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Initiatives to improve the quality of teaching and learning A review of recent literature

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Initiatives to improve the quality of teaching and learning

A review of recent literature

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ABSTRACT

This paper reviews recent literature relating to quality of teaching and learning processes within schools in low income countries illustrated with analyses of specific initiatives to improve quality. The paper focuses on three key areas of meeting diverse learners' needs, trends in curriculum change and enabling teachers including the provision of teaching and learning resources.

As progress is made to universalising access to primary education, attention is turning to the hardest to reach groups who have historically been excluded from formal education. Literature published since 2005 focuses on meeting the needs of girls, children affected by HIV/AIDS and learners with special education needs. The Gansu Basic Education Project is an example of an initiative aimed at inclusion of children from ethnic minority groups in rural Western China. As school populations are becoming more diverse, new goals for education are being expressed through the introduction of Life Skills subjects. This paper takes a closer look at uptake and implementation of the Life Skills approach to HIV/AIDS prevention and an example of a Peace Education Project being implemented in refugee camps. Meeting learners' needs implies the use of learner-centred pedagogies. A second curricular trend is towards learner-centred and outcomes-based pedagogies. The example of South Africa is briefly analysed as exemplifying the challenges involved in implementing pedagogic change. The rapid expansion of enrolments in many countries is resulting in large class-sizes and, as teacher supply fails to keep pace, multi-grade classes, up with demand. This review found very little literature on effective practice for teaching large classes and that new initiatives targeting multi-grade settings are mostly small-scale.

Quality education requires well-educated and trained teachers. Those countries that have to expand the most rapidly to meet EFA targets also tend to have the greatest shortage in teachers. As a region, sub-Saharan Africa faces the greatest challenge. In response, large-scale distance education programmes for unqualified and under-qualified teachers are being initiated across Africa. However, evidence of their effectiveness is yet to emerge. An initiative to tackle teacher deployment discrepancies in the Philippines is outlined and a teacher professional development initiative in Pakistan that has potential to go to scale is analysed. Teachers and learners need resources such as textbooks. The evidence from large-scale school effectiveness studies on the importance of textbooks and other resources is reviewed. The potential of ICTs to improve teaching and learning is explored through an analysis of the *Enlaces* project in Chile. It is argued that the three-way relationship between learner, teacher and materials lies at the heart of the education quality and that all examples of successful initiatives described in the paper injected materials carefully designed to meet learners' needs in their particular environments and related training for teachers. The paper concludes by highlighting areas in which this review found a lack of research evidence, despite their importance for the achievement of Education for All, this review found a lack of research evidence.

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CONTENTS

1. Introduction	5
2. Meeting diverse learning needs	6
Box 1: Gansu Basic Education Project (1999 – 2006), China	8
3. Curricula to promote relevant learning	8
3.1 Trends with respect to curriculum goals: Life Skills	9
Box 2: Interagency Peace Education Programme	11
3.2 Trends with respect to pedagogy: competence and competencies	11
3.3 Trends with respect to language of instruction	14
Box 3: New Breakthrough to Literacy, Zambia	15
3.4 Trends with respect to organisation of classes: multi-grade settings and large classes	15
4. Enabling teachers	17
4.1 Teacher deployment	18
Box 4: Reducing teaching deployment disparities in the Philippines: the Rainbow Spectrum	19
4.2 Teacher education and development	19
Box 5: Cluster Based Mentoring Programme, Pakistan	21
4.3 Enabling inputs	22
Box 6: Enlaces – Policy Level Strategies for Effective Teaching and Learning with ICT	24
Conclusion	25
References	27

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1. Introduction

The 2005 Global Monitoring Report, titled *The Quality Imperative*, focused attention on the meaning of quality and laid out a framework for conceptualising quality that had at its centre teaching and learning (UNESCO, 2005:36). In this respect, it closely resembled earlier frameworks developed by school effectiveness researchers (Lockheed and Verspoor, 1991; Heneveld and Craig, 1996; Scheerens, 2000). In brief, these frameworks represent learner characteristics, inputs, system and broader context as acting on school and classroom processes to produce learning outcomes. Outcomes may be defined in terms of individual achievements, both cognitive and attitudinal, and benefits to society e.g. economic growth, human development and social cohesion. Such frameworks illustrate diagrammatically that initiatives to improve the quality of education need to be firmly focused on improving teaching and learning at the same time as paying attention to all the factors, such as material inputs, teacher competencies, educational management and school-community relations, that enable and support changes to teaching and learning.

This paper reviews recent literature relating to quality of teaching and learning processes within schools in low income countries. The various sections of this paper include short descriptions of specific initiatives to improve quality, most of which have been implemented on a large scale since 2000. As more countries move closer to universalising access to education, the school population is becoming increasingly diverse and attention is turning to the hardest to reach educationally disadvantaged groups. Section 2 summarises some of the recent research on meeting the needs of learners with disabilities, affected by HIV/AIDS and girls. The Gansu Basic Education Project in West China (box 1) is an example of an initiative where quality was conceived as meeting learners' needs. Section three is concerned with contemporary trends in curricular change. It covers trends with respect to curriculum goals, focussing on the increasing prominence of Life Skills within national curricula; pedagogical changes towards more learner-centred curricula; language of instruction policies and the adoption of curricula for multi-grade and large classes. The importance of taking account of teacher competencies and school environments is illustrated through reference to the implementation of outcomes based education (OBE) in South Africa. Another Southern African initiative, the Primary Reading Programme in Zambia, is briefly analysed in box 3.

Section four focuses on teacher supply, teacher education and the material resources that enable teaching and learning. The growing popularity of large-scale distance education programmes of teachers is considered in the light of demands created by Education for All (EFA). Evidence from school effectiveness studies on the importance of textbooks and other materials is reviewed. Box 5 outlines an initiative to tackle teacher deployment disparities in the Philippines. In box 6, the Cluster-Based Mentor Programme in Pakistan is given as an example of the successful implementation of school-based in-service training that is yet to go to scale. ICTs are often mentioned as having the potential to support teachers'

professional development and classroom practice. The final box describes the *Enlaces* project that has networked schools serving 96% of the students in Chile. The conclusion highlights the common features of successful initiatives to improve the quality of teaching and learning processes given in the boxes. It finishes by pointing out the areas in which the review has revealed a lack of research evidence readily available in the international arena despite their importance to the achievement of quality Education for All.

2. Meeting diverse learning needs

Initiatives promoting learner-centred teaching and also awareness around child-friendly school environments are often driven, at least in part, by a concern for equity, as illustrated by the Gansu Basic Education Programme, described in Box 1. For much of the world, most notably Africa and South Asia, gender remains the most significant basis for educational discrimination. Until recently, most of the literature on meeting the needs of girls in schools has focussed on issues of access and retention. The establishment of a safe, girl-friendly school environment is crucial to attract girls to school and keep them there. Basic infra-structural concerns such as the provision of separate toilets have been the focus for some time, but attention is now shifting to a broader notion of a 'safe' environment that includes protection from violence and sexual harassment (Aikman and Unterhalter, 2005). This must include the development of gender awareness amongst staff and boys in schools leading to equality of respect for girls and women and the introduction of curricula and learning materials that are gender-sensitive and meet the needs of girls as much as those of boys (Oxfam, 2005). It is disappointing that even the most recent literature on gender and education in Africa presents few examples of gender-sensitive approaches to teaching and learning. Sanou and Aikman (2005), for example, comment that quality issues have simply not been part of the decade-old movement for girls' education in Mali. Although the issue of gender-sensitivity in the curriculum does appear in places, references to girl-appropriate teaching methods, for example, are very scattered (such as the schools managed by the Forum for African Women Educationalists - FAWE - described in Elimu Yetu Coalition, 2005).

The educational needs of orphans from the HIV crisis, and other vulnerable children, are rarely addressed despite the evidence that these children suffer serious educational disadvantage. Rispel (2006) identifies only four out of fourteen Commonwealth African countries as having programmes in place to address the educational needs of these children, but draws on the experience of these countries to suggest elements of good practice. A model that develops schools as centres of care and support is being piloted in five Southern African countries. This is based on empowering school clusters and local communities to take action on both HIV/AIDS education and the care of orphans and other vulnerable children (Media in Education Trust, 2006 cited in Rispel, et al., 2006).

To meet the needs of disabled children or those with learning difficulties, there is an increasing commitment in many countries to a policy of inclusion, whereby those with special needs are taught in ordinary schools, but with various forms of special support. The difficulties facing such a policy and the problems that such children face can be illustrated by looking at the case of Uganda. Kristensen et al. (2006) found that 3.2% of all learners in primary schools in Uganda had an identified disability, with over half of these suffering from impairment of hearing or sight. That the needs of these children is not being adequately met is illustrated by their high drop-out rate, with only about one third surviving from primary one to primary seven. Somewhat disturbing is the observation that the proportion of orphans – many of whom are

orphaned as a result of HIV/AIDS - in special schools is almost twice that in ordinary primary schools, suggesting that traditional forms of extended family support for orphans are less able to cope when the orphaned child is disabled, even if only mildly so, and that ordinary schools are also not meeting orphans' care needs. Uganda has a system of special schools but is also committed to developing inclusive schools. This is achieved through school clusters, each with either a Special Needs Education Co-ordinator or a Centre Co-ordinating Tutor. In addition, at least one teacher in each school is made responsible for inclusive and special needs education. There are also special schools to meet the needs of the more severely disabled and these schools are a source of expertise to assist inclusion in ordinary schools. The success of the approach is bound to be constrained by the shortage of appropriate training amongst those dealing with special needs, especially in ordinary schools, and the fact that primary school class sizes for the country average over 50 pupils, making individual attention almost impossible.

The meeting of special education needs through more inclusive mainstream schools is also a policy in Botswana, where negative attitudes of teachers towards the disabled and their capacity to learn are being challenged through teacher professional development initiatives (Dart, 2006). Ghana has committed itself to a policy of inclusion in mainstream schools rather than relying on the network of special schools it currently operates, but this initiative is yet to be implemented. In South Africa the approach to special needs can be seen in the broader context of a post-apartheid demand for genuinely inclusive education. Engelbrecht et al. (2006) identified five themes for the successful development of more inclusive schools in South Africa: an inclusive school philosophy; democratic leadership, structures, processes and values; collaboration amongst teachers; teacher development opportunities to learn how to address learner diversity and behaviour; and adequate resourcing.

Box 1: Gansu Basic Education Project (1999 – 2006), China

The Gansu Basic Education Project (GBEP) is a major attempt to improve the quality of education in a region of China where the three major dimensions defining the distribution of educational inequality meet: the west of the country rather than the east, rural rather than urban areas and ethnic minority rather than Han majority populations. Its implementation coincided with the introduction of the New Curriculum Reform for Basic Education (Ministry of Education, 2001) with an emphasis on child-centred learning, co-operative learning, creativity and the development of the individual. GBEP is a multi-component project but with two pivotal aspects, School Development Planning and Participatory Approaches to Teaching, that define a shift towards a 'bottom up' approach that ultimately focuses on meeting the learning needs of the individual child (GBEP, 2007). Important aspects in the project design include teacher training and up-grading; a variety of access improvement strategies such as the provision of scholarships, posting of female teachers to remote areas, feeding programmes and the development of child friendly campuses; the development of locally relevant materials for teacher and manager training and for classroom use.

The project makes considerable use of ICT. Resource centres, set up in township central schools and in-service teacher training institutions, capitalise on an existing national infrastructure of satellite communications and educational television. They are equipped with satellite dishes and a range of electronic hardware, including computers, printer, CD-player and re-writer, data storage items, television, digital camera and computer modem, plus a range of software. Not all of these centres have internet access but connectivity is rapidly increasing. The centres are used for teacher professional development activities but also for the production of print and video materials by local teams, to be relevant to local conditions and learning needs (Robinson, 2006).

An unusual component of the programme has been the designing and provision of 'Children's Schools', which starts from asking: 'What is a child's school? What does a school look like that a child would design rather than an adult? What should a school be like when the child is placed at the centre of the picture?' (Smawfield and Du, 2006). Important aspects of this design process include the provision, design and use of furniture to support participatory teaching methods and co-operative learning; the consideration of school and classroom displays; and the creation of a 'happy campus' by means such as the provision of space and facilities for sports and play and general improvement of the appearance and functionality of school grounds, often with active community involvement.

An account of the achievements of the project (GBEP, 2007) identifies the biggest changes that it has brought about as being changes in relationships between the school and local authorities, school and community and teachers and pupils. The last of these is perhaps most important in terms of identifying and meeting the diverse needs of learners in a truly inclusive education.

3. Curricula to promote relevant learning

Curricula specify what children are expected to learn and how much in terms of content, level of proficiency and time. This section is structured by Dembélé and Ndoye's (2005:143) division of curriculum reforms into those related to the purposes of education; linguistic reforms; pedagogical reforms and reforms related to the organisation of classes. Whilst there are inter-relationships between these

categories and reform can simultaneously target two or more of them, the categorisation is used to order current global trends.

3.1 Trends with respect to curriculum goals: Life Skills

Governments have always set goals for national curricula that broadly align with their vision for human welfare, social cohesion and economic prosperity although relative importance placed on each may vary. The contemporary context for setting these goals is globalization of the economy, media and communications infrastructure, escalating warfare, democratization, environmental degradation and, particularly in sub-Saharan Africa, the HIV/AIDS pandemic. Globalisation has implications for the skill required by the labour force now and governments preferred models of citizenship. Peace education is a response to escalating conflict and displaced populations. Human rights education, values education and developments in citizenship education are responsive to democratization. Environmental degradation has prompted the rise of Education for Sustainable Development, currently being promoted through the United Nations Decade of Education for Sustainable Development. The HIV/AIDS epidemic has presented education with a complex set of challenges, leading to the regeneration of health education and adding urgency to arguments for gender-sensitive curricula. All these 'new' subjects fall under the broad curriculum area of Life Skills, that has been promoted internationally by UNESCO, often in collaboration with other relevant United Nations organisations e.g. United Nations High Commission for Refugees, in the case of peace education (Reardon, 2002).

Life Skills encompasses social attitudes, basic knowledge and practical skills. It includes but is considerably broader than vocational skills, practical skills and knowledge that lay the foundation for children to be economically productive when they enter the world of work. Both the Jomtien World Declaration on Education for All (World Conference on Education for All, 1990) and the Dakar Framework for Action (World Education Forum, 2000) define quality basic education as enabling learners to acquire literacy, numeracy and essential Life Skills. The Dakar Framework for Action draws on the Delors (1996) report's pillars of education to elaborate on skill areas:

- **Learning to know:** Thinking abilities, such as problem-solving, critical thinking, decision-making, understanding consequences
- **Learning to be:** Personal abilities, such as managing stress and feelings, self-awareness, self-confidence
- **Learning to live together:** Social abilities, such as communication, negotiation, assertiveness, teamwork, empathy
- **Learning to do:** Manual skills, such as practising know-how required for work and tasks

Hence, curricular goals of promoting equity and social justice can lead to the planned incorporation of Life Skills in areas of learning to be and live together. Education for Sustainability Development or Environmental Education often integrates practical skills of conservation with 'live together' skills in the form of a sense of social responsibility and stewardship. Peace education can be viewed as focusing on Life Skills for learning to live together and learning to do (Dubois and Trabelsi, 2007). Life Skills are increasingly being incorporated into national curricula. They may be a theme that cuts across subjects, as in Bosnia and Herzegovina and Jordan. They may be incorporated within a specific subject, such as the Nepal National Life Skills Education Programme infused into its health curriculum. The India National

Curriculum Framework for School Education includes Life Skills linked to health, consumer rights and legal literacy. Other countries, such as Afghanistan, Lesotho and Sri Lanka, have established Life Skills within their curriculum as a subject area in itself (Hoffman, 2006).

3.1.1 Life Skills and HIV/AIDS

Responses to the HIV/AIDS pandemic have been a major catalyst for the incorporation of Life Skills. The Focusing Resources on Effective School Health (FRESH) initiative, launched at the Education For All forum in Dakar and supported by the WHO, UNICEF, UNESCO the World Bank and other key donors explicitly advocates a Life Skills approach to HIV/ AIDS prevention. Students acquire skills needed for positive behavioral change, including interpersonal communication, value clarification, decision-making, negotiation, goal setting, self-assertion, and stress management (World Bank, 2002: 34). A recent survey of 70 countries found that 55 reported including HIV/AIDS in their primary school curriculum and 62 in their secondary school curriculum (UNAIDS Interagency Task Team on Education, 2005:112). However, implementation has proved challenging. In a survey of 18 low income countries, The Global Campaign found that although nearly all had developed a HIV/AIDS curriculum, implementation was limited (Boler and Jellema, 2005). Boler and Aggleton (2005) list key barriers to effective implementation of Life Skills programmes for HIV/ AIDS prevention and make the following broad recommendations:

- There must be clearer definitions of Life Skills and what is needed in the curriculum;
- there is a need for greater political commitment at national level from a range of ministries;
- Life Skills approaches need to be more educationally driven, building upon evidence regarding which educational processes have transformative capacity;
- there is a need for research into how Life Skills can be adapted to the formal education system;
- whole-school approaches are needed;
- a massive injection of resources is needed to train teachers to deliver Life Skills;
- there is a need to take local contexts into account, in a way that is cognisant of the power structures within communities; and
- there is a need to take seriously the structural barriers that affect susceptibility to HIV, including poverty, gender, age, and race.

3.1.2 Education for peace, tolerance and reconstruction

Bush and Saltarelli (2000) describe how education has two faces, and its negative side can promote rather than reduce the chances of violent conflict. In the words of Robertson *et al.* (2007), “through social inclusion, violence and indoctrination, schools can serve as powerful weapons to produce rather than reduce violence”. For example, the Human Development Report for 2005 (UNDP, 2005:159) claims that a survey of over a 1000 ex-combatants in Sierra Leone found that half had dropped out of school for economic reasons or because the school was shut down. In Pakistan, declining quality and distorted content in the public sector has been associated with the radicalisation of underprivileged youth, risking an upsurge in violence (International Crisis Group, 2004). Articles in a recent special issue of the *International Journal of Educational Development* (Johnson and Stewart, 2007), considering how education both aggravates and mitigates ethnic tensions in Israel, Malaysia, Mexico, Nigeria, Northern Ireland and South Africa, make it clear

education's role is far from straightforward. Attempts to integrate 'peace education' into formal school curricula in low income countries have been targeted at conflict and post-conflict situations, including refugee camps (e.g. see box 2 and Bretherton, et al., 2003).

Box 2: Interagency Peace Education Programme

UNESCO and the United Nations High Commission for Refugees have collaborated to put together the Interagency Peace Education Programme that includes both a formal school programme and a community programme. It is currently being implemented in eleven countries in Africa, and has been integrated into complementary programmes in Kosovo, Pakistan and Sri Lanka (UNESCO-INEE, 2005). Designed for emergency or reconstruction situations, the programme responds to the needs of under-trained teachers, rigid syllabus and the special needs of learners by providing formal curriculum structure where concepts are gradually built on one another. Human rights-based learning is the key principle. Teachers are provided with a 'Teacher Activity Kit' that consists of a detailed lesson-by-lesson curriculum structured according to children's cognitive and emotional development. Baxter and Ikobwa (2005) outline its implementation in East Africa and the Horn of Africa.

"It is activity-centred and participatory, based on games and activities and the resulting discussions. Most of the activities are based on a "what happens when/if..." exploratory learning approach. These activities enable children to 'do peace' ... Peace Education is allocated one lesson per class per week. In Kakuma and Dadaab refugee camps (Kenya), higher-grade lessons are also used in school years 8-10. In some refugee settlements in Uganda, PEP is also implemented in after-school activities." (Baxter and Ikobwa, 2005:28)

An evaluation of the programme in Kakuma and Dadaab camps concluded that "For children [the Peace Education Programme] is a fun learning experience, full of activity, varied from lesson to lesson with competitions, outside activities, song, drama and groupwork", and that it "inspires hope and renewed faith in humankind" in both learners and teachers (Obura, et al., 2002:36). However, as Gross Enrolment Ratios are only 45% in Dadaab and 80% (Obura, et al., 2002:30) in Kakuma priority needed to be given to training more teachers. Much of the reason for its success was attributed to the "distinctly participatory way in which it was designed, with refugees as principal actors." (Obura, et al., 2002:36).

3.2 Trends with respect to pedagogy: competence and competencies

A shift or transformation in curriculum purpose can also have profound implications for pedagogical practice. Hence, the shift towards Life Skills complements a pedagogical shift towards competence pedagogies. Competence pedagogies broadly correspond to 'learner-centred' teaching. The term 'competence' is used here because competence pedagogies have been more tightly defined, principally in the work of Basil Bernstein (1975; , 2000). Competence approaches are associated with the constructivist view of learners as active and creative in constructing meaning. There is an underlying assumption of a "universal democracy of acquisition" (Bernstein, 2000:43) , i.e. learners of all abilities, all social, racial and ethnic groups, and genders are inherently competent and hence able to achieve, that sits comfortably with curriculum goals of promoting equity, social justice and inclusion. Traditional content-based curricula specify knowledge to be reproduced, so that learners are assessed according to the deficit in efforts to reproduce texts. By contrast, within competence modes evaluation is conceived as oriented towards

celebration of what is present in the learner's output (Bernstein, 2000:46-47). Competence approaches break down the rigid boundaries between subjects, for example, by using 'projects' that draw together knowledge from different subject areas within the curriculum. Rigid structures that circumscribe selection, pacing and sequencing of learning are also broken down, giving teachers and learners more control. Social boundaries are eroded as teachers assume the role of 'facilitators', giving learners greater apparent control of social interactions in the classroom (Bernstein, 2000:13-14).

3.2.1 Learner-centred versus structured approaches: insights from cognitive neuroscience

Learner-centred approaches have been strongly criticised for breaking down structure within the lesson. Critics arguing that structure is essential to pedagogical effectiveness have taken their evidence base from studies of school and teacher effectiveness (e.g. Creemers, 1994; Sammons, et al., 1995; Scheerens and Bosker, 1997), teacher or classroom effectiveness (Walberg and Paik, 2000) and, recently, also cognitive psychology and neuroscience (Abadzi, 2006; Kirschner, et al., 2006). Cognitive psychologists define learning as changing the long-term memory. Kirschner *et al.* (2006) argue that the use of minimal guidance methods that use problem-solving in information-rich settings diverts our limited working memory resources from learning. Abadzi (2006) has recently attempted to extend the findings emerging cognitive neuroscience and learning to the majority world. In high income countries, low ability learners have been found to be differentially disadvantaged by open instructional techniques. One explanation posited for this is that children from low-income households may not have the same opportunities as better-off children to acquire the skills that are useful at school. Consequently they "lack the cognitive networks and prior knowledge to which they can attach school-related information" (Abadzi, 2006:15). In addition, malnutrition and exposure to serious infections, such as giardia, worm-infestation or malaria, can impair cognitive processing abilities. She concludes that children with such disadvantages are likely to be less ready for complex educational tasks and need more time in school to practice component tasks.

Whilst the neurological make-up of people in all countries is similar, interpretations of what 'learner-centred' practice means is often different in low income countries to, say, the USA. Kirschner *et al.*'s argument is directed at discovery learning as it is applied in the United States and other Anglophone Western countries, most extensively in adult-learning and the sciences. However, between authoritarian teacher-led 'chalk and talk' and unstructured discovery learning lies a continuum of possibilities (as argued by Nakabugo and Siebörger, 2001; Lewin and Stuart, 2003:63) and 'learner-centred' is often used in a relative sense. Many initiatives in low income contexts that claim to be 'learner-centred' share characteristics of structured pedagogy in that they promote careful planning of lessons, with a clear introduction that links to the previous lesson and sets out learning objectives as well as use of formative assessment (e.g. see boxes 3 and 5 below). They often encourage teachers to make use of a range of strategies including talking to the whole class from the front, question and answer with the whole class, individual exercises or reading, group discussion and practical activities. To polarise learner-centred and teacher-centred *methods* is to oversimplify the variety of strategies that teachers can and should employ depending on their context, learners' needs and subject matter (Brophy, 1999:6).

However, there is a fundamental difference between a behaviourist view of learners as passive that leads to a focus on knowledge and how it is taught and a

constructivist view that requires teachers “view curriculum and pedagogy from the perspective of the learner and to build bridges to meet that view half way” (Little, 2006:340). The findings of cognitive neuroscience may be able to inform the design of strategies to improve cognitive learning outcomes, most especially in literacy and numeracy. However, they offer little insight into the range of values, attitudes and skills incorporated within Life Skills that were discussed in section 3.1. Competence approaches briefly described at the beginning of this section have an explicit goal of inclusion, encouraging diversity and developing social as well as cognitive skills. Their implementation on a large scale, however, can be problematic, most especially in under-resourced contexts, as discussed in next sub-section.

3.2.2 Interpretation of competence pedagogies in formal curricula

The concepts that underpin competence pedagogies have increasingly influenced the design of formal curricula, most especially *competencies*- or *outcomes*-based curricula that are structured around sets of learning outcomes expected of learners rather than content to be covered. Such curricula are attractive to governments and international agencies, firstly, because they are designed to produce lifelong learners with the flexibility to adapt to rapidly changing work environments created by globalisation and rapid technological developments. Secondly, competence pedagogic modes that use learner-centred strategies are viewed as inherently democratic (Tabulawa, 2003). Whereas such reforms represent a shift towards competence approaches, there are important points of deviation from the principles identified by Bernstein. Within formal curricula, assessment is envisaged as continuous and formative but not always celebrative of learners’ creativity. Boundaries between subjects are weakened by defining cross-cutting learning objectives (as some countries have done with Life Skills) or replacing traditional subjects with fewer interdisciplinary structures. For example, Dussel (2006) has observed a shift towards the use of curriculum frameworks that set out a spectrum of possible actions across seventeen Latin American countries. Such curricular changes are intended to make curricula more flexible so that schools and teachers can adapt them to local contexts. However, the resulting increase in complexity can have the effect of disempowering teachers. A similar criticism of complexity was also leveled at South Africa’s Curriculum 2005, compounded by the use of jargon opaque to many teachers (Chisholm, 2000; Cross, et al., 2002).

Although, its historical and political context is unique, South Africa’s ongoing experience with implementation of outcomes-based education is instructive. Curriculum 2005 was phased in from 1998 but it quickly became apparent that implementation in the majority of schools, which are under-resourced, was problematic (Chisholm, 2000; Cross, et al., 2002). Hence, a curriculum aimed at promoting equity stood accused of favouring the middle-classes. Among the reasons for this is that the success of competence approaches depends on appropriate levels of physical resources and a high degree of commitment from teachers who have been exposed to both the theory and practice of constructivist approaches (Bernstein, 2000:49). Many of the schools serving the poorest communities in South Africa do not have photocopiers, libraries, sufficient textbooks for learners or reference materials for educators to prepare meaningfully. It has been estimated that 62% of educators serving in public ordinary schools in South Africa are under-qualified (Phurutse, 2005). This has prompted a revision of the curriculum, in the form of Revised National Curriculum Statements that are currently being implemented. Despite the significant problems encountered, many commentators recommend holding on to some form of outcomes-based curriculum and are supportive of the goals of social transformation and inclusion that underpin outcomes based education in South Africa. If the challenge is the implementation of a

curriculum premised on principles of equity, inclusion and preparation in life skills for social well-being as well as economic productivity than the answer is seen to lie in making necessary compromises with respect to pedagogic approach and teacher development rather than reverting to a traditional content-based curriculum (Todd and Mason, 2005). In this respect, South Africa shares in a dilemma facing a range of the low income countries – how to design and implement within under-resourced settings curricula that are learner-centred in the sense that they take a constructivist view of learning processes and that are inclusive in that they prepare all children with the skills they need for future employment, well-being and positive civic participation in democratic societies. Chisholm and Leyendecker (2007) provide an analysis of the challenge in sub-Saharan Africa. In India, Clarke (2003) highlights the barriers presented by teachers and learners epistemological assumptions, also mentioned by Dussel (2006) writing about Latin America. Curricular reform needs to be aimed at moving teachers and learners towards a constructivist view at the same time as taking into account the professional, material and social realities of the contexts in which teaching and learning takes place.

3.3 Trends with respect to language of instruction

With respect to language of instruction, there has been a shift towards the adoption of bilingualism and in particular the use of mother tongue (L1) for the first few years of primary education within countries where a significant proportion of the population speak a minority language. These changes are driven by research evidence that suggests that children acquire linguistic and cognitive skills more readily in their first language and are then able to transfer these to a widely-used language (L2). The Primary Reading Programme (PRP) implemented in Zambia from 1998 (see box 3) is typical of such reforms in sub-Saharan African countries (e.g. Uganda, Burkino Faso, Mali) in using L1 as a medium of instruction for the first one to three years of schooling. L2 is introduced as a subject sometime between grade 1 and grade 3 and becomes the medium of instruction from sometime between grade 2 and grade 4. Outside of Africa, India's National Curriculum Framework for School Education, published in 2005, strongly upholds the principle of L1 medium of instruction. The State of Andhra Pradesh started the process of introducing instruction in eight tribal languages in 2003 with the scripting and analysis of these languages. The power of modern software means that by 2006 curricular were being developed for grades 1 and 2 (Penny and MacKenzie, 2006).

Whilst use of L1 in first few years of schooling has been demonstrably successful in raising literacy levels, critics point out that educational success requires not just literacy but also Cognitive Academic Language Proficiency (CALP) - i.e. the complex of language and learning skills needed to carry out school tasks. Acquiring these skills takes time: North American evidence suggests that it can take up to seven years (Thomas and Collier, 2002). The most effective educational programmes for bilingual learners in North America develop cognitive academic language proficiency in the first language before transferring to the second (Cummins, 2000). With insufficient time, learners' language skills may still be inadequate for the demands of the second language-medium curriculum (Macdonald, 1990). Heugh (2006) has recommended 6 years using L1 as a language of instruction in a well-resourced context and 8 years in a poorly-resourced context are necessary, to be followed by the use of both L1 and L2.

Box 3: New Breakthrough to Literacy, Zambia

The *New Breakthrough to Literacy* (NBTL) course is one of a number of interventions in the Zambian Primary Reading Programme (PRP) which aims to improve the reading and writing skills of Zambian learners in Grades 1-7. The NBTL course focuses on developing literacy in Grade 1 through the seven official Zambian languages (L1). Children simultaneously develop their speaking ability in English (L2), which remains the official language of instruction overall, to enable them to transfer their literacy skills into English from Grade 2 onwards. In Grade 2, literacy in English is developed through *Step into English*, a course which covers much of the same content as NBTL, and is familiar in terms of methodology and classroom management.

The PRP as a whole uses a version of the well-known primary literacy programme developed by the South-Africa-based Molteno Project. NBTL is a version of *Breakthrough to Literacy* which originated in the UK and was adapted by Molteno for developing initial literacy in African languages. The Project develops materials in languages where none exist. Literacy skills are then taught in English and a programme of early English language development with cross-curricular application prepares learners to use English as a medium of instruction. Outside South Africa the Project operates in many countries (e.g. Namibia, Botswana, Malawi, Uganda, Ghana) and is widely considered to be successful in raising primary school literacy levels.

The Zambia PRP started piloting in 1998 and was scaled up to include all primary schools by 2005. Evaluations (e.g. Sampa, 2003; Linehan, 2004) have consistently recognised the success of the project. Reading levels have improved considerably in both local languages and English. Apart from the principle of L1-literacy first, the success of the PRP may owe much to the wider Molteno package which includes focussed classroom pedagogy using child-centred methods, strict teacher planning and assessment, school-level project monitoring, high-quality materials production, extensive teacher training and targeted community support. These practices have had an influence in Zambian education beyond the boundaries of the PRP itself. There is widespread support for the Zambian programme amongst teachers, in the community and the education service as a whole.

The Zambian PRP illustrates the importance of focussed instruction in African classrooms, the value of parental support for educational interventions, and the potential for low-cost spin-offs (Linehan, 2004) of well-managed system innovations for the wider educational culture. It also illustrates a crucial debate on the role of language in African education. Not only does it demonstrate that learning through a local language in the early years is easier and more effective but that the learning skills acquired transfer to a second language. However, it remains to be seen whether it raises subject achievement in the longer term. Achieving this in African education is likely to require extended periods of L1-medium education as well as stronger emphasis on CALP in the teaching of both African languages and languages of wider communication.

3.4 Trends with respect to organisation of classes: multi-grade settings and large classes

Dembélé and Ndoye (2005) use the last of their categories to talk about the use of multi-grade classes and double shifts. Both of these tend to arise as a response to necessity. Multi-grade classes are most common in rural areas, where student

numbers do not warrant a teacher per grade or a school cannot attract enough teachers. Double shifts are a solution to overcrowding of classes in urban areas. Only multi-grade classes and the alternative to double shifts, large classes, have implications for organisation of the curriculum. However, despite the prevalence of both, there are very few examples of national curricula in low income countries being adapted to these conditions. Those examples that do exist tend to be small scale.

3.4.1 Designing and adapting curricula for multi-grade settings

Little (2006) identifies two ways in which national curricula have been centrally adapted for multi-grade settings. The first way is through the development of materials for use by learners, allowing individuals within in a class to work at different levels at the same time. The second develops materials for teachers to use in planning their teaching. Both *Escuela Nueva* programme, which originated in Colombia in the 1980s and has been adapted for use in many other countries, and the Rishi Valley elementary school programme in the state of Andhra Pradesh, India have developed learning materials to help the learner progress through the curriculum sequence. Assessment tasks and in the case of the Rishi Valley, also remedial activities, are built into learner guides. This approach relies on a plentiful supply of high quality self-study materials that engage learners. Teachers are trained not only in how to integrate learners' use of these materials within their teaching but also in associated theories of how learning occurs. In a series of evaluations spread over its lifetime *Escuela Nueva* has been found to lead to better cognitive achievements as well as improved civic, democratic and social behaviour than traditional schools, (Forero-Pineda, et al., 2006). In Sri Lanka, the Learning and Teaching in Multi-grade Settings (LATIMS) project has developed learner guides in collaboration with teachers for grades 3-5 of the mathematics and language curriculum (Little, et al., 2006). Teacher education materials were also developed to go alongside these materials.

The second approach focuses on teachers. Central curriculum development teams re-organise the curriculum to enable teachers to address the same topic across grades. The LATIMS team in Nepal used this approach to re-organise the Natural and Social Science curriculum, once again, developing complementary teacher education materials. Pridmore and Vu (2006) give a detailed description of a similar curriculum development exercise in Vietnam. Starting with a primary curriculum presented for mono-grades, the team developed health education lesson plans for multi-grade teachers using an enquiry-based approach. Field-tests in ten multi-grade schools and a complementary research study (Vu, 2005) showed that teachers were able to follow the lesson plans and students had significantly higher cognitive scores compared to a control group who had received traditional health teaching. In extending this work to seven sub-Saharan African countries and Bhutan Pridmore has found that deep-seated cultures of curriculum design are a significant barrier to the introduction of multiple-grade cycles (Pridmore and Vu, 2006:187-188). Nonetheless, multiple-grade cycles have been introduced into multi-grade demonstration schools in Zambia. Both approaches relieve teachers, who are often working in difficult circumstances (see, for example, Aikman and Pridmore's description of single class schools in rural Vietnam, , 2001), of the burden of re-developing curriculum.

With the exception of *Escuela Nueva*, initiatives to re-organise curriculum for multi-grade classes have tended to be small scale. Yet, given the prevalence of small schools with fewer teachers than grades, scaling up such initiatives is essential if

children in remote areas or overcrowded schools are to be offered primary education of a reasonable quality.

3.4.2 Effective practice for large classes

The abolition of user fees in many low income countries, particularly in sub-Saharan Africa over the last decade has led to mushrooming class-sizes, most especially in the lower grades. Given this situation, the paucity of research and initiatives, at least in the English language, on effective practice for large classes is surprising. Dembélé and Ndoye (2005:160) mention that Burkino Faso, Cameroon and Senegal have experimented with large-class pedagogy on a small scale for several years. A few individual researchers have observed on a small scale the practices that teachers in sub-Saharan African countries employ with large classes. Croft (2006) describes how teachers in Malawi use a variety of oral techniques to manage large classes and meet the needs of learners, who, with the implementation of Education for All, are increasingly diverse. On the basis of a review of the literature and her observation of “more effective teachers” in Uganda, O’Sullivan (2006a) recommends that narrow-based academic curricula are easier to deliver to large classes than a broad curriculum with vocational elements, suggesting that the introduction of Life Skills subjects is likely to be especially challenging when enrolments are growing. O’Sullivan also points out that assessment and medium of instruction policies limit strategies that teachers of large classes can use. It is worth noting that these observations, like those made by Barrett (2007) in Tanzania suggest that teachers employ practices that may be perceived as being ‘teacher-centred’, such as whole class question-and-answer or singing because they find them to be relatively effective with large classes and minimal teaching and learning resources. As Croft (2006) points out, many strategies recommended for multi-grade classes, such as ‘learning from friends’, may also work well in mono-grade large classes. This is an area of inquiry that deserves more investigation, most especially as the patchy evidence available suggests that strategies that work best in poorly-resourced settings may be different from those that are most successful in well-resourced settings.

4. Enabling teachers

This section looks at the challenges of recruiting and deploying teachers and providing them with the education and professional development they need to be effective. It finishes by looking at evidence on the importance of resources, particularly textbooks and learning materials, in enhancing learning achievement. The potential of ICTs to support both teacher education and teaching and learning in schools is considered.

The previous section stated that shifts in curriculum design that are currently occurring in various low income countries need to be supported by teacher education. This is one important part of the composite teacher recruitment, education and deployment puzzle posed by Education for All. It is estimated that the achievement of the educational millennium development goal of universal primary education by the year 2015 will depend on the recruitment of 18 million new teachers across the world. Sub-Saharan Africa faces the greatest challenge where the total number of teachers will have to increase by 68%, requiring an inflow of 3.8 million teachers (UNESCO Institute for Statistics, 2006:45). However, the reality is that the countries with the greatest shortfall in teachers also have low secondary enrolment ratios, and hence a small pool of educated adults from which to recruit teachers. In these countries also, teachers’ salaries represent a large part of the education budget. Yet, because primary school teachers are numerous, in real terms their

wages are low and have tended to fall over the last thirty years (Bennell, 2004; Lambert, 2004; Siniscalco, 2004). This state of affairs means that many countries face a choice between recruiting under-qualified and allowing pupil to teacher ratios to escalate. Many low income countries either at present or at some time in the past have opted to recruit under-qualified teachers. This may occur unofficially, as in Ghana, where desperate schools plug vacancies with unqualified teachers (Ankomah, 2006). Alternatively, recruitment of under-qualified teachers may be legitimised at the national level through the creation of 'contract' positions or the creation of a lower grade of teacher, who is trained but has received fewer years of schooling prior to training. As a consequence, in many countries, a significant proportion of teachers, who themselves only received a lower secondary education or even primary education (UNESCO Institute for Statistics, 2006). The least qualified teachers tend to be concentrated in remote hard-to-staff schools (UNESCO Institute for Statistics, 2006). Further, research suggests that trainee teachers have typically left school with low academic grades (Lewin and Stuart, 2003). So, even fully qualified teachers are likely to need support with academic content and also in the language of instruction, where this is not a widespread lingua franca, in addition to professional development to improve pedagogical skills.

4.1 Teacher deployment

The sheer quantitative challenge of recruitment is compounded by one of deployment (Shibeshi, 2006). It is common to find that schools in remote areas are vulnerable to under-staffing at the same time that there is a surplus of unemployed teachers in large cities. Disparities in deployment of female teachers tends to be greater as it is generally accepted that married women should not be separated from their husbands and families are reluctant to see young unmarried women move to distant locations perceived as unsafe, in large part due to lack of medical facilities (Bennell, 2004). Strategies that have been tried to attract teachers to hard-to-staff schools include building or improving staff housing, recruiting teachers locally in the expectation that they will return to the districts where they have family and cultural ties and offering financial incentives. The second of these options is the most affordable and even more so when unqualified contract teachers are recruited, as occurs in India. However, as an initiative in the Philippines demonstrates (see Box 4), the implementation of policies to reduce disparities requires an enabling environment with respect to effective Education Management Information Systems and transparent management practices. Teacher shortages in rural schools are often exaggerated in official statistics by blanket national policies of one teacher per grade.

Box 4: Reducing teaching deployment disparities in the Philippines: the Rainbow Spectrum

The Philippines successfully reduced disparities in teacher deployment between 2002 and 2004 through using a 'rainbow spectrum' to render disparities visible. Districts were 'coloured according to pupil teacher ratios (PTR), with blue indicating a PTR below 24 and red indicating a PTR over 50. This simple device raised awareness of teacher distribution issues by rendering previously-concealed disparities visible and created a set of terms through which debate about these disparities could be conducted without recourse to statistics. Managers at all levels of the education system quickly became familiar with the meaning of phrases such as 'blue-zone schools' and 'red-zone divisions'; and many local managers began using them in arbitrating the competing claims of school principals and local stakeholders. By making the relevant information readily available and easily understandable, the rainbow spectrum has, in effect, given the marginal schools a voice they previously lacked. The rainbow system paved the way for sharper targeting of new teaching positions to the shortage areas and systematic transfer of vacant teaching positions from surplus to shortage areas. Between 2002 and 2004, red zone areas received proportionally between four and five times the average national allocation of new teaching positions. Transfer of vacant positions is a slower process. While the deployment of new teaching positions to a red-zone school has an immediate impact, it may be necessary to wait several years before a vacancy occurs in a moderate sized blue-zone school, enabling a transfer to take place. After three years of project intervention, disparities in teacher deployment at the elementary level have been significantly reduced, although the Philippines are a long way from achieving equitable distribution. In 2004, the most favoured quarter of elementary pupils still had twice as many teachers available to them as the least favoured. Nearly all the improvement has been achieved at the local (divisional) level, indicating that local management are largely responsible for the reduction in disparities.

From Genito, Roces and Somerset (2005)

4.2 Teacher education and development

The challenge of training new and existing teachers for EFA has led to calls for more school-based teacher education and professional development (Dladla and Moon, 2002; Lewin and Stuart, 2003). There are signs that this is beginning to happen with ministries of education in Zambia, Kenya, Malawi and Ghana strengthening decentralised networks for supporting school-based teacher training (Mattson, 2006). For example, Ghana started a distance programme in 2005 that aims to give 24, 000 untrained teachers the opportunity of studying a diploma in basic education. In Zambia, Provincial and District Education Office staff and District Standards Officers are responsible for monitoring the Zambia Teacher Education Course school-based year. In Malawi, District Education Officers are responsible for monitoring the level and quality of support provided to Malawi Integrated In-service Teacher Education Programme students by zonal Primary Education Advisers.

Establishing decentralised support systems for students remains the greatest challenge for school-based teacher training and demands a large up-front cost. For this reason, Mattson (2006) warns that distance education should not be considered as a 'cheap option'. However, given that teachers' practice is constructed 'on the job', school-based models of pre-service and in-service training do have the potential to raise the quality of teaching (Dembélé, 2005). School-based methods of coaching,

mentoring and assessing students tend to rely on, and therefore expose students to, competence pedagogies to a greater extent than traditional college-based courses, as illustrated by the Cluster Based Mentoring Programme, described in box 5.

A small number of high profile projects have experimented with the use of ICT to support distance education for teachers. The DFID-funded Digital Education Enhancement Project (DEEP) developed locally relevant professional development programmes for teachers in twelve primary schools in South Africa and another twelve in Egypt using ICTs. DEEP found that teachers and students quickly gained confidence in the use of ICTs. An evaluation found that learning to use ICTs had “a significant impact on the self-image, confidence and professionalism of teachers” (Leach, et al., 2005:ix). However, a study on primary teacher connectivity in sub-Saharan Africa, concluded that although it is possible that hand-held technologies will in future become widely available, “the dominant scenario remains lack of access to any form of ICTs in the school environment” (South African Institute for Distance Education, 2005:52). Large-scale trials of SMS to support in-service training of thousands of teachers are currently being conducted in Kenya (Traxler, 2007). An earlier scoping study concluded that, as pay-as-you-go mobile networks cover 70% of Kenya’s population and teachers are ‘early adopters of new technologies’, there is potential to use bulk SMS messages to support in-service teacher training and for school census returns (Traxler and Dearden, c. 2005). At the current time, however, field-based teacher training programmes in the region still overwhelmingly rely on print-based materials with very little use of ICTs (Mattson, 2006). The web is, however, being used at the level of teacher education institutions to share and support development of materials for distance education cross-nationally. The Teacher Education in Sub Saharan Africa (TESSA) Programme, led by the Open University in UK in collaboration with teacher training institutions in nine African countries, is creating web-based 'open content' multimedia resources and course design guidance for teachers and teacher educators (TESSA, 2007).

Box 5: Cluster Based Mentoring Programme, Pakistan

The Cluster Based Mentoring Programme (CBMP) used an adapted version of the cascade model to deliver school-based professional development to teachers. CBMP was led by the Institute for Educational Development, at the Aga Khan University (IED), within the framework of Education Sector Reform and, more specifically, the USAID-financed Education Sector Reform Assistance Programme (ESRA), which runs from 2003 up to 2007 in selected districts of Sindh and Balochistan. The government's policy documents prior to the launch of ESRA indicated that teachers needed development in the areas of: curriculum content, material development and pedagogical skills, most particularly for multi-grade settings found in rural areas (Ministry of Education, 1998; Ministry of Education, 2002). CBMP had the following objectives:

- to enhance teachers' content knowledge in the curriculum areas of Maths, Science, Social Studies and Languages;
- to develop skills for curriculum integration;
- to develop classroom pedagogic practices, most especially in multi-grade settings, through the use of lesson planning, child-centred learning techniques and active teaching methods; and
- to help teachers make teaching and learning resources from locally available material.

Primary and secondary school teachers were selected to be mentors for clusters of between 15 and 20 schools. The mentor training consisted of six weeks at IED, two weeks in their own schools and two weeks back at IED. Early sessions focused on developing reflective practice and critical thinking to help trainees conceptualise their new roles as mentors as well as teachers. Subject knowledge and teaching techniques were also covered in the first six weeks. During the two-week field-based sessions trainee mentors started mentoring other teachers within their cluster, supervised by field-based IED coordinators. The last two weeks at IED were geared towards addressing specific needs of the mentors based on their field experiences, preparing detailed training manuals and effective teaching learning aids using low cost material. Once trained, the mentors conducted weekly workshops for teachers in their clusters over 48 weeks. They also visited teachers in their schools where they co-planned and co-taught the lessons. The central school of each cluster served as an open Learning Resource Centre. The whole process was closely monitored and supported by the field based coordinators. Between 2004 and 2006, CBMP trained more than 300 mentor teachers who went on to mentor around 8000 teachers.

The professional development model adopted by IED recognised the centrality of school for educational improvement but also the school's position within the education system. Hence, it was considered equally important to build the capacity of managers and teacher educators, who support the school. Several certificate, diploma and degree programmes were offered at tehsil (parish), district and provincial levels' for the management staff, the faculty of training colleges and the head teachers of the schools. IED faculty members also conducted research to inform development of CBMP (Ali, et al., 2006; Hussain, et al., 2007).

Early evaluations by ESRA indicate some improvement in teachers' skills and students' achievement (ESRA-Pakistan, 2005a; ESRA-Pakistan, 2005b). It is still too early to measure improvement in students' learning as a direct consequence of CBMP, although the anecdotal evidence suggests a positive outcome for a majority of the students (Hussain, et al., 2007). Mentor teachers reported that the mixed mode training gave them the confidence to deliver training within their clusters. The

mentee teachers reported that their mentors were effective facilitators. One advantage of using practicing teachers as mentors is that colleagues were inspired by their improved practice and transformed attitudes. Classroom observations reveal real improvements in school environment, teachers' competency and teaching skills, students' learning and overall culture of the school. In small rural schools, mentee teachers manage multi-grade classrooms more effectively and are better at involving the local community in school improvement. Some of the challenges encountered by CBMP were: large numbers of teachers in some clusters, political barriers, frequent transfers, unavailability of substitutes when teachers of single-teacher schools attended workshops and lack of coordination with components of the broader ESRA Programme. Despite all these challenges, CBMP has a potential to be replicated on a larger scale in a cost-effective way within the existing government system by developing its available human resource and regularising the cluster based system (Hussain, et al., 2007).

4.3 Enabling inputs

Large scale school effectiveness studies have highlighted the importance of textbooks and other learning materials on student performance. For example, Fuller and Clarke (1994) reviewed School Effectiveness studies in less developed countries that adjusted students' achievements for their family background and found "rather consistent school effects" in relation to availability of textbooks and supplementary reading materials. Around 50% of the reviewed studies showed significant positive associations between academic achievements and school inputs. Velez *et al.* (1993) reviewed 18 empirical quantitative studies at the primary level conducted in Latin America and the Caribbean mainly in the 1980s and identified that access to textbooks and other instructional materials were related positively to academic achievement. More recently, the World Bank Operations Evaluation Department's review on the "*determinants of education quality in developing countries*" (Boissiere, 2004) further confirmed textbooks and writing materials as key contributors to school effectiveness at the primary level in developing countries. Lee *et al.* (2005) analysed the SACMEQ II data and found that students in better physically resourced schools achieved higher, although the relationship between teaching resources and students achievement was less clear. Michaelowa (2001) analysed the PASEC data on primary education in five Francophone Sub-Saharan African countries Burkina Faso, Cameroon, Côte d'Ivoire, Madagascar and Senegal. It was found that the availability of textbooks had strongly significant and positive impact on learning outcomes. In short, much literature in the developing countries does seem to suggest that resources do matter and the single most important cost-effective input is the textbook and other pedagogical and learning materials (e.g. Fuller, 1987; Fuller and Heyneman, 1989; Lockheed and Verspoor, 1991; Fuller and Clarke, 1994). However, there are influential dissenters.

Hanushek (1995; , 2005) has consistently argued that "there are no clear and systematic relationships between key inputs and student performance" (Hanushek, 1995:232). The central theme of his argument is that the traditional approach to providing quality education by simply providing more inputs is frequently ineffective. In a production function analysis of data from the *Trends in International Mathematics and Science Study* (TIMSS) (Hanushek and Luque, 2003), Hanushek confirmed his earlier findings concerning the inefficiency of school resources in both developed (Hanushek, 1997) and developing countries (Hanushek, 1995). The abundance or lack of school resources may play a less important role than the efficiency in the use of such resources. In a similar production function analyses of TIMSS data,

Wößmann's (2003) found that student-level international differences in achievement in science and mathematics could not be attributed to resource differences but were strongly related to institutional differences such as a centralized examination system and school autonomy. However, the sampled countries/regions in the analyses of TIMSS data by Hanushek and Luque (2003) and Wößmann (2003) are all relatively wealthy. For instance, no African countries that participated in TIMSS (e.g. South Africa, Morocco) were included in Hanushek and Luque's (2003) analyses. Hence, the generalization of their findings to developing countries is problematic, particularly for African contexts. Nonetheless, Hanushek and Luque's (2003) advice to look "beyond simple resource policies" (p.498) remains important.

A weakness of these types of studies is that they do not tell us about the quality of inputs, their suitability to curriculum or the school environment, whether they form part of an integrated plan for quality improvement initiative or indeed whether they are actually being used (Crossley and Murby, 1994; O'Sullivan, 2006b). It has been pointed out with respect to multi-grade classes that teaching and learning materials need to form part of an integrated teaching strategy. This principle is illustrated by the initiatives to improve teaching and learning described in boxes 1, 2, 3, 5 and 6 in this paper. All of these initiatives involved the input of resources, although they vary considerably in nature. The Gansu Basic Education Project equipped resource centres to generate their locally relevant resources and also provided furniture to facilitate a greater range of teaching strategies. High quality materials contributed towards the success of the Interagency Peace Education Programme and the Primary Reading Programme in Zambia. The Cluster Based Mentoring Programme generated training manuals and supported teachers to develop their own low cost materials. *Enlaces* is an example of the use of ICTs on a large scale to improve the quality of teaching and learning and make school curricula more relevant to the knowledge age. In all these examples, inputs contributed to the success of initiatives because they were appropriate to the environment and were introduced alongside teacher training. Both Gansu Basic Education Project and *Enlaces* were able to take advantage of existing communication infrastructure. In most of sub-Saharan Africa connectivity is still limited and this makes inputs based on ICTs unlikely to be effective. Not only do materials need to be selected or developed to support desirable pedagogical practice but conversely the availability of materials has implications for pedagogical practice. *Enlaces* opened the door to new teaching models in Chile. On the other hand, discovery learning is severely constrained where children do not have access to the internet or well-stocked libraries. The 2005 Global Monitoring Report (UNESCO, 2005) and UNICEF (2007) include *enabling inputs* as one of five dimensions of quality. If inputs are, rightly in our view, considered as enabling then they can only be discussed meaningfully in terms of *who* they enable (context, knowledge and experience of teachers and learners) to do *what* (literacy, Life Skills etc.) *how* (participatory, learner-centred, inclusive etc.).

Box 6: Enlaces – Policy Level Strategies for Effective Teaching and Learning with ICT

The Chilean initiative, *Enlaces* (links), started in 1992 with the aim of improving quality and equity of education through integrating ICT as learning and teaching resources for all students and teachers in the eleven thousand Chilean public schools (Hinostroza, et al., 2003). By 2007, 88% of primary and 85% of secondary schools participated in *Enlaces*, covering 96% of the student population. One of the fundamental premises of the *Enlaces* programme has been that merely supplying information technology to a school is not enough. Although ICT can potentially simplify and enhance the learning process (OECD, 2005; Balanskat, et al., 2006), additional efforts, such as teacher training, technical support, and explicit ICT-based classroom activities must be carried out in order to produce sustainable changes in pedagogical practices and student learning outcomes (Fullan, 1998; Osin, 1998; Pelgrum, 2001; Hepp, et al., 2004). *Enlaces* focuses on empowering teachers with new tools and resources for teaching and learning and use of the Internet for communication and cooperation, with a special concern to incorporate isolated schools. Towards this end, the initiative has developed a “system” of “strategies” to develop capacity to use ICT (potential), put in place digital resources (contents) and defining shared goals with respect to ICT in education (vision).

With respect to capacity-building, *Enlaces* has developed a three-tiered teacher development programme. The first tier is periodic school-based training spread over two years. A version adapted for rural schools is spread over three years and involves trainers providing support within the classroom. The second tier follows on from the training period, when teachers are offered a one-year follow-up technical assistance programme that supports incorporation of technology into educational projects and the development of greater autonomy. The third tier is a series of seminars intended to deepen teachers’ understanding of the use of ICT in teaching and learning. In rural schools, capacity-building is extended to the educational community (teachers, principal, students, parents and other relevant actors) through the “technology appropriation process”. The key dimension of this process is the empowerment and involvement of the educational community in designing and refining a project that responds to the needs of the schools as well as to the opportunities of ICT.

Enlaces has established an education portal (<http://www.educarchile.cl>) that provides a rich collection of materials such as lesson plans for teachers, learning materials for students and papers for researchers. These resources help teachers to envision simple ways of technology integration. Resource development is ongoing as research institutions can bid for funding to develop and evaluate models and kits for using ICT in the teaching and learning. Finally, work is just beginning to establish a consensus around a vision for ICT in education through defining standards for technological infrastructure availability and use in different types of schools the ICT skills that teachers and students are expected to attain during initial teacher training institutions and in school.

After fifteen years of implementation, *Enlaces*, together with other national initiatives, has achieved the following:

1. Installed and sustained a national ICT infrastructure in the Chilean educational system, providing computers, Internet and digital resources to schools and related institutions;

2. Enabled teachers to take advantage of the potential of ICT, for their personal use and for their professional activities;
3. Built national research and development capacity to further develop ICT uses in education;
4. Provided students and parents of all socio-economic backgrounds with access and capacity to use ICT;
5. Developed national consciousness on the importance and possibilities of ICT for education and other areas, especially among policy makers, researchers, teachers and parents.
6. Influenced other countries in the Latin-American region in their design and development of ICT in education policies.

On the other hand, *Enlaces* has not yet achieved a demonstrable impact on students' learning achievements as defined by the national curriculum. *Enlaces* is now embarking on a new stage and has defined its mission as to "contribute to the improvement of the quality of education and to the development of citizens' digital culture, with quality, equity and pertinence".

Enlaces has benefited from a stable political environment and national consensus around the need for integration of ICT in education, which has enabled it to survive seven Ministers of Education. Key to its success has been the evolutionary development of the initiative, a multi-pronged approach in which teacher development is given a central position and the flexibility to meet local needs through such strategies as the technology appropriation process.

Conclusion

This paper has reviewed recent literature relating to prominent themes in recent literature on the quality of teaching and learning in formal basic education in low income countries. In the process it has presented brief analyses of six specific initiatives. At the beginning of the twenty-first century, a quality education is expected to be inclusive in the sense that it meets the needs of diverse learners, including girls and boys, minority ethnic groups that have historically been excluded from or underachieved in schools, learners living in remote areas, children with special education needs and those speaking minority languages. An inclusive education is conceived as being learner-centred, rooted in a constructivist understanding of the learning process and drawing on participative or interactive pedagogic strategies. As well as the basic academic skills of literacy and numeracy, a quality education is also expected to provide children with Life Skills to tackle challenges in their societies such as the prevalence of HIV/AIDs and environmental degradation and skills to promote peace, human rights and democracy. These demanding expectations are being upheld internationally at the same time that enrolments in many countries are expanding out of proportion to teacher recruitment with the consequence that teachers on low salaries, many of whom are not formally qualified, are faced with large or multi-grade classes.

The literature review has also revealed examples of initiatives that have successfully addressed these challenges, through provision of resources, professional development for teachers and the use of ICTs. All these initiatives succeeded in strengthening what Little (2006:320) describes as the three-way relationship between learner, teacher and materials that lies at the heart of teaching and learning. Further, initiatives also consider elements of the broader context in which schools and classrooms exist. The Interagency Peace Education Programme had a community strand that was at least as equally important as the formal school strand

described in this paper. Enlaces adapted its programme to the specific needs of rural schools through working with school communities. CBMP in Pakistan included capacity-building activities for administrators as well as teachers.

In the course of reviewing literature for this paper, it has become clear that there is a lack of research evidence readily available in the international arena in some key priority areas for the EFA movement. These are:

- Gender-sensitive processes of teaching and learning;
- The ways that multiple forms of disadvantage interact (e.g. orphans with disabilities);
- Ways to integrate Life Skills into formal education systems that are responsive to social structures and inequalities, school realities and teacher capacity;
- Effective strategies for teaching large classes, including teaching of 'new' Life Skills subjects, such as HIV/AIDS awareness and peace education;
- The effectiveness of the recently implemented large-scale distance-education programmes for teachers;
- Effective ways to introduce ICTs, including mobile technologies, to improve the quality of teaching and learning, including teachers' professional learning, in areas with limited connectivity and low density of computers.

Addressing these gaps in our knowledge will be a key part of the next steps towards quality Education for All.

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