M U S T E R

Multi-Site Teacher Education Research Project

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Discussion Paper 1

Counting the Cost of Teacher Education: Cost and Quality Issues

Keith M Lewin

January 1999

Centre for International Education
University of Sussex Institute of Education

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Multi-Site Teacher Education Research Project (MUSTER)

MUSTER is a collaborative research project co-ordinated from the Centre for International Education at the University of Sussex Institute of Education. It has been developed in partnership with:

- The Institute of Education, University of Cape Coast, Ghana.
- The Institute of Education, The National University of Lesotho.
- The Centre for Educational Research and Training, University of Malawi.
- The Faculty of Education, University of Durban-Westville, South Africa.
- The School of Education, The University of the West Indies, St. Augustine's Campus, Trinidad.

Financial support has been provided for three years by the British Department for International Development (DFID).

MUSTER is focused on generating new understandings of teacher education before, during and after the point of initial qualification as a teacher. Its concerns include exploring how new teachers are identified and selected for training programmes, how they acquire the skills they need to teach effectively, and how they experience training and induction into the teaching profession. The research includes analytical concerns with the structure and organisation of teacher education, the form and substance of teacher education curriculum, the identity, roles and cultural experience of trainee teachers, and the costs and probable benefits of different types of initial teacher training.

MUSTER is designed to provide opportunities to build research and evaluation capacity in teacher education in developing countries through active engagement with the research process from design, through data collection, to analysis and joint publication. Principal researchers lead teams in each country and are supported by three Sussex faculty and three graduate researchers.

This series of discussion papers has been created to provide an early opportunity to share output from sub-studies generated within MUSTER for comment and constructive criticism. Each paper takes a theme within or across countries and offers a view of work in progress.

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ABSTRACT

The costs of teacher education in many developing countries[1] arise from historically established patterns of organisation and budgeting, which have their origins in colonial history. Costs per qualified and employed teacher can be high, the quality of teacher training is widely contested, and many of the assumptions that underpin common models of delivery are open to question. Uncertain proportions of those trained obtain teaching jobs; in some cases the match between training and job placement is weak with teachers teaching at different levels or in different subject areas to those for which they were trained; in other situations the average length of teachers' careers may be shortening with implications for the nature of appropriate investment in training.

Providing basic schooling universally in the wake of the commitments made at the World Conference on Education for All (WCEFA) has resulted in rapidly expanding enrolments of primary age children throughout Sub-Saharan Africa. This conference resulted in most governments developing national plans to ensure at least six years, and often nine or more years of schooling (Colclough with Lewin 1993). Unlike previous attempts by the UN agencies to promote targets related to primary education, WCEFA included explicit concerns for quality and achievement alongside enrolment targets. Increased enrolment was to be accompanied by investment to improve learning outcomes (WCEFA 1990:30).

These developments have created unprecedented demands for the training of teachers. Many of the poorest countries with low enrolment rates have high proportions of untrained teachers (UNESCO 1997:26). This is particularly a problem in Sub-Saharan Africa. In much of Asia demographic transition and other changes associated with development have reduced the demand for new teachers, though it remains the case that many teachers are untrained, especially in South Asia (Lewin 1998). If quality is to be improved the needs of untrained teachers for professional development must be met. In addition in many African countries new teachers are needed to meet the demands of enrolment growth to universal levels. Thus the capacity of existing systems of teacher education is challenged to meet high levels of demand in the short term and new needs arising from an emphasis on effective learning which links the competencies of teachers with the capabilities of pupils. This has placed pressures on the financing of teacher education, which invite reflection on cost-effectiveness, internal efficiency and the value for money provided by different methods of delivery.

The purpose of this paper is to share some preliminary thoughts on cost and resource issues[2] related to the training of teachers. It anticipates a programme of empirically based research

[1] This paper uses the developing countries as a general term for countries which have a cluster of largely economic indicators which suggest relatively low levels of income per capita, a preponderance of non-industrialised economic activity, and which have lower ranks on the UNDP HDI indicator. It does not imply homogeneity in other attributes.

[2] Costs are used in a general sense in this paper to include all the physical and human resources that need to be mobilised.

which is being developed at Sussex as part of the Multi-Site Teacher Education Project[3]. It is therefore exploratory rather than designed to report findings which may emerge from the data that will be collected.

The paper has a focus on patterns of education and training which lead to initial qualification[4] since this is where most investment is concentrated in most systems. The first section outlines some core issues and discusses a number of concerns which contextualise the subsequent arguments. The second section provides an overview of common features of conventional patterns of teacher education and draws attention to a range of consequences relevant to resource utilisation. The third section raises some methodological issues. The fourth section explores the analysis of costs and identifies major categories. Section five develops a framework of questions before, during and after core training experiences. These are summarised in Appendix 1. Section six summarises some alternative organisational patterns and draws attention to the range of options available and is followed by some concluding remarks.

[3] The Multi-Site Teacher Education Research (MUSTER) project is support by the Department for International Development of the British Government through a three year grant. It is based at the Centre for International Education, University of Sussex, and is directed by Keith Lewin, David Stephens and Janet Stuart.

[4] For convenience and to make the arguments manageable this paper is focused on the point of initial qualification; many of the issues raised extend to other types of training for teachers.

1. INTRODUCTION

There are many good reasons to be concerned about the costs of teacher training in developing countries. The most important appear to revolve around the following observations and issues.

First, teacher training can be surprisingly expensive. Orthodox, pre-career full-time residential training in some countries has costs per student which can average several times the costs of conventional higher education. This may arise as a result of many factors including the length of training, the small size of training institutions, low pupil-teacher ratios, inefficient working practices, and historic budgeting largely unrelated to enrolments. If teacher training is comparatively expensive, and if demand for newly trained teachers is high (as a result of enrolment expansion), simple expansion of existing modes of training may be unrealistic. Even if this is not true, high costs per student need justification. The pressures created by austerity in those countries suffering from recession add to the needs to reconsider patterns of educational investment during economic downswings (Lewin 1987).

Second, in many developing countries there are concerns about the quality of new teachers and the need to qualify the untrained. Where criticisms are valid, and the content and pedagogy of training need to change to increase the probability of newly trained teachers possessing appropriate competencies, innovations need to be planned which are costed against sustainable budgets which can claim to provide value for public funds.

Third, and closely related, where the quality of the intake to initial teacher training is low and expansion is anticipated, it may be necessary to re-profile not only content and pedagogy, but also the organisation and modes of delivery of training to cope with trainees who have different characteristics and weaker basic skills than those who entered training in the past.

Fourth, many training systems have their origins in colonial practice. What may once have been rational may no longer meet new needs and resource constraints. Systems based on conventional training colleges may have been unduly influenced by colonial administrations and exogenous influence and advice provided by those who have sponsored their development. In many countries the training college sector has received sustained support from private and public donors of one kind or another based on a variety of mixed motives. As needs are increasingly identified at a national level, qualified teachers become more mobile, and much of the costs of expansion are borne publicly, it is timely to review practice and resource allocation.

Fifth, studies of the comparative costs and benefits of different methods of training teachers are not readily available in most developing countries. Decisions on modes of training are therefore often made on grounds which are largely independent of these kinds of considerations. It is not that cost and cost-effectiveness data should or could be the main basis for policy. It is simply that without considered judgement of what is known of costs and benefits it is unlikely that the best use will be made of public investment.

To avoid the misunderstandings that are sometimes associated with economic analysis of educational development issues, a number of observations are relevant.

First, it should be clear from the outset that the training of teachers is both desirable and necessary. It is obvious that an appropriate level of mastery of content and concepts is a pre-requisite to the ability to share competencies with learners whether in language, mathematics, science or history. It is also self-evident that intuition and experience are not in themselves efficient ways of acquiring skills of effective teaching which are the common property of those who have trodden the pathway successfully before. It would be perverse to argue that it is advantageous to be unaware of established theories of cognition, common errors of reasoning amongst children of different ages, or tried and tested methods of learning to read. Such things can be understood and translated into learning and teaching strategies through systematic learning and organised experience more efficiently than in other ways.

Second, though training teachers is in principle attractive this does not mean that all methods are equally effective. Nor does it mean that what may have been satisfactory in the past will be so in the future. Belief in the efficacy of a method is probably a necessary condition for its successful realisation; it is not sufficient. Assertion and advocacy need to be buttressed by evidence that desired competencies are actually achieved by trainees who are able to deploy these in real leaning and teaching environments. In a rational world it ought to be possible, at least at the level of judgement backed by systematic data, to separate out the more and the less costly and effective approaches to training, given defined goals, in order to assist choices that have to be made where resources are constrained.

Third, there are obvious pitfalls in believing that an initial qualification to teach represents an end point in the acquisition of competence and guarantees its manifestation in practice. Certifying all teachers so that none are formally untrained is a desirable goal but is insufficient to guarantee improved teaching quality in schools. Initial qualifications are literally what they present themselves as - confirmation of the minimum levels of competence which justify a public "licence to teach". They can hardly be based on competencies possessed by average and above average members of the profession established in mid-career. This is why the belief that initial training is sufficient to certify teachers for the whole of their working lifetimes has been overtaken by widespread recognition of the importance of continuing professional development spread over a career. The underlying point is that investment in the development of a teacher's competencies can and should be seen as a continuous process that follows initial qualification with support which consolidates newly acquired skills, encourages reflection and self-criticism, and provides opportunities to move to higher levels of competence. Models of investment in training which are heavily front-loaded (i.e. all the investment is pre-career), as is the case with conventional pre-service training, begin to seem less and less attractive.

Fourth, making connections between costs and resources, and policy on training teachers, is uncomfortable and often unfamiliar to many of those involved in the training process. This may be because training institutions distance faculty from decisions on the allocation of

resources, because trainers may be predisposed to think in terms of what is desirable rather more than what is feasible and sustainable in terms of resources, and because cadres of trainers may well have sectional interests that value the self-interest of their profession over the interests of those who are trained. None of this detracts from the fact that training is resource-constrained and, where it is a public activity, it should be accountable for the resources it consumes, which might otherwise be allocated to different purposes that might have more effect on learning and teaching outcomes for school pupils.

2. SOME COMMON APPROACHES TO INITIAL TEACHER EDUCATION

There are many different modes of teacher education and several ways of developing typologies. For the purposes of this paper a simple ideal-typical schema has been developed[5] that differentiates four main pathways to becoming a qualified teacher. These are encapsulated as:

1. Full-time certificate/diploma/undergraduate college-based training in purpose-built institutions usually lasting for 3 to 4 years

2. Full-time postgraduate training in higher education institutions subsequent to the acquisition of a degree level award

3. Apprenticeship models based on service in school with in-service support leading to certification as a qualified teacher.

4. Direct entry as teachers without training who are subsequently certified

Table 1 offers some familiar distinguishing features of each approach in terms of duration, entry, curriculum, teaching practice, teaching methods, certification and probable costs per student.

[5] This schema is most applicable to Anglophone countries; Franco-phone and Lusophone countries have different patterns..

Table 1: An Ideal Typical Typology of Initial Teacher Education Programmes

Description	Duration	Entry	Curriculum	Teaching Practice	Teaching Styles	Certification	Costs per student
Type 1							
College certificate Diploma B.Ed	2-4 years full-time residential	Junior or senior secondary school leavers	Subject upgrading, subject methods, professional studies	Block practice 4-12 weeks	Lectures, small group work, use of specialist facilities	Written exams, school practice reports, projects or special studies	Relatively high
Type 2							
University Post Graduate Certificate of Education	1-2 year full-time residential after first degree	University degree	Subject methods, professional studies	Block practice 2-10 weeks	Lectures, small group work, use of specialist facilities	Written exams, school practice reports, projects or special studies	Relatively high but for shorter duration
Type 3							
In-Service and Post-Service Up-grading for initial qualification	1-5 years part-time residential and/or non-residential	Post-experience as temporary or untrained teachers	Subject upgrading, subject methods, professional studies	Teaching in schools in normal employment	Residential lectures/ workshops of varying duration, self-study, distance learning	Written exams, school or inspectors reports	High or low depending on duration and intensity of contact with tutors
Type 4							
Direct entry	0-2 years probation	Senior secondary, College or University	None, or supervised induction	Teaching in schools in normal employment	Apprentice - ship	Inspection, school reports	Low

This simplified typology cannot reflect the many detailed variations on the characteristics identified for each Type. Thus it is not uncommon for Type 1 programmes to have different characteristics depending on the level of entry. It is also the case that in some systems students graduate from certificate, through diploma to degree programmes over an extended period interspersed with teaching in schools. Degree level B.Ed programmes may or may not have additional Honours years dependent on completion of the basic qualification. University-based B.Eds may have different entry criteria and curricula to college-based programmes. Curricula may treat academic and subject-based courses concurrently in each year or more sequentially with a shifting emphasis as the course proceeds. Type 2 courses probably have less variation. Nevertheless their duration is not standard, the mix of curricula

requirements varies widely especially in relation to teaching practice, and they may be offered part-time and non-residentially.

Type 3 arrangements can be found *de facto* or *de jure* in a substantial number of countries. It is not uncommon for large proportions of those accepted for initial training to have experience as untrained teachers. They may also have taken part in in-service programmes and will have received more or less systematic induction into teaching from those with whom they work. This is important. It means that those who enter initial training may already be familiar with the classroom environment, and schools as organisations. It is also likely to be true that they have acquired teaching styles, pedagogic dispositions, and beliefs about pupils' learning and the nature of the subjects they teach which reflect those commonly held by their teacher colleagues. These may or may not resonate with the teacher education curriculum and its realisation. What has been learned may need to be (at least partially) unlearned or developed in different ways than might be the case with inexperienced school leavers. It certainly has implications for the nature, value and extent of periods of school practice in professional training. These issues are obviously relevant to Type 3 training and are also germane for Type 1 and 2 programmes where a significant proportion of the entry have prior school experience.

Type 4 patterns are those closest to apprenticeship. Graduates, or those with sub-degree qualifications are allowed to enter teaching by virtue of their final academic qualification. In some cases this is sufficient to teach indefinitely; in others a probationary period has to be completed successfully. The possibilities are very wide. Induction may be systematically supported and monitored or may depend on informal arrangements with minimal reporting. Prior experience may or may not be recognised. Higher levels of qualification may be accepted in lieu of training. Sufficiently long service may result in recognition as a qualified teacher.

Another important feature of initial teacher qualification systems, which carries cost and resource implications which cannot be simply captured in the typology, concerns the rubrics which define different levels of qualification. These are usually linked to conditions of service and salary scales determined by public service commissions or similar bodies. This is a complex area. Teachers' salaries are often determined by the highest level of academic qualification and the level of training certificates. Entry onto one scale or another influences earnings over long periods independent of performance. Once on a scale, seniority is generally the basis for increments. This means that the point of entry is of great significance. It can and does create pressures for would-be teachers to pursue the highest levels of academic qualification and training before career entry, or to focus on up-grading after experience. It can mean fully qualified and trained teachers have experienced between 5 and 10 years of formal education and training beyond the school leaving age. In countries where primary and secondary school teachers are on different salary scales independent of academic qualification and training, it may mean that disproportionate numbers of those who are primary trained rapidly gravitate to secondary school posts.

A further observation is of interest. It has become fashionable in some countries with a long history of college-based teacher education to argue the merits of an increased emphasis on

school-based training. In England this has resulted in mandatory guidelines that require partnerships between training institutions and schools and the allocation of substantial amounts of training resources to participating schools. In exchange for resources that may exceed those allocated to the training institution, schools play a central role in the initial training curriculum.

In many developing countries school-based training is in reality the default method of training. As noted above, trainees have often cut their teeth as untrained teachers. Their largely informal training takes place as an unstructured and unrecognised apprenticeship. Some countries deliberately provide school experience through on-the-job training before admission to training programmes (e.g. Trinidad). These programmes can be used to filter and select trainees.

Proponents of more school-based training strategies argue the advantages of initial training close to the chalk face focused on basic skills and competencies modelled by practitioners close to the realities of effective learning and teaching. They contest the ability of conventional college-based training to provide relevant and contextualised professional learning. Depending on how school-based training is costed this may have some economic attractions. Trainee teachers contribute teaching time to schools at low cost, teacher mentors may be cheaper per unit of tutoring than college staff, and if trainee teachers are more competent at the point of initial qualification than would otherwise be the case, cost-effectiveness will be increased.

A brief historical digression may be of interest to some readers as it illustrates that recent fashions in education usually have their precursors in previous practice. Various forms of school-based teacher training have a long history. In the 1930s a lively debate took place between the proponents of the system used at the Institute of Education, London, and that used at Oxford (Dixon 1986:14). At the London Institute teaching practice involved a preliminary 3-4 week period in schools:

> As a means of turning back, before it is too late, young people who seem plainly unfitted to the teaching profession and ought not to prepare for it at public expense.

Subsequently students spent two days a week in school and the remainder of their time at the Institute (they thus did not undertake block teaching practice). Tutors were paid to supervise students in school and also gave tutorials in the Institute, for which they were paid about one-third of a lecturer's salary.

This approach had many of the elements of school-focused training intended to link college and school-based experience in a continuous dialogue. It was contrasted with the orthodoxy of block practice which the University of Oxford used. At a meeting of the university departments of education and the Headmistresses' Association the issues were debated in 1938. London defended its system, which required students to spend at least 60 days in school on teaching practice, extending over the school, not the university, term. The advantages were said to be that theory and practice could be welded together and methods tutors were specifically invited to ensure their lectures addressed problems of presentation,

classroom management and teaching craft skills. In contrast Oxford representatives argued that block practice gave students early responsibility for learning, and integrated student-teachers into school life where they could develop skills systematically. The conservatism that this implied - students would adopt existing practice rather than experiment with new ones - was criticised by London tutors. Subsequently, Oxford adopted school-based internship models as did many other institutions in the UK, sometimes apparently reinventing practice with a long history (McIntyre 1990).

The historical record also reminds us that the major elements of the teacher education curriculum are long standing. The London Institute's Teaching Diploma examination in the 1930s required successful performance in:

- Principles of Education, Methods of Teaching,
- Elementary Psychology and Hygiene, The English Education System
- One of: History of Education, Comparative Education, Further Educational Psychology.

Successful practice teaching in a school was the final requirement. Term essays were included in the assessment along with the closed book written examination papers for the Diploma. Further Educational Psychology included a course in vocational testing and guidance for an extra fee (!). In this system students had personal tutors who conducted weekly seminars and arranged demonstration lessons. They also advised on personal matters not otherwise referred to the Warden or the Advisor to Oversea (*sic*) Students. A "Colonial Course" was run as a variant on the Diploma for those preparing for teaching or educational administration in the colonies which included core courses from the Diploma and special inputs in comparative education and the teaching of English to "non-Western" peoples.

Much could be said about the attractions, disadvantages and necessary antecedents for effective school-based training. Not least, it is plausible that the advantages are more than counter-balanced by possible problems. These include difficulties arising from locating a sufficient number of partnership schools where good practice is abundant, mentor teachers are willing and available to train new teachers, and where the costs of adequate infrastructure support (e.g. advisory visits, training of mentors, monitoring of standards and assessment of competencies) are not excessive. It was implied earlier that many of the normative conventions of teacher training can trace their origins back to once rational practices elsewhere - the familiar curriculum of the London Institute in the 1930s is an admittedly fragile illustration of the extent to which this might be the case.

In summary, this section has drawn attention to the range of common patterns of initial teacher qualification. It has highlighted some important features that may be significant in responding to new needs and the changing qualities of trainees in many developing country training systems. Specifically attention is drawn to the fact that many trainees have experience of learning and teaching on entry to training programmes. It is likely that these students will have established patterns of working and grounded (if possibly naive) theories of learning and teaching, which may or may not match with the presumptions of training

curricula. Issues, which relate to the content and length of training, are also flagged. Normative practices and bureaucratic regulation seem to have been at least as important as considerations of professional competence in making decisions on the teacher education curriculum and its length. Lastly it is suggested, using school-based training as an illustration, that many proposed innovations in initial education may have antecedents which invite further analysis, especially if the norms which currently exist in many countries derive directly or indirectly from them through processes of historical (colonial) transfer or through contemporary diffusion by the diaspora of teacher educators.

3. SOME METHODOLOGICAL ISSUES

There are methodological reasons why exploring the allocation and utilisation of resources to teacher education is difficult. Establishing the costs of different teaching and material inputs to training appears to be the easiest part. In systems where initial teacher education and certification is undertaken in training colleges which have training as their main function, it should be relatively straightforward to establish the cost per student successfully trained. This may be more difficult where initial teacher education is provided alongside other activities - e.g. large-scale in-service support - or where several modes of training co-exist in the same institution (e.g. PGCE, B.Ed) and share staff and other resources. It may also be complicated where distance education programmes exist if these share an infrastructure that delivers a range of courses. But it should still be possible to separate out costs attributable to initial training at least to the point where there is a good enough approximation sufficient to guide policy.

More difficult is to decide how to treat costs that arise from contributions that student-teachers may make to teaching. If they undertake a substantial amount of teaching during training they contribute to the cost of providing an adequate number of teachers. If they were not in the system more teachers would have to be provided for the same levels of pupil-teacher ratios.

It is also problematic to include the costs of salaries, which are paid in full to trainees in some systems during full-time training. These teachers may or may not be replaced in the schools in which they are employed. In principle the teaching they are not doing has to be covered, but it may not be.

Notwithstanding these problems it is realistic to attempt to discover what costs are associated with different modes of delivery, how they have been changing, and what will be the budgetary implications of an expansion or reduction in any particular mode. This is needed in any medium term planning which aspires to place qualified teachers in front of all classes within a defined time period. In some cases this may indicate that the ambition cannot be realised using existing modes of training designed for different circumstances. If so, alternative modes need to be considered which are cost-sustainable and likely to be at least as effective.

The analytical difficulties associated with measurements and judgements of the effectiveness of training are considerable. Most studies which attempt this either assess the extent to which training programmes change trainees in relation to subject competence and/or professional skills, or they focus on the degree to which trained teachers are more effective in the classroom than those who are not trained. Linking these two perspectives - to establish whether those who are trained acquire relevant competencies, subsequently transfer these to classroom teaching, and as a result their pupils learn more effectively - is very ambitious. What appears simple in principle is very complex to research in reality as others have noted (Tatto, Nielson, Cummings, Kularatna, and Dharmadasa 1991:7).

A brief reminder of some of the problems creates the following incomplete list. School effectiveness research indicates how important school effects may be on achievement independent of individual staff attributes. Pupils' achievement generally cannot be viewed as the outcome of individual teachers' competencies since pupils may experience several teachers. Teachers' effectiveness is unlikely to be independent of who is taught under which circumstances, and out-of-school factors may vary in importance between pupils, classes, schools and subjects.

Given this mosaic of problems the question is how to proceed? With the luxury of offering possibilities for discussion rather than conclusions to a process, I offer some ideas to create the beginnings of a framework for empirical enquiry in the next sections.

4. ANALYSING COSTS

There are two obvious ways to begin to explore costs and subsequently effectiveness. The first focuses on different types of costs (or more generally resource issues). The second seeks to unpack the training pathway to minimum competence for a publicly licensed teacher into three domains - before, during and after the core training experience. This section addresses the first focus.

First, some general observations. At a macro level the main cost drivers related to teacher training systems are self-evident and can be separated into recurrent salary and non-salary costs[6] and into fixed and variable costs.

Recurrent salary costs arise from teaching faculty and support staff (which include non-teaching administrators and service personnel). The costs of training in full-time institutions will normally be most heavily influenced by salary costs which will typically account for between 50% and 90% of all recurrent costs per trainee in post-school training institutions. The distribution between teaching and non-teaching salary costs can vary over a wide range - it is possible to find institutions where non-teaching salary costs may exceed those of teaching salaries per trainee, especially where training is residential.

In principle it is easy to identify factors that will tend to increase salary costs and those which will reduce them. Low student-staff ratios (10:1 or less?) will inflate costs, as will a high proportion of non-teaching staff salaries (more than 25%?). Relatively high and growing lecturers' salaries (in relation to GDP/capita and other comparable groups of professionals) will increase costs unless coupled with higher levels of student-staff ratios. Younger average ages of college staff will reduce costs, high and increasing average seniority will inflate costs. School-based training, if it substitutes teachers' time for that of lecturers, may reduce average costs per trainee.

The main determinant of recurrent salary costs per student is the student-teacher ratio[7] (STR). This can be expressed formally as follows.

Student-teacher Ratio = STR = $\frac{Ns}{Nt}$

Where Ns = number of students and Nt = number of teachers (lecturers).

Re-arranging we have Ns = STR x Nt

[6] Capital costs fall outside the scope of this discussion. These are costs which should rightly be apportioned over the lifetime of physical assets i.e. predominantly buildings. It is problematic to analyse capital costs in the absence of knowledge of building stock, utilisation rates, and methods of financing capital expenditure which typically is separately treated in national accounts.

[7] Assuming non-teaching salaries are small in relation to teaching salaries - this may not be true in some systems.

The salary cost per student for teaching staff (Cs) is represented by

Cost per Student $Cs = \frac{\text{Sum of the Salary Cost of Teachers}}{Ns} = \frac{\Sigma Ts}{Ns}$

Where ΣTs = the sum of all teachers (lectures) salaries

By substitution $Cs = \frac{\Sigma Ts}{STR \times Nt}$

If ΣTs is approximately equal to the Average of all Teachers Salaries (AvTs) x Nt

then $Cs = \frac{AvTs \times Nt}{STR \times Nt} = \frac{AvTs}{STR}$

This mathematical representation leads to the fairly obvious point that recurrent teaching costs per student rise with average teachers' salaries and fall as the STR increases.

However, the more precise relationships over time will depend on whether average and total salary bills change at rates different to the STR as a result of pay awards, incremental drift and differential retirement and recruitment rates at the top and the bottom end of the salary scales. On the margin the relationship between AvTs, and ΣTs/Ns, may not remain constant if the mean and the median salaries do not coincide with the arithmetic average.

It might seem as simple as arguing that if AvTs is minimised and STR maximised in ways consistent with maintaining quality, the economic concern with cost efficiency would be satisfied. It is not quite that simple. What is delivered to students in the training curriculum will not only depend on salary costs per student. These have to be translated into staff contact hours with students and the work which surrounds these contact hours. Higher salary costs per student and lower student-staff ratios, can co-exist with low student contact hours depending on how work is organised. Lower salary costs per student and higher student-staff ratios can be achieved without necessarily diminishing student contact time.

The key point here is that the STR is a function of the number of teaching staff thought to be needed (Ts). This of course ultimately determines ΣTs. Formally the relationships can be represented as follows.

Number of Teaching Staff Needed = Number of Students (Ns) / Average Teaching Group Size (Gs) x Av. Taught Hours/Week/Student (Th) / Av. Teaching Load in hours per week (Tl)

$$Nt = \frac{Ns}{Gs} \times \frac{Th}{Tl}$$

and

$$Th = \frac{Gs}{STR} \times Tl$$

It is now clear that what is delivered in terms of taught time (taught hours per week) for a particular cost, is a function of the number of students per teacher (STR), the amount of teaching associated with teaching posts and the average teaching group size.

Table 2a is suggestive of some possible relationships between variables. It shows that for Colleges with the same number of students and staff, which therefore have similar costs per student, different mixes of group size, student learning time and teaching loads are possible.

Table 2a: Four Different Patterns with Similar Costs

College	Number of Students	Number of Staff	Student-teacher Ratio	Cost per Student (Av Salary per Teacher 15000).	Average Teaching Group Size	Number of Student Teaching Periods per Week	Teaching Load in Periods per Week
1	1000	67	15	1000	30	10	5
2	1000	67	15	1000	15	20	20
3	1000	67	15	1000	45	30	10
4	1000	67	15	1000	30	30	15

Thus College 1 has low teaching loads and students experience relatively few periods a week in mid-sized groups. In College 2 teaching loads are high, students have more contact time and group sizes are small. In College 3 group sizes are large, students receive a lot of teaching but teaching loads are not high. In College 4 students receive a lot of teaching in mid sized groups with mid-level teaching loads for lecturers.

Table 2b shows possible effects of varying the College intake whilst maintaining the same number of staff.

Table 2b: Four Different Patterns with Different Enrolments and Similar Staffing

College	Number of Students	Number of Staff	Student-teacher Ratio	Cost per Student (Av Salary per Teacher 15000).	Average Teaching Group Size	Number of Student teaching Periods per Week	Teaching Load in Periods per Week
1	500	67	8	2000	15	10	5
2	1000	67	15	1000	15	20	20
3	1500	67	23	667	15	20	30
4	2000	67	30	500	15	15	30

In this case the costs per student vary as the student-teacher ratio varies. College 1 has high costs and low teaching loads and taught time. Colleges 2 and 3 deliver the same number of taught hours to similar size groups of students but College 3 does so at lower cost as a result of higher teaching loads. College 4 has the lowest costs but the highest teaching loads.

These two tables and further variations on them illustrate how the key parameters interact. Most importantly they highlight the fact that, though costs per student are determined by average salaries and student-teacher ratios, what is delivered to students is also a function of teaching group sizes, and teaching loads. High costs can co-exist with low levels of contact time for students.

The discussion above focuses on teaching salary recurrent costs per student and has general applicability. Total salary costs must include non-teaching salaries, which arise from a variety of widely differing practices and expectations about staffing related to teacher education institutions. These are more difficult to generalise about. The number of non-teaching staff may or may not be related to enrolments. Some categories - e.g. Director, Vice-principals, finance officer, hostel warden etc. may exist in every training institution independent of enrolment. Other posts may be related to enrolment - e.g. the number of laboratory assistants, caretakers, and security guards. If historic budgeting is used employees may continue to be employed whether or not there is a continuing need for their services. The most that can be said about this category of expenditure is that it almost certainly is desirable to establish norms related to enrolment based on what is thought to be necessary in effectively run institutions. If this generates costs which are a small proportion of the cost per student, then analysis is of secondary importance, assuming adequate checks and balances exist to ensure what is allocated is spent as intended. If non-teaching salaries are a large proportion of the cost per student, this invites scrutiny of whether such expenditure is essential to the main training mission.

Non-salary recurrent costs per student are also difficult to generalise about. Most costs will arise from expenditure on maintenance, equipment, consumable materials, travel and subsistence, food subsidies and hostel costs, and student stipends. All of these can be examined with a view to establishing whether what is spent needs to be spent to maintain the

quality of the training programme. It is of interest to compare non-salary with salary costs, to establish the extent to which non-salary costs vary per student between institutions, and to establish whether non-salary costs are or could be shared in an appropriate way which was not damaging to quality or equity. This applies both to the costs of physical assets (which may be shared with other institutions or used as community resources) and to the direct costs of training (which may be partly supported through contributions from those who benefit).

As with non-teaching salary costs, if non-salary costs are a high proportion of per student expenditure they need careful examination. If they are a very small proportion this may also suggest that there is a problem in supporting basic infrastructure and providing conditions under which effective professional development may take place.

A complementary way of analysing costs is to separate out the component parts into fixed and variable elements. The latter will be sensitive to the number of students trained and will normally not be subject to marked economies of scale. Fixed costs, as a component of costs per student, should fall with increased volume. The distinction between fixed and variable costs is clear in principle but can be blurred in practice.

In brief, fixed costs usually include central administration and other common support costs, national programme development costs, and monitoring, quality assurance and accreditation systems. These cost are likely to be fixed within a range of student numbers, but may increase stepwise when thresholds are crossed. Thus within a wide band of enrolments a fixed size teacher education secretariat may be able to administer the services needed from the centre. In some cases some of these central costs will behave more like variable costs e.g. where the costs associated with periodic inspection multiply as the number of sites that need to be inspected increases.

Variable costs include staff costs associated with teaching, tutoring and mentoring, materials for students, the direct costs of assessment, school supervision visits, and student support costs for food, accommodation and clothing. Most of these will increase linearly with the number of students. There may be areas where there are economies of scale, e.g. in textbook production, which reduce the cost of a book as the volume of production increases.

5. A FRAMEWORK FOR EXPLORING COSTS BEFORE, DURING AND AFTER TRAINING

The second focus identified above for exploring costs concentrates on questions that may be asked of training systems before, during and after the core period of training. These questions can be framed in relation to relate to antecedent circumstances, the transactions associated with the process of training including its organisational features, and those aspects of outcomes from training that might indicate the value or otherwise of the investments that have been made. The latter include not only evidence of competence as a result of training but also any indications that may exist of the translation of competencies into practice.

5.1 Before Training Issues

It is fundamental to judgements of the efficiency of training systems that those who are selected for training are individuals who are likely to successfully acquire the competencies identified as the subject of the training. The predictive validity of selection methods should be high. If it is not, wastage will be excessive, and many who start programmes will fail to acquire competencies and become certified. Thus, whatever the costs of training per student, these have to be adjusted to take into account wastage arising from non-completion, and questions must be put related to whether better selection might improve the quality and quantity of those trained.

There may also be significant costs (and benefits) associated with different patterns of selection independent of their predictive validity. In particular, where selection takes place from amongst those who are already teaching or who have substantial periods of school experience, several considerations come into play. Selection may be more reliable since it can be based partly on judgements of performance in schools. Those applying for training may also be self-selected in the sense that some will decide that teaching is not their preferred career on the basis of their experience in schools. The work pre-training students undertake in schools may also be a net benefit to the costs of the school system.

Lastly, the attributes of those trainees selected constitute a starting point for training. If the assumptions made about trainees' characteristics are false, and subsequent training curricula and pedagogy are based on these, it is unlikely that appropriate competencies will be acquired efficiently. To be more specific, it may be assumed that students are fluent in the medium of instruction of colleges and schools. In some developing countries entry scores on language tests indicate that this is at best an optimistic assumption. It is also not unusual in some countries to find substantial proportions of new students minimally academically qualified in subjects for which they are being trained. If these students are confronted with subject-based curricula, which proceed from an assumption of, for example, mastery of basic mathematics at school level, they may well find the content and expectations of courses very difficult.

5.2 Training Organisation and Process Issues

Several general questions can be identified which relate to the costs and resource needs of the training process. As noted above these depend on the allocation and utilisation of salary and non-salary expenditure. Thus it is of interest to compare costs per student and patterns of expenditure (teaching and non-teaching salary recurrent, non-salary recurrent) in teacher education institutions and between teacher education institutions and other types of education and training organisations. Are the variations the result of different patterns of staff utilisation, economies of scale, or variations in one or other type of salary or non-salary costs? If so is this the result of historic budgeting or can it be justified by current conditions? Would norm-based funding encourage a convergence in costs that might promote equity and efficiency within the same mode of provision?

Pre-career training is becoming more popular and in many countries represents a preferred mode of training. It may or may not have higher costs than in-career up-grading. This will depend on how it is organised. Full-time residential pre-career training is expensive especially where it is prolonged, residential costs are substantial, and attrition rates during and after training are significant. However, the simplest alternatives, which depend on various types of in-career training, can also be costly if there are significant periods of residential tuition, trainees are paid full salaries as opposed to student stipends, and supervision and support systems during training are extensive.

Increasing the extent to which training is school-based has attracted many advocates who advance convincing pedagogic rationales. In principle it shifts some of the costs from the teacher education budget to schools depending on how it is financed and what model is adopted. This may or may not represent a net cost saving and could actually be more expensive though of course it might be more effective. The critical question to answer before stepping in this direction is whether sufficient infrastructure and good practice exists in schools where trainees can be located for them to benefit from systematic and well-informed training and support. If it does not, the costs become irrelevant.

Conventional College-based training systems generally operate block practice teaching systems where students are placed in schools for a teaching practice period and are visited by College tutors. The major cost of this is usually in tutors' time and travel expenses, assuming that schools do not charge for hosting student-teachers (as they now do in some countries). Given that the workload imposed by school visits is often a focus of tutor dissatisfaction, and that students typically report variable experiences and learning benefits, the question is how much resource does teaching practice consume and could some or most of the benefits be achieved in different ways or at lower cost? This question has a sharp focus if students already have substantial school-based experience on which to draw, as a result of periods spent in school prior to acceptance on training courses.

Lastly distance-learning systems are established widely. Teacher education is delivered using distance methods usually in combination with some face-to-face contact. This method of delivery can dramatically reduce costs though due attention must be paid to completion

rates. Where completion is linked to promotion and salary increments attrition may be low. The criticism that some desired outcomes are more difficult to achieve through these methods and some cannot be achieved at all can be countered by the observation that mixed-mode (some distance some full-time) methods can be developed that retain some of the advantages of both conventional and distance organisational patterns.

5.3 Outcome and Deployment Issues

A series of cost-related questions relate to the output side of initial training. First, many training systems couple subject up-grading concurrently with the development of method and professional skills. This may be cost-inefficient. If entrants to training have low academic competence, further schooling or targeted and intensive study programmes may be both more effective and less costly than post-school College-based subject work. This might also reduce the proportion of students who follow education courses who are using the opportunity as a second chance to enter higher education and pursue non-teaching careers. It may also be true that where subject teaching co-exists with teaching methods and professional studies, the latter are regarded as relatively low status and are neglected as a result.

Second, training may provide opportunities to acquire competencies that are unlikely to be acquired through other routes. Conversely, at least some of the competencies that training is directed towards are likely to be achievable through experience and purposeful induction. If the latter is true the key questions become: how much does training accelerate the acquisition of competencies at what cost? How long do training effects persist once teachers have entered the profession? If this time is short then training is relatively cost-ineffective.

Thirdly, and closely related, is the question of what can be learned from studying the performance of trained and untrained teachers working in similar school environments. If schools as organisations are more powerful determinants of teachers' practice than training, where should investment in the improvement of learning and teaching and in the development of teachers' competencies be located? This is not to deny the possible efficacy of training. It does open up questions of when and where in the life cycle of a teacher training should be provided and whether it needs close coupling with the organisational realities, working preferences, and incentives to improve practice found in school systems.

Fourthly, success rates on most teacher education programmes are high. This sometimes rests uneasily with observations of the competence of newly trained teachers and their working practices. There are both benevolent and malevolent explanations. It may be that the predictive validity of selection is high and that competencies are well specified and reliably assessed. If there are dissatisfactions with performance they arise from factors beyond the training process. Alternatively, selection for training carries with it the normative expectation of certification at levels of competence that do not reflect the reasonable expectations of the schools which employ new teachers. Which of these possible explanations (or others that may be plausible) stand up to analysis?

The last element of an analysis of costs is concerned with three questions, which relate to the deployment, induction and professional longevity of those trained.

Firstly, in some countries a free labour market operates and newly qualified teachers are expected to identify opportunities for employment and apply competitively for appointment. This has the attractions and disadvantages associated more generally with labour markets. It may not result in a rational deployment of new teachers in supportive schools, which can cultivate good practice based on competencies acquired during training. Other countries post new teachers according to a wide range of criteria, which are rarely based on the needs of newly qualified teachers for professional nurture. Yet, it would seem desirable that whatever is achieved in initial training was seen as the beginning of a process of professional development which would greatly benefit from some systematic support related to the consolidation of competencies. It also should encourage reflection on the conditions under which newly qualified teachers might have a real impact on the diffusion of innovations in learning and teaching and consequently lead to effective teaching methods. Newly trained teachers with untried skills entering established departments in junior positions would not seem to have a high probability of convincing colleagues of the need to adopt new pedagogy.

Secondly, and as a follow on from the first, it is largely unknown what support newly qualified teachers receive after training in their first jobs. Few education systems allocate substantial resources to induct new teachers. Guidelines may or may not exist relating to probationary periods but these frequently stress the administrative and procedural, over the professional and developmental. Training institutions may have few or no active linkages with the schools in which newly trained teachers find themselves, and no contact with most of their alumni. In these circumstances it may not be surprising that competencies acquired in training are not recognised or consolidated, and that the relevance of what is acquired in training is questioned by those who receive its products. Lying behind these issues is the open question: how should the resources invested in training be distributed over the professional lifetime of teachers? As has been noted it is not evidently the case that investment should be as front-loaded, as has traditionally been the case in many training systems.

Finally, with a few exceptions, not much is known about the professional lifetimes and career trajectories of trained teachers in many systems. If certification does not guarantee employment there may be wastage as a result of a proportion of those certified choosing to follow careers other than teaching (or teaching in another national system of education thereby representing a net loss for the national investment in training though probably a high rate of private return to the individual). Those who do enter the teaching force may not remain. This needs to be factored into costs especially where attrition rates are high; the proportion of those trained still working in areas they were trained for can drop dramatically after 5 - 10 years. The shorter the professional lifetime of teachers in the system the higher are the real costs of providing an adequate number of trained teachers.

The questions raised in this section collectively begin to identify the arenas in which data is needed to understand more about what the costs of training are, why they are configured in

particular ways, and what constraints and opportunities they create for the future. If expansion in enrolments is needed it must be achieved within realistic costs that can be sustained. Similarly if qualitative improvements are desirable these must be costed and justified in terms of at least some of the benefits that they are likely to bring. Appendix 1 collects together a summary of the questions that have been identified.

6. A NOTE ON ORGANISATIONAL PATTERNS AND COSTS

It may be helpful before concluding to provide a schematic reminder of some of the options that exist in patterns of training that carry with them cost and quality implications. This is attempted in Table 3 below. It draws attention to alternative patterns of provision before, during and after core training periods.

Table 3 identifies seven possible modes. Descriptively these can be summarised as:

Mode 1	Conventional full-time college-based training preceded by no experience
Mode 2	Conventional full-time college-based training preceded by pre-course experience and followed by mentored induction into schools
Mode 3	Untrained teaching experience followed by conventional full-time college-based training
Mode 4	Mentored pre-training experience followed by conventional full-time college-based training and mentored induction into schools
Mode 5	Mentored pre-training experience followed by a short period of conventional college-based training followed by school placement with INSET support
Mode 6	Mentored pre-training experience followed by alternating short periods of conventional full-time college-based training followed by mentored induction into schools
Mode 7	Mentored pre-training experience followed by wholly school-based training on the job leading to mentored distance support

Clearly these modes only illustrate possibilities and there are many other possible mixes, which carry different resource and cost implications. This schematic chart draws attention to four key observations. First, extended full-time institutional training is only one of many options. Second, what comes before and what comes after core periods of training may be just as important as what occurs in the core. Thirdly, there is no necessity for core periods of training to be continuous or front-loaded. Fourth, mixed-mode methods, which make use of distance education and learning while working, are clearly an option.

The analytic questions related to future policy and practice now focus on which of these (and other possible modes) are feasible, relevant to short to medium term needs, and are likely to be cost-effective. Is a new and different balance of factor inputs, in the economists' language, attractive to meet new needs and disquiet over both costs and effectiveness of existing patterns of delivery? There are opportunities provided by the pressing needs to meet shortfalls in teacher supply generated by enrolment expansion, the new emphasis in many countries on changing curricula to improve pupils' achievement, and the consequences of austerity to reconsider how investment in teacher education and training is best organised and delivered.

Table 3: Some Possible Training Modes

Mode	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Pre Training		College Training			Post Training
1						
		no experience	Full-time training	Full-time training	Full-time training	
2						
		pre-course programme	Full-time training	Full-time training	Full-time training	post course mentor support
3						
	unsupported	teaching	Full-time training	Full-time training	Full-time training	
4						
	mentored	teaching	Full-time training	Full-time training	Full-time training	post course mentor support
5						
	mentored	teaching	Full-time training	In school + INSET	In school + INSET	In school + INSET
6						
	Mentored	teaching	Full-time + in school	Full-time + in school	Full-time + in school	post course mentor support
7						
	mentored	teaching	School-based INSET	School-based INSET	mentor+distance	mentor+distance

7. CONCLUDING REMARK

This paper has explored resource and cost issues in the provision of teacher education. It implies that there is a window of opportunity for some radical reconsideration of how teachers are trained which may be long over due. Tried and tested approaches can be expensive and may not be not self-evidently effective. Despite the existence of many enthusiastic teacher educators, what evidence there is often suggests a surprising homogeneity of practice and assumptions about how best to train teachers at the curriculum level, and a disappointing record of sustained innovations which might lead to new practice which meets new needs.

There are attractive images of teacher education institutions at the cutting edge of professional practice and the development of learning and teaching methods in schools and for teacher education students. There are many opportunities to contribute to and lead curriculum development, develop close relations with clusters of schools, support teachers over the early years of their careers, improve school-based assessment, and explore and evaluate pupils learning at all levels. Teacher education institutions and teacher educators could be the critical mass at the centre of a spider's web of partnerships designed to improve the quality and range of competencies that schools engender in their pupils. Can colleges become developmental institutions which are closely linked to practice? Can they provide theoretical insights and research based rationales for experiment directed towards innovations that can "go to scale" and become generally adopted? Can they inspire and motivate new generations of teachers who might move more freely between schools and college environments? How can initial training and certification become more of a stopover on a railway line to an interesting destination rather than an arrival at a terminus beyond which maps are scarce?

All these things and many others are possible in revitalising teacher education systems. All the options are resource-constrained. The implication of this paper is that the constraints are not a starting point - imagination, enthusiasm, commitment, and insight into the training process take precedence. But costs and resources are a central issue, which must be coupled with judgements of effectiveness to chart the room to manoeuvre in generating alternative and preferable strategies to train teachers in a vibrant and purposeful professional environment.

Teacher education is at risk where austerity in public financial resources leads to the asking of hard questions about how to re-profile educational investment. Unless the sceptical can be convinced that what exists, and what can be developed, does represent value for money, unless proposed and actual costs and resource needs identified are realistic, and unless there is robust evidence that training methods of whatever kind lead to tangible benefits, the pressure will be to find the cheapest methods of certifying teachers. These will not necessarily be the most effective.

This paper makes a start at mapping key questions concerning costs and resource utilisation that can be explored empirically. Appendix 1 provides a summary of these. Deeper understanding of these questions, and the reasons for whatever answers can be provided, would provide a much more secure basis to develop policy on teacher education in particular countries. Such policy will never be solely the result of analysis focused on resource utilisation. However it can hardly ignore the questions raised in this paper if the best use possible is to be made of public funds.

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Appendix 1: Researchable Questions Related to Entry, Training Process, Outcomes and Deployment of New Teachers

Question **Entry Conditions**	Sub-questions	
How are trainee teachers selected?	What criteria are weighted in the selection process? Academic achievement? Personal qualities? Age and experience?	What evidence is there of the predictive validity of the selection process? What are the selection ratios of applicants to places and what issues does this raise?
Is there "queuing" for selection in the training market?	Are trainees direct entrants from school or have they been teaching as unqualified teaching assistants?	If there is queuing for training places does it increase or decrease costs and selection efficiency?
What are the characteristics of those selected?	What do the academic and professional experience characteristics of those selected indicate about their needs in relation to the desired competencies?	Are the (changing) characteristics of entrants into training reflected in the curriculum they follow and the pedagogic methods used?
Training Process		
What are the costs per successful student for different modes of training?	How do costs vary between institutions and modes of training? How do costs compare with those in other forms of post-school education and training?	Are variations in cost per student within a mode of training the result of different patterns of staff utilisation, economies of scale, or variations in non-salary costs?
Should pre-career training models be preferred to in-career models?	Does pre-career training have higher costs than in-career training?	What evidence is there that pre-career training is more effective and efficient than in-career training?
Is more school-based training an attractive option?	Are actual costs likely to be higher or lower?	Do schools have the infrastructure to support training and induction?
How much does teaching practice cost?	Is the cost of practice teaching consistent with the benefits?	Could the benefits be achieved in different ways?
Does distance education offer a viable alternative to College-based training?	Is distance education cheaper per qualified teacher? Does it result in similar outcomes?	How feasible are mixed-mode systems?

Outcomes		
Does teacher training increase mastery of subject disciplines?	If it does, how much are the gains and how do they compare with the costs of achieving similar gains in further schooling or higher education?	Is it cost-effective to mix subject upgrading with method and professional development courses?
Does teacher training speed up the acquisition of professional skills?	Does training impart competencies which are different to those arising from experience?	By how much does training accelerate the acquisition of which competencies?
Do newly trained teachers perform differently to untrained teachers?	To what extent do newly trained teachers act differently in organising learning and teaching to untrained teachers working in the same schools?	Do institutional effects overshadow training effects in teacher's performance in the classroom?
What are the success rates on teacher training programmes?	Are the criteria for success set at appropriate levels? Which competencies are the most common cause of lack of success?	To what extent are newly trained teachers regarded as competent by schools and other stakeholders?
Deployment		
How and where are newly trained teachers employed?	Are newly trained teachers directed to posts or does a free market operate?	Would a managed market in placement of newly trained teachers be beneficial?
What support do newly trained teachers receive?	How much is invested in supporting the induction of newly trained teachers?	Should some of the costs of initial training be redirected to continuing professional development of newly trained teachers?
What is the attrition rate for newly trained teachers?	What is the average length of time newly qualified teachers teach after completing training?	Is the ratio of investment in training to the average length of service a balanced investment?

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Centre for International Education
University of Sussex Institute of Education Falmer Brighton Sussex BN1 9RG UK

T +44 +1273 678464
E cie@sussex.ac.uk
F +44 +1273 678568

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ISBN 0 905414 24 1