

## **Teaching the teachers**

### **Hilary Perraton**

#### **Executive summary**

Many countries in sub-Saharan Africa have far fewer teachers than they need to achieve the goals of education for all by 2015. Many of the existing teachers have themselves had a limited background education and specialist teacher training. Existing colleges are not training enough teachers to fill the gap. Furthermore, conventional teacher training tends to be relatively expensive. Even where its content is similar to that of secondary education, its costs are often several times the cost of secondary education.

Distance education has been used to provide initial training for inexperienced teachers, initially training for experienced but unqualified teachers, and continuing education for qualified teachers. Programmes have included some or all of four elements of teacher education: general education, learning about the subjects trainees will teach in the classroom, pedagogy and associated subjects, and classroom practice. Programmes have generally been successful in their aims of reaching large and scattered audiences, and have often achieved highly successful completion rates and examination pass rates, especially where trainees were guaranteed promotion on completion. There is also evidence of learning gain and of the development of teaching skills by trainees. Programmes have tended to have lower unit costs than conventional teachers' courses because of the saving in residential costs and the economies of scale that can be achieved through distance education. Costs per successful student have often been between one half and two-third of the cost of conventional teacher education.

A range of technologies has been used. Print, in the form of correspondence courses, has often dominated. Radio and television have also been used, with television being of particular importance in larger countries with large audiences of students. There have been experiments in the use of videoconferencing for the continuing education of teachers. Experiments have begun in the use of computer conferencing, and the distribution of computer-based teaching materials, although logistics rule this out for many rural teachers. Combinations of media have an advantage over any single medium while, in designing a successful programme, one key is the successful organisation and supervision of classroom practice. At the same time, as classroom supervision and other forms of student support do not allow economies of scale, their costs need to be contained if distance education is to retain its economic advantage.

Other conditions of success are in the areas of motivation, management and integration. Teachers need to be motivated if they are to learn at a distance. Logistical problems have to be overcome so that the management of the process of distance education is efficient. Distance education needs to be integrated with the regular work of the teaching service if it is to be more than a dispensable add-on and the teaching offered at a distance integrated with the regular curricular practice of the service.

#### **Teaching the teachers**

We are short of teachers. In many countries, children are in large classes and many teachers are untrained. Many African children still do not go to school. If all children are to be in school and get a better education by 2015, far more teachers will be needed. Not enough have been produced by conventional teachers' colleges.

Nearly ten years ago, UNESCO forecast that Africa needed to expand its teaching force at a rate of 5.6 per cent per annum during the 1990s. In fact, as table 1 shows, it has not managed to achieve anything like this rate. In Africa as a whole, over the last fifteen years the teaching force has grown at 3.4 per cent, slightly ahead of the growth in the number of children in school, but at nothing like the rate needed to provide enough teachers for education for all. Meanwhile many teachers are untrained and have themselves had a

Table 1: Primary-level teachers and students in some African countries

Country	Year	Pupils '000	Growth % p.a.	Teachers '000	Growth % p.a.	Gross enrolment ratio 1997	Net enrolment ratio 1997
Botswana	1980	172		5.3			
	1995	314	4.1	12.3	5.8	118.3	98.4
Ethiopia	1980	2 131		33.3			
	1997	5 091	5.3	n/a	n/a	42.0	36.0
Ghana	1980	1 378		47.9			
	1990	1 945	3.5	66.9	3.4	77.5	n/a
Kenya	1980	3 927		102.5			
	1995	5 545	2.3	182.0	3.9	87.7	n/a
Malawi	1980	810		12.5			
	1995	2 887	8.8	49.1	9.5	133.5 <sup>a</sup>	n/a
Mali	1980	291		6.9			
	1997	863	6.6	10.9	2.7	50.0	39.9
Mozambique	1980	1 387		17.0			
	1995	1 415	0.1	24.6	2.5	68.2	38.5
Senegal	1980	420		9.2			
	1997	1 027	5.4	18.4	4.2	61.7	58.1 <sup>b</sup>
South Africa	1980	4 353		160.3			
	1995	8 159	4.3	224.9	2.3	96.5	87.1
Zambia <sup>c</sup>	1980	1 042		21.5			
	1995	1 506	2.5	38.5	4.0	101.0	85.4
Africa	1980	62 134		1 661.0			
	1997	100 226	2.9	2 927.0	3.4	80.7	n/a

Source: UNESCO *Statistical database*; UNESCO *Statistical yearbook*; UNESCO *Decade of education cd-rom*; Own calculations

Notes: a. UNESCO reports that this figure is not validated; b 1996

limited basic education. The problems of teacher scarcity, and of raising the competence of existing teachers, are compounded by HIV-AIDS which is killing teachers and reducing the life expectancy of trainee teachers.

The scale of the potential demand for teachers, which has not been met through conventional approaches to teacher education, prompts the question: what other ways are there of expanding their numbers? This paper explores the role of distance education as one way of training teachers. It has starting points in economics and education.

### The costs and effectiveness of conventional teacher education

Conventionally, and in much of the south, teachers learn their craft in a teachers' college after completing between three and seven years of secondary education. Many teachers' courses in fact overlap the content of upper secondary education. Reviews in the 1980s found that two-thirds of programmes in low and middle-income countries had courses similar to those of secondary schools with as much as 86 per cent of the content being the same (Lockheed and Verspoor 1991: 95). But, on average, in a group of low and lower-middle income countries, teacher training costs seven times as much as secondary education. Some figures for Africa and Asia are in table 2. While the variations between the figures are striking - with Bangladesh and Pakistan at opposite ends of a spectrum - the cost of teacher training tends to be high, in part because training courses are often residential and costs may include housing, food, and sometimes training salaries.

Table 2: Annual cost of teacher training as multiple of cost of general secondary education

<i>Country</i>	<i>Relative cost per student</i>	<i>Country</i>	<i>Relative cost per student</i>
Bangladesh	1.64	Malawi	3.07
Botswana	2.83	Nigeria <sup>a</sup>	3.21
China	8.51	Pakistan	25.53
The Gambia	10.3	Swaziland	4.28
Ghana	2.96	Tanzania	4.11
Indonesia	1.10	Zambia	3.25

Source: Lockheed and Verspoor 1991: 97

Note: a. state not federal institutions

To make things worse, we are not sure that teacher education works in developing the skills, knowledge and attitudes needed by good teachers. UNICEF, for example, has found that 'in different parts of the world, primary education programmes that operate with underqualified and para-professional staff are often showing equal or even better student results than those operating with professional, certified teachers' (Torres 1996: 449).

It is worth looking at alternative approaches.

### **The job of teacher education and the roles of distance education**

Much teacher education concentrates on four things:

- giving trainee teachers a general education;
- improving their knowledge of the subjects they will teach;
- teaching them about children, the curriculum, and pedagogy;
- developing their skills in the classroom.

Many programmes want to go beyond this, encouraging potential teachers to develop particular attitudes to their job, to think about their future role in the community, and to develop the capacity to think critically about their own day-to-day work. But those four are basic.

Some teacher education is done before teachers start work - preservice - and some after - inservice. But the distinctions may be blurred. 'For many unqualified teachers in-service training may be the only training they receive. For others, pre-service education may well have been of a general kind, an extension of their secondary education with some study of education thrown in for good measure. In-service education (if they are fortunate to receive any) may constitute their only source of *professional* training' (Hawes and Stephens 1990: 93). It is more useful to distinguish three categories of teacher education: initial training for inexperienced teachers, often immediately after they have left school; initial training for experienced but unqualified teachers, often done on the job; continuing education for teachers after their initial training.

Distance education has been used in all three of these categories of education. It has often been used alongside other modes of education, and for good reason: while students can learn about mathematics, or about children at a distance, they are unlikely to learn how to teach from a radio programme, or a correspondence course, or an interactive computer program. Thus, when we talk about distance education, we mean here a programme of teacher education that uses a variety of approaches in order to raise the capacity of teachers. Four illustrations tell the story.

About ten years after independence Tanzania decided to move towards universal primary education, almost doubling the number of children in school. The government calculated that it needed an extra 40 000

teachers. As the existing training colleges were producing only 5000 new teachers a year it was decided to recruit secondary school leavers and train them, on an apprenticeship model, partly on the job and partly through distance education. Over a course of three years trainees were posted to schools where they had a reduced teaching load. They then followed correspondence courses backed by radio programmes, were supervised and tested on their classroom practice, and ended by spending six weeks at a residential seminar. 45 000 trainees began the course and 38 000 completed and passed their examinations. Two evaluations found that they ended up reasonably competent in the classroom (Chale 1993; Mähleck and Temu 1989).

Nigeria set about similar problems not by running a one-off, short-term, programme but by setting up a specialised, distance-education, National Teachers Institute in 1976. It has become a permanent part of the federal education system. Over the years it has run courses both for unqualified teachers working in schools and for school leavers who follow a course at around upper-secondary level geared to teaching. The main emphasis of its work today is on the Nigerian Certificate of Education, which requires five years of secondary education for entry. In 1994 it produced 21 000 certificate holders, equivalent to the production of all 58 conventional teachers' colleges. The institute teaches mainly through correspondence, with some face-to-face support (Bako and Rumble 1993, Perraton 2000: 67-8).

More recently, as it was coming out of war, Uganda 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 ten districts of northern Uganda, an area of about 400 by 200 kilometres. The programme integrated its distance teaching with the work of ten conventional teachers' colleges where trainees attended two residential courses each year. They also went to a twice-monthly tutorial 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 and the pass rate is understood to have been around 75 per cent (Wrightson 1997, Perraton 2000: 69-70).

The final example comes from the north where the (then) Department for Education and Science commissioned the Open University to run a postgraduate certificate in education. Its target audience comprised graduates, who had never taught, and wanted to do a home-based qualification that would allow them to teach in public-sector schools. The programme had three unusual features. First, it made extensive use of computer conferencing both for teaching students and for overcoming their isolation as they worked, in ones and twos, around the country. Second, the supervision and mentoring of students was made the responsibility of the schools in which they did their teaching practice so that the whole programme could be seen as school-centred. Third, in order to make this possible about a significant proportion of the total expenditure on the course went to pay for this mentoring: schools received a payment of £1000 per trainee. (This is in line with payments made to schools in training partnerships with other universities in the UK) The course is controversial and the primary course has been withdrawn for redesign to meet new standards required by the Department for Education and Employment. However, the model suggests some pointers for future course design.

Between them, the four examples, together with much wider experience, demonstrate that distance-teaching methods can be used for all four of the elements that make up teacher education, from subject matter knowledge through to classroom practice. Programmes have varied in their emphasis; one early programme in Kenya, for example, aimed simply to provide a general education to students. Some programmes have been more specialised than any of those illustrated. In francophone west Africa, for example, programmes developed by the *Consortium International Francophone de Formation à Distance* have been developed to teach headteachers about school management.

One feature is common to many teacher education projects: the organisation and supervision of teaching practice presents the greatest challenges. It does so partly because the students are scattered, partly because there is often a tension between the curriculum of teacher education and the day-to-day practice of the schools, and partly just because of the numbers involved; logistics are a problem in supervising trainees no matter how they are taught.

## Outcomes and costs

Did the programmes work in reaching their intended audiences, teaching them something, and making their students into better teachers?

They were quite good at reaching audiences. One of the biggest success stories is from Tanzania where the distance-education programme reached 45 000 trainee teachers in five years at a time when the conventional colleges had only 5000 students in total. Even in industrialised Britain, the (then) Department of Education and Science asked the Open University to use its distance-teaching system to get 450 000 copies of training material on secondary examinations into the hands of teachers. In South Africa in 1995 nearly 130 000 teachers were studying at a distance while, as usual, the statistics from China dwarf the rest. More than that, while actual enrolments have sometimes been well below what was planned, a large proportion of teachers have often completed their courses and gained the expected qualification. Table 3 gives some exemplary figures and summarises the evidence on outcomes and costs. The completion rates are better than those achieved in many distance-education programmes, most probably because many programmes led to a qualification which guaranteed more pay.

We have two ways of asking the tougher question as to whether students learned anything. One way is to look at the examination results. Here, by and large, trainee teachers have done reasonably well with pass rates of between 50 and 90 per cent. Some of the exceptions take us back to the purposes of teacher education. In Nigeria, for example, the National Teachers' Institute, which was getting pass rates of only around 27 to 44 per cent, was offering the equivalent of a secondary education, but aimed at students who had not succeeded in getting into regular senior secondary schools. Its pass rates were higher than those of conventional teachers' colleges (Bako and Rumble 1993: 219). If examinations are a fair way of assessing potential teachers' competence, then the distance-teaching approaches come out reasonably well.

In a handful of cases we have a different kind of evidence. In both Indonesia and Sri Lanka, for example, a research team tried to measure more directly the learning gain achieved by trainee teachers on courses. In Tanzania and Zimbabwe researchers followed trainees into the classroom to see how well they taught. In both cases, they were forced into comparing teachers taught on-the-job and at a distance with those taught in conventional pre-service courses, making it difficult if not impossible to separate the effect of distance learning from the effect of longer classroom practice. The general conclusion is moderately encouraging:

In Tanzania, two separate research enquiries found similar results: that 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. There was one specific and important negative finding about response to different subjects: students taught conventionally performed significantly better in science than those trained at a distance. In Zimbabwe, while it was not possible to make this kind of comparison, 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. Findings from Indonesia and Sri Lanka are more complex. In both countries students studying face to face had better results in mathematics than those working at a distance. In contrast, distance-teaching methods worked reasonably well for the study of mother-tongue languages. In Sri Lanka distance education performed better than the alternative in teaching language and in developing professional attitudes towards education while in Indonesia neither distance nor conventional education were effective in changing trainee teachers' attitudes.

(Perraton 1993: 394-5)

In principle we would expect teacher training at a distance to show economies as compared with training in a college. In-service training provided at a distance makes more economical use of residential centres, for short courses, and means that trainee teachers are employed while they study. Distance education tends to have lower staffing ratios than conventional education, with the same teaching materials being used for large numbers of students so that, provided student enrolments are high enough, its costs tend to be below those of

conventional education. Practice reflects theory: many distance-education programmes have achieved costs per successful student at between a half and two-thirds of those of conventional education, although these economies have not been obtained for projects with relatively low student enrolments..

### **The technologies**

Much teacher education has been done with simple technologies; correspondence lessons, sometimes backed by radio, have often been the basic teaching method. They remain central, for example, even to a project that has relied heavily on computer communication like that of the British Open University. Both radio and television have also been important, and of especial value where distances are great and travel difficult. In both Indonesia and Nepal, for example, teacher training programmes have relied heavily on radio as a means of reaching scattered students. Innovative approaches to radio have been tried. The techniques of interactive radio instruction, developed for teaching maths and languages in the classroom and asking for frequent responses, in chorus, from pupils, have been adapted to teacher education in Latin America. In large countries, where the numbers following a single curriculum make it possible to justify the cost - often ten times that of radio - television has been used. In China, for example, the Central Radio and Television Universities use satellite television broadcasts as one component of teacher education.

There have been experiments with more advanced technologies. Open universities in both India and Israel, for example, have experimented with one-way video and two-way audio as a way of providing inservice education to teachers. A central lecturer can then talk to teachers in multiple locations and respond to questions which they put over the audio link. The technique has the advantage of allowing teachers, regardless of their distance from a centre, to follow an updating programme. The downside is that, in practice, they often need to travel in order to do so. In India this proved a barrier: it was not possible to link individual schools for video-programmes and many teachers proved reluctant to travel to a centre for upgrading.

Within both the industrialised and the developing world there are experiments in using computer-based teaching and communication as a way of supporting and communicating with teachers. The computer system used by the British Open University to help scattered, inexperienced, and possibly nervous, trainees overcome their isolation provides one example. Within Africa, while there are experiments in linking schools, the major barriers to computer communication sharply limit what can be done with individual schools. But there is the potential to use new information and communication technologies to raise the capacity of teachers' colleges and overcome their isolation. (While universities are often in capital cities and the larger towns, teachers' colleges are often also far out in the bush.) The UNESCO Institute for Capacity Building in Addis Ababa, for example, has developed a prototype cd-rom on mathematics teaching which it plans to distribute, in English and French language versions, to teachers' colleges in subsaharan Africa. It consists of lesson plans in mathematics and journal articles about the teaching of mathematics - the kind of resources that could raise the quality of what is done in the colleges and so strengthen the education of the next generation of teachers.

While there is no magic formula for selecting the most appropriate media for a particular educational purpose, the experience of successful projects suggests some guidelines. One is to use a variety of media, both to maintain the interest of students and to allow course designers to seize the different opportunities they present: print allows permanency, radio or television can transport the learner, individual tutoring can give students a kind of support as yet unmatched by any other medium. Beyond that, the strength and weakness of many programmes has lain in the arrangements they make for classroom supervision. In some programmes this has crumbled away, with the consequent danger that trainees' theoretical understanding may never be translated into good classroom practice, without the course administrators' even knowing whether or not this is the case. Ironically, in selecting and deploying teaching media, the most important issues arise in deploying face-to-face support rather than in sophisticated electronics. Beyond that, the choice of medium is likely to be conditioned by economics. Here, the critical variables are the number of students, the sophistication of the media chosen, and the amount of face-to-face support provided. With large numbers of students, unit costs even for mass media like television with high production costs, may be

acceptable because of the economies of scale. In contrast, face-to-face support does not allow economies of scale. The economic challenge is, therefore, to provide enough face-to-face support to gain all its benefits while not allowing it on such a generous scale that costs become unsupportable.

### **Conditions for success**

The extensive use of distance education for teachers, in all continents of the world, makes it possible to identify the major conditions for success. Along with student support and classroom practice go sound economics, just examined, and issues of motivation, management and integration.

- The first condition is to set in place effective arrangements to support students and, in particular, to supervise their classroom practice. If programmes are to develop teachers' capacities in the classroom then a system is needed for managing and supervising their classroom work. A variety of structures have been used, ranging from the ad-hoc and temporary arrangements set up for the Tanzanian programme to the decentralised model of school mentors developed by the British Open University.
- 
- The costs need to be right. Distance education demands investment in teaching materials and in a system for teaching and supporting students. These elements generally have fixed costs, which do not rise with increasing numbers of students, so that economies of scale are possible. If, however, the costs of student support, which vary with the number of students, rise to the levels of those of conventional education, then the distance-teaching alternative is bound to cost more. This may be acceptable, if it is the only way of reaching particular groups of remote and isolated students. But we need to work out the costs and have good reason to adopt a strategy that increases unit costs.
- 
- Teachers, like any other learners, need to be motivated. In many cases, as already suggested, they are motivated to study at a distance because they expect to achieve an improved qualification, higher status, and more pay. One early programme in east Africa collapsed when, because government felt it could not meet the costs of increased pay, the guarantee of improved status on qualifying was removed. Where programmes have been provided as part of inservice education, without any guarantee of a change of status, other ways of motivating students need to be found.
- 
- Good management of the process of distance education has an obvious priority. While distance students are amazingly tolerant of the delays inherent in the process, they need to receive lessons on time, to get reactions from their tutors despite all the logistical problems involved, and to be able to depend on well-prepared teaching materials available in a medium and at a time that is convenient for them. The logistics of all this tend to be more complicated than the logistics of conventional teaching: you can walk into a classroom and make last-minute changes but cannot do this for students 100 kilometres away.
- 
- Successful programmes have been integrated into the educational service. The Nigerian National Teachers' Institute provides one example as a federal institution meshed into the regular system for teaching and examining students. In contrast, early teacher-education programmes in Botswana and Swaziland were designed as temporary add-ons to the system, each located in a single teacher's college, and planned to run over a fixed period of time after which there would be no more untrained teachers. Their allotted time span ran out, but untrained teachers remained in the service.
- 
- The curriculum also demands integration. It needs to be close enough to the day-to-day practice of the schools for trainee teachers to see how the two fit together, while remaining some steps ahead of current practice so that teachers of the future may teach more effectively than those in the classroom today. The challenge here is to integrate the ideas about education built into the curriculum of teacher education with the reality of the schools where trainees are teaching or will teach.

August 2000

### About the writer

Hilary Perraton has worked in distance education and international education for many years and is at present director of a specialist research agency, the International Research Foundation for Open Learning. He has at various times been co-director of the International Extension College, a member of the Education Programme of the Commonwealth Secretariat, and Educational Planner for Distance Education at the University of the West Indies. His most recent book, from which this note partially draws, is *Open and distance learning in the developing world* (Routledge 2000).

### Bibliographical note and references

There are three general overviews of distance education for teacher training and a fair number of case study reports. Perraton 1993 consists of three overview chapters and eleven case studies, mostly carried out in the late 1980s. A valuable and more recent overview is in Robinson 1997. There is one chapter on teacher education in Perraton 2000. All three have useful bibliographies. Although it is focused on Asia there is useful general material in a set of conference papers on distance education for primary school teachers in Asian Development Bank 1997. The most useful general works on teacher education in developing countries are mainly ten years old or more. They include Dove 1986, Rust and Dalin 1990 and Avalos 1991. There is also extensive discussion of teacher education in two books on primary education, Hawes and Stephens 1990, writing from their experience as teacher trainers, and Lockheed and Verspoor 1991 from the World Bank and based on its extensive research. Useful recent journal articles on the problems of teacher education in the south include Villegas-Reimers and Reimers 1996 and Torres 1996.

### References

- Asian Development Bank 1997 *Distance education for primary school teachers*, Manila
- Avalos, B. 1991 *Approaches to teacher education: Initial teacher training*, London: Commonwealth Secretariat
- Bako, C. I. and Rumble, G. 1993 'The National Teachers' Institute, Nigeria' in Perraton 1993
- Chale, E. M. 1993 'Tanzania's distance-teaching programme' in Perraton 1993
- Dove, L.A. 1986 *Teachers and teacher education in developing countries*, London: Croom Helm
- Hawes, H. and Stephens, D. 1990 *Questions of quality: primary education and development*, Harlow: Longman
- Lockheed, M. E., and Verspoor, A. 1991 *Improving primary education in developing countries*, Oxford: Oxford University Press
- Mählck, L. and Temu, E. B. 1989 *Distance versus college trained primary school teachers: a case study from Tanzania*, Paris: International Institute for Educational Planning
- Perraton, H. 1993 (ed.) *Distance education for teacher training*, London: Routledge
- 2000 *Open and distance learning in the developing world*, London: Routledge
- Robinson, B. 1997 'Distance education for primary teacher training in developing countries' in J. Lynch, C. Modgil and S. Modgil (ed.) *Education and development: tradition and innovation* volume 3 *Innovations in delivering primary education*, London: Cassell Educational Press
- Rust, V.D. and Dalin, P. 1990 *Teachers and teaching in the developing world*, New York: Garland
- Torres, R.M. 1996 'Without the reform of teacher education there will be no reform of education' *Prospects* 26, 3: 447-67
- Villegas-Reimers, E. and Reimers, F. 1996 'Where are the 60 million teachers?' *Prospects* 26, 3: 469-93
- Wrightson, T. 1997 'Northern Integrated Teacher Education Project: a case study', paper presented at the World Bank colloquium *Distance education for teacher development* Toronto: 22-5 June