30%	Cost \$218 per teacher for 24 week course; no direct comparison made
<i>China</i> EU China Gansu Basic Education Project 2001-6 ^g	103,550 teachers	1,648 teachers gained diplomas 89,239 doing backbone or school-based teacher training 9,588 head teachers trained Some evidence of changes in classroom practice	Project cost \$18.4m ^h
<i>Pakistan/Britain</i> Online MA in education of the Institute of Education, University of London in partnership with Aga Khan University 2004-5 ⁱ	20	100% graduation rate	Cost about 2/3 cost of full-time residential course in London

Source: This table is mainly adapted from tables 4.8 and 7.4 in Perraton 2007 except where shown.

Notes: a. The dates shown refer to the data quoted and not necessarily the duration of the project. b. Robinson 2007. c. Walker 2007, assuming his costs are at 1998 prices and using US CPI deflator. d. Mehrota 2007 with similar assumptions on costs as in (c). e. Cerda et al. 2007 and Perraton 2007: 71. f. Capper 2002 and Perraton 2007: 71. g. Robinson and Yi 2009. h. This treats the project cost of €17m (Robinson and Yi 2009: 98) as at 2002 prices, deflated using US CPI. i. Anderson et al. 2006

8.1 Reach

In terms of numbers, open and distance learning has a positive record. The early programme in Tanzania, for example, reached 45,000 teachers, nine times the annual output of conventional teachers' colleges. In Pakistan the first phase of the Primary Teachers Orientation Course reached over 83,000 and the second phase over 50,000. Over a period of twelve years distance-teaching methods enabled over a million teachers to gain qualifications. Both China, where television programmes were estimated to reach 2 million teachers, and Brazil, with an estimated audience of 1.3 million for A-Plus, have demonstrated the power of television as one component of large-scale open and distance learning. Speed may be as important as well as reach. The project in Mongolia made it possible to reorient teachers much more rapidly than would have been possible through the conventional approach of using residential summer courses in the capital city.

Large numbers may not be the appropriate indicator of reach. The early programmes in central and southern Africa, for example, had student numbers in the hundreds, but these were significant in relation to the size of the teaching force at the time. While the programme in Burkina Faso had an audience of only 1,275, this amounted to a quarter of the total number of head teachers in the country.

For some programmes, and in particular for unstructured programmes that are attempting to raise teachers' skills without enrolment on a formal course, measures of reach may be the only available indicator: the students in Mongolia, for example, or teachers using OLSET materials in South Africa, were not following a structured course leading to an examination. Similarly, statements from the TESSA project have used the expected number of teachers using their materials as an indicator of outcomes. Although higher figures had been cited in earlier forecasts, recent evidence shows that its materials were in use in nineteen programmes and that 303,300 teachers were enrolled in programmes that made some use of TESSA materials (Wolfenden et al. 2010).

Unfortunately studies of audiences have seldom provided information on gender that would enable us to compare the gender breakdown of enrolments with those of teachers in the system, or of participation in conventional teacher training.

8.2 Success rates

There is mixed evidence on examination, completion or retention rates for formally organised programmes, which fall into three categories. First, high success rates have been reported for programmes of initial teacher training that led to a qualification, usually with a guarantee of employment or better pay. These programmes often included at least three of the components of teacher education, including subject knowledge, pedagogy and teaching practice. Completion rates of 83 to 97 per cent in early projects in central and southern Africa, 84 per cent in Tanzania, 80 per cent in Zimbabwe and 66 per cent in Uganda were reported. In the industrialised world, alongside pass rates around 75 per cent, the Open University found that the proportion of graduates employed in the teaching force one year after graduation was similar to the national average for conventionally trained teachers (Walker 2007: 77-9). Alongside these results we can put evidence on learning gain reported from Indonesia and Sri Lanka which confirmed the effectiveness of distance education, while finding face-to-face education at some advantage in mathematics but not in languages (Nielsen and Tatto 1993).

The figures on success rates contrast with those achieved in a second category where programmes of initial teacher training amounted to an alternative form of secondary education. Many of the students at the National Teachers' Institute in Nigeria were following a preservice course with a success rate of between 25 and 30 per cent. These were young people who had not succeeded in getting into conventional secondary schools and were pursuing this as the only realistic alternative. The success rate is closer to that for out-of-school secondary-school systems than those achieved by trainee teachers on inservice courses.

The third category of results, from courses of continuing professional development, are more varied. They may be explained by learners' making a careful balance between costs, in time and money, and reward. The Burkina Faso head teachers achieved a high completion rate on a course with modest demands on their time and with the costs being met by funding agencies. In contrast only 44 per cent of teachers on the information technology course in Chile graduated: it made heavy demands on students' time, they had to pay their own fees, and the qualification awarded was a diploma not a degree. In India only 16 per cent of students on a certificate course in child guidance, completed the course and gained the qualification. With limited student support they had to pay their own fees and

needed to put in 480 hours of study; the certificate brought no assurance of promotion or better pay. At the other extreme, the cohort of students from Pakistan, on the London online master's course, with their 100 per cent success rate confirmed the strength of the model: strong student support, removal of worries about funding, the prospect of obtaining a respected qualification, and a mix of distance and face-to-face study.

8.3 Teachers' performance

Unfortunately we have little information on the key question: how did teachers perform in the classroom? Few projects or programmes have included formative evaluation or attempted to follow learners into the classroom. Tanzania and Zimbabwe were exceptions:

"In Tanzania, students trained at a distance tended to perform better than those trained conventionally on a number of measures of classroom performance but rather worse academically and in their command of the subject matter. While it was not possible to make this kind of comparison in Zimbabwe, studies of teachers' classroom effectiveness showed positive results while the examination performance of pupils taught by ZINTEC teachers were in line with the national trend."

Perraton 2007: 75

Beyond this we have some qualitative evidence. In Gansu Province evaluation identified "changes, such as in teaching approaches, teachers' attention to their professional development, school management and 'mindset' (a word frequently used in reports). There was some evidence, though not systematic, that classroom practices were changing as a result of the project" (Robinson and Yi 2009: 103). Teachers in Pakistan reported positively on the usefulness of their orientation course and there is evidence that school heads saw no differences between the performance of teachers trained by Allama Iqbal Open University and those trained conventionally (Daniel 2010: 155) There is also anecdotal evidence that the A-plus programme in Brazil was seen as useful and valuable by teachers; there were positive self-reports and some evidence of improved school management in Brazil (Oliveira 2007).

8.4 Quality

In assessing how far open and distance learning can raise educational quality, the evidence on effectiveness is thinner than we would like, but so it is for many conventional programmes of teaching education. The evidence is particularly thin on the use of the newer information and communication technologies where, despite grand claims, we have little hard evidence. To sum up, the evidence confirms that open and distance learning can reach large audiences, and can do so quickly. It has been used by governments to meet the needs of significant proportions of their teaching force. High satisfactory completion rates have been reported for programmes of initial training where teachers were motivated by the prospect of improved status and more pay. There is a much more mixed record for programmes that amounted to secondary-school equivalence and for programmes of continuing professional development. Anecdotal and qualitative evidence, and a small number of research studies, show that it has played a role in raising the quality of school systems and of classroom performance.

Looking at the evidence more broadly, it is reasonable to assume that strengthening teachers' education should improve their performance. In a classic study, based in part on experience in the Pacific, Beeby warned that the teacher with a minimal education was "always teaching to the limits of his knowledge. He clings desperately to the official syllabus, and the tighter it is the safer he feels. Beyond the pasteboard covers of the official textbook lies the dark where unknown questions lurk". Educational change and advance depend on having an education that goes beyond this (Beeby 1966:61). More recently the expectation that teachers should become reflective practitioners, able to examine and improve their own practice, makes increased demands on their education. Rich-country study evidence reinforces the conviction that better education should produce better teachers. By comparing policies within the United States, for example, researchers found "that the states leading the nation in student achievement and those that have made the most significant gains in achievement are *the states that have the most highly qualified teachers and that have made consistent investments in teachers' professional development*" (Russell and McPherson 2001: 8).

Theory and practice confirm that where open and distance learning for teachers is successful, we can expect it to raise the quality of education.

9. Costs and economics

In a number of cases the cost data make it possible to draw a direct comparison between open and distance learning and conventional teacher education (see Table 2). They show that, with the relatively large audiences attracted to teacher-education programmes, and high success rates, costs per successful student have often been lower than those for conventional teacher education, giving open and distance learning an economic advantage. While there is significant variation, we can summarise that costs per successful student have been achieved at between one third and two thirds of those for conventional teacher training. (At the same time, some distance-education projects were probably too small to show economies of scale: projects with enrolments in the range 500 to 3,000 have been seen as at risk of costing more than conventional education (Perraton and Potashnik 1997: 21))

Greater economies than this are not to be expected: where supervision of teaching practice is a component of a distance-learning project, its variable costs, which rise with the number of trainees, inevitably keep up the cost per student. In Malawi, for example, greater economies were achieved in the MIITEP project but it suffered because of the weakness of student and classroom support (Lewin and Stuart 2003: 83-4). In contrast, supervision of teaching practice was a major component of the early project in Tanzania which meant that the variable costs of the project were high. Similarly, the Open University committed 25 per cent of its budget to mentoring and passed this over to trainees' schools.

We can draw three further conclusions. First, cost analyses have shown that the unit costs of any programme are likely to be a function of the size of the audience, the amount of student support including supervision of teaching practice, and the sophistication of the technologies used. With large numbers, the high fixed cost of television, for example, can be shared between large numbers so that the cost per learner of programmes like A-plus in Brazil was kept low. As the examples quoted have shown, the variable cost of good student support tends to keep up unit costs. On technologies, industrialised-country experience suggests the range that is likely to be incurred as one moves from the simplicity of print to the complexities of computer-based communication. European distance-learning projects found that costs were likely to double as one went from print to placing printed materials on the internet while costs could increase by 350 times as one moved to television. Table 3 shows the estimated relative costs for various levels of sophistication in producing teaching material. Costs to any one institution may be reduced if in practice it proves possible to make heavy use of open educational resources: we do not yet know if this is likely.

Table 3: Ratios between costs for course development

<i>European data:</i>		<i>American data</i>	
<i>Cost per student learning hour</i>	multiplier	<i>Cost for three-unit internet course</i>	multiplier
		Course outlines and assignments	x 1
Print	x 1	Text	x 2
Print placed on internet	x 2	Text with reference material	x 3
		Text with reference material and images	x 6.25
Audio	x 5	Audio and video	x 20
CD-rom	x 40		
Video	x 100	Simulations	x 42
Television	x 350	Virtual reality	x 167

Source: adapted from Hülsmann 2000:17, Arizona Learning Systems cited in Rumble 2004: 145

Second, in considering the internet and the use of other computer-based approaches it is important to distinguish between the use of technologies to distribute teaching materials and their use to allow interaction with students. Where the internet is used simply as a distribution mechanism, so that materials are put on the web rather than in the post, there is likely to be a saving to the institution, matched by an increased cost to the learner. But where the internet allows for increased communication with learners, staff costs are likely to rise. Thus, there

is a risk that the use of sophisticated information and communication technologies will increase both the fixed cost of producing teaching materials and the variable cost for student interaction (see Rumble 2004: 144-51). With satellite television and computer-based learning the Shoma project in South Africa bore this out with a cost per teacher of US\$218 (at 2005 prices) for a 24-week course together with a capital investment for each school of \$40,500 (Perraton 2007: 140; Capper 2002).

Third, comparisons between open and distance learning and conventional teacher education show that their patterns of expenditure can be expected to differ, as in Table 4. Open and distance learning is likely to have lower costs for residence, for stipends to students and for face-to-face teaching, but increased costs for teaching materials. The opportunity costs for the two approaches are likely to differ, from the standpoint of both learners and institutions. The fact that teachers are not taken out of the school while they study may have particular attractions for an employing ministry especially where trainee teachers on conventional courses are paid a stipend.

Table 4: Some differences in patterns of expenditure

	<i>Conventional methods</i>	<i>Open and distance learning</i>
Expenditure		
Residence	Likely to be a significant proportion of total costs	Cost likely to be reduced where students are in residence for smaller part of total study time
Grants, allowances	Often paid to full-time students	May be paid only for short periods of residence
Staffing	Staff time dominated by face-to-face teaching	A proportion of staff time required for development of materials and for tutoring at a distance
Materials, media, communication	Costs likely to be modest	Costs likely to be higher and influenced by sophistication of media chosen; economies of scale are possible
Student support	Level of expenditure determined by amount of field supervision provided	Significant expenditure often needed for isolated students and to supervise classroom work
Annualised capital	Cost of teachers colleges and facilities likely to be a major capital item	Some capital required for distance-education activities but offset by reductions in costs of college accommodation
Opportunity costs		
For students	Students forgo notional income by attending college	Teachers may forgo income from private tuition while studying
For ministry of education		If students teach while they study ministries avoid costs of funding their replacements
Income		
Student fees	Rarely charged	Are sometimes charged, especially where students are voluntarily upgrading their qualifications

Source: Based on Creed 2001

10. Conclusion

International experience has demonstrated that open and distance learning can be effectively deployed for teacher education. While it has often been regarded as a temporary expedient, adopted, dropped, and sometimes re-adopted, the evidence on its effectiveness is in fact robust enough for it to be developed and treated instead as a regular part of national systems of education.

Successful programmes have in common that students were motivated, that they benefited from good tutorial support, and that the logistics worked well. Logistics caused particular problems in relation to the supervision of teaching practice, and this has been a persistent theme from the earliest projects on. Conditions for success, and appropriate organisational structures, beyond the scope of this paper, are explored in more detail in UNESCO's *Teacher education guidelines: Using open and distance learning* (Perraton, Creed and Robinson 2002).

The record shows that distance-learning methods can be used for all four components of teacher education: for general education, to strengthen teachers' knowledge of the subjects they will teach, in teaching pedagogy and

child development, and as a guide towards good classroom practice. While the evidence is limited it is generally positive: teachers can learn through these methods, and high success rates have been widely reported. The evidence on costs shows that open and distance learning can be at an economic advantage as compared with conventional education, although it will not always do so. In their planning, administrators need to strike an appropriate balance between the educational arguments for using sophisticated technology and providing ample, individual, face-to-face support to learners and the economic arguments for containing costs, even for elements that are educationally attractive.

Notes

1. Distance education is 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 is an organised educational activity, based on the use of teaching materials, in which constraints on study are minimised in terms of access, or of time and place, pace, method of study, or any of these. "Open and distance learning" is used as an umbrella term to include both distance education and open learning. Open educational resources are defined as educational materials, made freely available through technology, for consultation, use or adaptation on a non-commercial basis.
2. OLSET was funded by external donors and, from press reports, closed down late in 2009 with the withdrawal of funds by the Netherlands government and allegations of financial irregularities. Evidence on its achievements are from independent studies and can be relied upon.
3. I am indebted to Freda Wolfenden and to Jane Cullen for an early sight of this paper.

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