EQUIP1
**STUDY OF SCHOOL-BASED TEACHER INSERVICE PROGRAMS
AND CLUSTERING OF SCHOOLS**

School- and Cluster-based
Teacher Professional Development:
Bringing Teacher Learning
to the Schools

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1. INTRODUCTION

The current movement to universalize access to quality education in a cost effective manner – coupled with recent developments in our understanding of human learning - has led to a critical re-examination of conventional modes of teacher education. Traditional pre-service teacher training programs have been lacking in quality and slow to change, while large-scale in-service teacher training schemes have proven to be unsustainable and have rarely translated into instructional gains. School and cluster-based, in-service teacher professional development programs have been offered as promising alternatives. This approach includes community participation, ties teacher training curricula to local conditions and school-level goals, and purports to be cost-effective. Pilot activities and innovations, some taken to scale, have proliferated around the world in both developed and developing countries. This paper endeavors to critically examine these ongoing programs to determine whether school and cluster-based, in-service teacher professional development programs are more effective than more traditional, large scale "cascading" teacher training approaches. In particular, this review will explore the question: *Are school-based and cluster-based, in-service teacher professional development programs the most effective means to improve teacher practices in developing country contexts?* First, the rationale for in-service teacher professional development will be presented. Next, I will review the current status of our understanding about in-service teacher professional development, looking at theory and practice. Then, I will review some ongoing cases to gain insight into the diversity of TPD configurations. Finally, I will draw implications for policy as well as identify persistent gaps for researchers and outstanding issues for policymakers.

2. RATIONALE FOR SCHOOL AND CLUSTER-BASED IN-SERVICE TEACHER PROFESSIONAL DEVELOPMENT

In a review of 310 studies of teacher education since 1980, Tatto (1997) found that the structure of teacher education had changed very little and that the pedagogy in teacher training programs tended to reinforce the 'transmission', or passive, model of learning. This led to the conclusion that few innovations in teaching had occurred over the previous fifteen years (Tatto, 1997). Conventional teacher education in general has been shown in many cases to have little impact on teacher learning or subsequent classroom instruction (Tatto, 1997; Warwick and Reimers, 1992). Examining the findings of 170 estimates of the impact of teacher education in various settings, Hanushek (2002) found that only 9% of these estimates showed positive and statistically significantly effects on student performance[1]. On the other hand, Husen, Saha and Noonon, examined 32 studies and found that teacher education can make a difference – qualifications, experience and levels of education and knowledge were all positively associated with student achievement (cited in Psacharopoulos and Woodhall, 1985). They concluded that trained teachers and the quality of teaching matter, but questions remain about how they matter and in what contexts and about what is the most cost-effective way to conduct teacher

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[1] These are production function estimates taken from 89 individual publications which appeared before 1995. A production function is the relationship between an output (student achievement, in this case) and inputs required to produce that output (teacher education, e.g.).

teaching. Ultimately, "…the best way to improve teacher quality will depend on conditions in the country and can be determined only after analysis of the costs and effectiveness of alternative ways of training and using teachers"(Psacharopoulos and Woodhall, 1985:227).

These mixed and often disappointing effects of teacher education have inspired many countries to augment their teacher training by providing in-service teacher professional development (ITPD) activities. These programs purport to be relevant and practical, timely and topical, and are generally appreciated by teachers who are accustomed to working in isolation with little technical support. Countries have also been searching for more cost effective alternatives to traditional teacher education. ITPD also holds more potential for spawning much-needed innovation than conventional teacher training colleges and universities. These latter institutions are typically conservative and teacher trainers themselves can be resistant to change (Tatto, 1997; OECD, 2003). Despite the recent preponderance of progressive rhetoric on learning and teaching in these institutions, teacher educators have been slow to incorporate new methods into their teaching (Avalos, 2000). In a review of fifty-three studies of teacher education, Tatto (1997) found that only fourteen of them incorporated elements of constructivist theory, despite its widespread espousal among educators today. Only three of these fourteen programs had been deliberately designed with constructivism as their core approach (Tatto, 1997).

Most countries have by now introduced some form of ITPD. Lacking other models, however, many have relied on large-scale "cascading" or "multiplier" workshops as their primary means of ITPD. Many countries have found that this form of ITPD is prohibitively expensive, reaches few teachers, often fosters a negative model of passive learning, and effects little change in the teaching/learning process. These programs are typically organized on an *ad hoc* basis, often responding to specific directives or fads (Villegas-Reimers and Reimers, 1996), or designed to train teachers in a specific package of curricula or policy (Tatto, 1997). It is often conducted in locations that are inconvenient for teachers in remote areas and proves to be a financial and logistical burden on participants. The quality of instruction in in-service programs is often as poor as pre-service programs; indeed, the pre-service instructors typically are the ones delivering the in-service training (Villegas-Reimers and Reimers, 1996). The content of in-service courses is often of little practical value to teachers. Teachers interviewed in several studies indicated that training programs overemphasized theory, but would be more effective if they combined theory with opportunities for practice and structured reflection (Castro, 1991; Subirats and Nogales, 1989, cited in Villegas-Reimers and Reimers, 1996).

Finding alternative, effective, relevant and cost-effective means of providing ITPD that will reach all teachers has thus become a priority for many governments, particularly those that are introducing the new paradigms of teaching and learning. Ensuring that teachers understand the meaning of such reforms, are competent in the subject matter they teach, know a range of appropriate methodologies, and approach their work with professionalism and high morale are issues that demand urgent attention. The issue is

particularly urgent given the context of rapidly expanding enrollment rates, declining educational quality, and the growing awareness that the quality of teachers is the one of the most important factors in creating a good quality of education for students. The recent study of the Programme for International Student Assessment (PISA) has shown that teacher-related factors[2] account for 31% of the variation in student performance, on average, between schools within OECD countries and 21% of the variation between OECD countries (OECD, 2002: 204). Teachers are even more important in developing countries, where the teacher is often one of the few resources available to students (Chau and Carron, 1996).

In response to this challenge, many countries have developed or are currently developing *school-based* or *cluster based* in-service programs (SITPD) as an important means of updating teacher skills and providing professional support (Avalos, 2000, Tatto, 1997, Reimers, 2003). It is hoped that school-based and cluster-based approaches will be more cost-effective, make better use of local resources, respond to teachers' immediate needs, and provide opportunities for on-site practice ad reflection. This approach has been used to good effect in many developing countries, and in developed countries as well. Whether SITPD successfully meets its objectives, and does so in a cost-effective and sustainable manner, is a question we will explore below.

2.1. Caveats concerning research on SITPD

There are many outstanding questions about the organization, content, effectiveness, cost, and sustainability of school-based and cluster in-service programs, and information is relatively scarce about these issues. Research has typically focused on teacher education in the context of general education reform and has not specifically examined the contributions made by the in-service components. Due the paucity of research, much of the evidence about the effectiveness of SITPD is anecdotal and based on case studies. Little is known about the comparative costs of different modes of instructional delivery and systems of organization. In many cases, the "project effect" has masked government intentions and ability to devote resources to teacher in-service programs as long as outside funding is in place.

3. THE CURRENT STATUS OF OUR UNDERSTANDING ABOUT IN-SERVICE TPD

3.1 Toward a Framework for Effective TPD Programs

Like many aspects of education, there exists no empirically tested model of TPD that has been proven to be effective across all settings. Nevertheless, one can discern from the literature, guidelines for TPD that have broad appeal and provide compelling workable frameworks for designing and analyzing TPD programs (Elmore, 2002). In their paper, *A New Vision for Staff Development*, Sparks and Hirsch (1997) contend that effective professional development programs must be developed from a clearly articulated vision based in student learning and mindful of how students learn specific content in particular settings. Such TPD programs must embody a clearly articulated theory of adult learning; focus on specific issues of pedagogy and content, develop collaborative teacher efforts

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[2] Teacher-related factors include: disciplinary climate, student-teacher relations, overall school climate regarding teacher-related factors, teacher expectations, and teacher morale. (OECD, 2002)

within schools, involve participation of school leaders and staff. To be successful, these programs must be sustained over time and the learning of teachers and their students must be continuously assessed and improved upon. The authors also suggest that the most effective programs take place as close to student learning as possible – in schools and classrooms (Sparks and Hirsch, 1997). Several studies indicate that the most successful in service TPD programs are ones that allow high levels of school staff and community participation in design and implementation (Mosenthal and Ball, 1992; National Center for Research on Teacher Learning, 1991; Schiefelbein, 1992, Tatto, et al 1993 – cited in Tatto, 1997). Although each of these components has not been empirically tested and validated, there is some consensus among practitioners and academics that this approach provides a reasonable and workable framework (Elmore, 2002).

On the international level, Craig et al present a consensus view on effective TPD in their *Teacher Development: Making and Impact* (1998). Based on the work of Andrews et al (1990)[3], Van Tulder and Veenman's (1991) surveys and reviews from several countries, and a host of other scholarly works, Craig et al articulate a model for effective TPD that resembles the view of Sparks and Hirsch. According to the study of Craig et al, an effective TPD program has the following characteristics:

1) A thorough and participatory needs assessment of teachers and staff is required for the design of an effective TPD;
2) The design of an effective TPD program must be derived from an overall strategic vision and framework for the continuous implementation of the professional development effort.
3) Teachers, school staff and administrators must participate in all stages of planning and implementation. There are also successful examples of community involvement in the earliest stages of TPD planning;
4) The curriculum of the TPD program should combine pedagogy and content, rather than overemphasize one or the other; and
5) There should be a commitment to continuous improvement through ongoing guidance, monitoring and feedback, and technical support (Craig et al, 1998).

In addition, Craig et al (1998) also point out the need to accommodate the special needs of teachers in rural areas, including isolation, the local cultural milieu and community expectations, multi-grade classrooms, chronic lack of resources and safety and sanitation issues.

Given the considerable overlap amongst the work of diverse scholars, one can imagine combining these frameworks into a single useable set of guidelines to inform the practice of TPD, with additional provisions for teachers in particular settings, from rural areas in developing countries to the inner cities of industrial countries. Accordingly, there is less disagreement about what constitutes a good professional development program than there is about *how to actually implement one*. As Elmore claims, "The knowledge gap…is not so much about knowing what good professional development looks like; it's about knowing how to get it rooted in the institutional structure of schools" (Elmore, 2002:11).

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[3] Andrews et al surveyed opinions from nineteen educational experts in eleven countries.

Elmore (2002) refers to a simple model for school improvement offered by Cohen, Raudenbush and Ball (2000) that can help frame discussions about capacity development and the essential role of TPD. These scholars define capacity as the "knowledge, skill and material resources that are brought to bear on the interaction among students, teachers, and content" (Elmore, 2002:24). They argue that three elements must be developed in concert, and contribute to the effort, if improved learning is to result. From this simple, yet elegant, perspective, successful TPD programs are ones that effectively build this instructional capacity.

3.2 Practical and Theoretical Underpinnings

The movement toward more site-based, in service teacher professional development is driven by pragmatic, as well as theoretical, considerations. On the practical side, the perceived failure of many of the large-scale "multiplier" workshop approaches have prompted interest in site-based approaches as potentially more cost effective, relevant and sustainable. At the same time, decentralization and accountability movements have made school-based TPD programs more practicable as well as politically acceptable. The decentralization of administration and financial management, coupled with the increasing accountability being directed at schools, has led to professional development approaches that focus on the school, rather than on individual teachers. In the past, particularly in industrialized countries, individual teachers saw professional development as their own responsibility as well as their prerogative to advance their own professional interests. The advent of the accountability movement, however, has prompted school leaders to link TPD with specific instructional and learning outcomes (OECD, 1998). Researchers have also noted the academic successes of school districts that are able to couple TPD with specific outcomes in the classroom (Elmore, 1997). Decentralization, in particular, in developing countries, not only enables this approach, but also may necessitate it. Globalization and the rapid generation and dissemination of knowledge are also demanding that teachers, and their students, learn not just new content, but also the sustainable and transferable skills of lifelong learning (MacNeil and Kahler, 2001, OECD, 1998). With these skills they can acquire and develop new knowledge as it evolves and as they need it. Sustainable and transferable learning skills (STLS) enable teachers to learn continuously throughout their careers.

Recent research and theory into human cognition also provides a rationale for situating a TPD program at the school, district and cluster levels. In recent years, the "cognition revolution", as well as advances in research into the human brain, has transformed the way that reformers and researchers think about learning in the classroom (Bruer, 1993; Bruner, 1996; Caine and Caine, 1994, Jensen, 1998). Cognition appears to be more complex than previously believed, now comprising social, situated and distributed aspects (Greeno, 1995 Bruner, 1996). Teachers now need to be attentive to the psycho-cultural aspects of learning, and effective instruction is thus more context-dependent. This revolution could equally apply to the way that teachers are trained to teach. This movement gains further theoretical support from the literature of participatory development, which emphasizes indigenous knowledge and local aspirations over imported and expert-driven knowledge and projects (Dewey, 1936; Korten, 1990; Chambers, 1997).

3.3. Describing School-based and Cluster-based ITPD

As this paper is concerned with teacher development in the broadest sense, the term 'teacher professional development' (TPD) is preferred to the more traditional 'teacher training'. Teacher professional development is conceptually and practically divided into pre-service and in-service teacher training. This paper focuses on in-service teacher professional development. Nevertheless, following Craig, et al (1998) and Tatto (1997), it is constructive to think of teacher professional development as a continuous process, and not simply a time-bound activity or series of events. From this perspective, the conventionally-divided in-service and pre-service activities should be viewed as seamless components of the same process. This paper recognizes this perspective, but will focus on in-service teacher professional development, or ITPD, especially since many of the cases presented below still employ the conventional distinctions.

ITPD programs follow a wide variety of patterns ranging from programs based on single schools to those that involve the clustering of schools for mutual activities and support. The curricula and content varies from *ad hoc* and loosely organized to highly structured programs that complement the instruction given in pre-service teacher education institutions. They include a variety of instructional delivery systems including printed materials, radio support, or multi-media kits. They are typically participatory in organization and facilitation. The OECD's (1998) *Staying Ahead: In-service Training and Teacher Professional Development* identifies four modes of in-service TPD delivery. The first model is the *provision of TPD by education authorities* who want to realize a particular policy by influencing teacher practices. Examples of this model are "teacher centers", publicly funded institutions that provide training for individual teachers. These are common in Japan, Germany and Sweden. These centers tend to use a cascading model of teacher development. Such centers have also been instrumental in India's District Primary Education Program, where one or two 'pedagogical coordinators' stationed at a Cluster Resource Center support eight to ten schools in the cluster (Pandley, 2000).

The second model is using *third party external providers*, or independent providers of teacher training services, such as universities or teachers' unions. The third model is the *self-organized school development* model. In these cases, the provider is the school itself, such as teachers working together in groups. Fourth, is the model of *networking and inter-school collaboration*: In this mode, teachers share experiences and resources with each other within and amongst schools (OECD, 1998). School- and cluster-based ITPD typically employ the latter two models of ITPD. As will be seen below, different configurations of school and cluster based ITPD incorporate aspects of all four of these models. They situate activities on and off site, combine resources with other schools in their cluster of district, and employ the services of external experts and internal resource persons. In their search for effectiveness and efficiency, successful ITPD programs are likely to avoid becoming wed to a particular model, and instead flexibly apply suitable features of each model.

4. CONFIGURATIONS OF SCHOOL-AND CLUSTER-BASED IN-SERVICE TPD

School-and cluster based TPD programs have proliferated in recent years in Asia, Africa and Latin America. SITPD featured prominently in the Nueva Escuela Unitaria (NEU) in Guatemala, where most teacher training investments have been in in-service training. Through ongoing training and on-site follow-up supervision and feedback, most teachers have been able to improve their pedagogy in order to facilitate NEU's innovative education program (Craig, et. al, 1998). The teachers also participate in Teacher's Circles, groups of teachers from different schools who meet regularly to train each other and share their experiences. A study by Baessa et al compared ten NEU to ten conventional schools and found that students in NEU schools performed higher in math and reading, and teachers worked with greater confidence and skill in managing multi-grade classrooms and facilitating small group work (World Bank, 2000). Since the NEU, was a package of interventions, these gains cannot be directly linked to Teacher Circles and in-service teacher support. Nevertheless, these latter interventions at least partly explain the differences between NEU and conventional school teachers.

The Primary Education Development Project (PED) in Pakistan's Balochistan and Northwest Frontier Provinces has developed an innovative ISTPD program that features a Mobile Female Teacher Training Unit (MFTTU). With UNICEF support, the MFTTU has trained uncertified female teachers in their villages, rather than requiring them to travel to distant training centers. Teacher sharing and on-site supervision were integral aspects of the MFTTU. Despite mixed results on quality of the training and the pace of pedagogical improvement, the MFTTU approach has been able to increase the skills and confidence of thousands of teachers in a cost-effective and timely manner. Local communities and a national NGO played important roles in implementing the PED and the MFTTU. (Craig, et. al, 1998).

Confronted with similar isolation of rural schools, Lesotho in the 1980's implemented the District Resource Teacher (DRT) Program to develop teacher support networks in small schools in mountainous areas. In this program, teams of DRTs visited isolated schools (four times a year for two to three days at a time) to support teachers in instructional improvement and materials development, as well as provide specialized training. A few times each year, workshops were held at clusters of schools under each DRT (10-15 schools) to provide an opportunity for additional training and teacher sharing. About 700 of Lesotho's 1,200 schools were serviced by DRTs by 1996. The DRTs are paid from the government budget and have proven to be a sustainable innovation. Although they have reduced some of their activities due to resource constraints, they continued to function more than ten years after their inception (O'Grady, 1996, cited by World Bank, 2000).

The Teacher Development and Management System (TDMS) in Uganda is a case of an ITPD program with a cluster-based component that has gone to scale and become a national program. Created in 1993 by the Ministry of Education (with USAID support), the TDMS worked through primary teacher-training colleges to provide in-service training for untrained teachers and refresher training for all teachers (Moulton, 2002). The TDMS was designed to rapidly train and certify teachers to meet the soaring primary

school enrollments, which increased from 2.4 million in 1993 to 6.3 million in 2000 (Uganda Ministry of Education and Sports, cited in Engels, 2001). The TDMS has instituted a cluster structure whereby 23 'core' PTCs train teacher tutors who are then based at 'coordinating center schools' throughout the country. From these centers, the tutors provide training and support for teachers in approximately twenty schools in the coordinating center's catchment area. By 2001, the TDMS system was working through ten revitalized PTCs to cover the entire country. In 1997, 50,000 teachers and 5,000 headmasters were participating in various activities of TDMS, and by 1999, 3,500 teachers had completed a three year teacher training program and became certified (Engels, 2001).

To illustrate in more detail some of the configurations of SITPD, three cases of school- and district-based TPD will be presented in the following sections. These case examples come from three different continents and three levels of development, Cambodia, Malawi and the United States. Following these three cases, implications will be drawn for cluster- and school-based ITPD approaches.

4.1 Malawi: an integrated approach to alleviate teacher shortages
One example of an in-service TPD program that combined various modes of teacher education is the Malawi Integrated In-service Teacher Education Program (MIITEP). The MIITEP was established in 1994 in response to soaring enrolments, and the resulting teacher shortages, which were precipitated by the enactment of free primary education (FPE) in the early 1990's[4]. To meet the rising demand for teachers, Malawi developed the MIITEP program to recruit and train 18,000 secondary school leavers to become teachers. At that time, 1,500 new teachers each year were graduating from the nation's six college teacher training system, which was then staffed by 150 teacher trainers (Kunje, 2002).

The structure of the course (see Table 1 below) is a three month residence at college, followed by twenty months of students' teaching in their respective schools, and then one additional month in residence for review. Each student uses a series of five Student Teacher Handbooks – based on primary school subjects plus foundation studies - that have been tailored to guide them through each stage of the process. In residence, the students are taught by college tutors. During the teaching phase student teachers receive support and supervision from headteachers, qualified teachers, primary education advisors (PEAs) and the college tutors. During this phase, students are also responsible for writing twelve papers and conducting and reporting on four school-based projects. They also attend twelve zonal workshops to meet and share with other student teachers. The PEAs organize and facilitate these workshops, as well as visit each student at their school at least twice a term. At the end of initial residence and final review, each student must sit for an examination administered by the MANEB Malawi National Examination Board (Kunje, 2002).

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[4] Primary enrollments increased from 1.8 million in 1992/93 to 2.9 million in 1994/95 (Malawi MOE, cited by Kunje, 2002).

Table 1. Structure of MIITEP

Period	Student Activities	Assessment
Three months	Resident in college	- Teaching practice assessed by tutors - End of residence exam by MANEB
Twenty months	- Teaching in schools, supervised by school directors, PEAs and tutors - Study by distance mode (write 12 papers and conduct 4 projects) - Attend 12 zonal seminars	- teaching practice assessed by supervisors - projects and assignments assessed by MANEB
One month	- Review course work - Write final examination	Final exam by MANEB

Source: Kunje, 2002

Results of MITTEP
The MIITEP was designed to rapidly train teachers at a much lower cost than the conventional system. To accomplish this, it aimed to accommodate three cohorts of student teachers per year. Its principal strategy was to shift much of the learning from in-college residence to school-based, distance learning activities and student teaching. Placing the student teachers in schools represented a two pronged strategy to rely on existing paid staff (qualified teachers, headteachers and PEAs) to act as mentors to student teachers; and help reduce pupil-teacher ratios that were rising as enrolments swelled. The implementation of this strategy was aided by a supportive policy environment, popular enthusiasm for free primary education, and generous support from foreign donors. On the other hand, the rapid shift of the locus of teacher training to the school level, the inclusion of multiple stakeholders, the reorientation of professional development philosophy, and the sheer complexity of the scheme, placed serious demands on the players involved. The spread of the HIV/AIDs pandemic in the 1990's (which significantly impacted teachers) also militated against smooth implementation.

In practice, MIITEP's coherent strategy turned out to be only partially successful. Tutors in colleges generally tended to rely on didactic methods and transmission modes in their teaching of student teachers. Many of the tutors were themselves unqualified and suffered from low morale (Stuart et al, cited in Kunje, 2002). The performance of tutors highlighted the tension between MIITEP's progressive ideas about participation and student-centered learning and the tendency of instructors in conservative institutions to reflexively fall back on the pedagogy that they themselves were exposed to as student teachers. School level support for the student teachers – an important assumption of the MIITEP design – was frequently inadequate. Lack of credentials of the existing teachers was part of the problem. The MIITEP data base showed that more than two-thirds of participating untrained teachers came from schools which had more than 50% untrained

teachers. The preponderance of untrained teachers, coupled with soaring enrolments, prompted headteachers to rely on student teachers to ameliorate the teaching burden at the expense of providing them with structured tutelage. In only one of thirteen case study schools were the student teachers paired with qualified teachers as a deliberate strategy (Kunje, 2002). One can surmise that a student teacher who is forced to teach a full load has less time for reflection and seeking out feedback and advice.

Other forms of support and supervision were similarly of variable quality. The PEAs were unable to visit student teachers as frequently as planned. The myriad competing duties of the PEAs had not been adequately accounted for. Overwhelmed with supervising up to five cohorts of student teachers in residence at a time, the tutors were unable to visit the student teachers at all. Distance learning activities were performed and assessed as planned, but they were not always connected to specific topics of instruction or issues in the classroom. Feedback from tutors on these products was also relatively rare (Kunje, 2002).

Student-teacher graduates of MIITEP showed an adequate mastery of mathematics content but an insufficient grasp of English. This is hardly surprising given their educational backgrounds and the absence of content-focused remedial courses in MIITEP. The student-teachers fared much better in their teaching practices, scoring as well as other teachers on their examinations (Kunje, 2002). Of course, the most important question is whether these new credentials and improved pedagogy gained through MIITEP resulted in higher student achievement. The only study that addressed this issue directly, the Improving Educational Quality longitudinal study, found no statistically significant association between teacher certification and qualifications and student achievement in math and Chichewa language (Jessee, et al 2003:24-25). It is notoriously difficult to measure the impact of teacher training, however, especially given the 50% mobility rates of Malawian teachers each year (Jessee, et al 2003)[5].

The important story of MIITEP is the quantity of teachers who received training in a timely and cost-effective manner. Through its innovative approach, MIITEP was able to train and certify 80% of the 18,000 target student teachers in less than four years. At its current capacity, the two-year teacher college system would have required twelve years to accomplish the same feat (Kunje, 2002). The IEQ longitudinal study (2003), on the other hand, found that over one-third of 251 teachers who participated in MIITEP remained uncertified at the end of 2002 (Jessee, et al 2003). As for costs, Kunje and Lewin (2000, cited in Kunje, 2002) found that the cost per trainee of the conventional full-time pre-service teacher training course was 3 and 4 ½ times the cost per trainee competing the MIITEP. Given these cost differences and the current capacity of the conventional program, Kunje (2002) concluded that the MIITEP is the only available and viable structure that can meet the demand for trained teachers. However, Kunje also concedes that external assistance is still needed to maintain even this relatively low cost

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[5] The IEQ study cites several possible confounding factors. Many teachers may have completed the MIITEP, but were not yet certified. In addition, the numerous interventions in the research area of Save the Children's Quest project probably affected teacher performance and other conditions in the school.

program. To improve cost effectiveness, he recommends, "…attention to curriculum improvement, more efficient arrangements for school-based support, and a regular system of college funding that provides incentives to manage college resources to best effect" (Kunje, 2002:317).

Implications
The MIITEP experiment highlights the importance of having clear, realistic and achievable objectives. "MIITEP cannot be judged a success in terms of all the aspirations heaped on it. In particular the aim to provide a crash training programme with the implementation of a radical new approach proved unrealistic" (Kunje, 2002:319). There is no doubt that need for a cost-effective rapid training program was urgent. Without the MIITEP, primary school pupil-teacher ratios in Malawi could today be as high as 100:1 (Kunje, 2002). But the progressive ideals of the project designers proved to be unattainable for the undereducated student teachers, the overworked PEAs and tutors, and the resource-poor schools who were being overwhelmed with new students.
Quality of in-service teacher education is undoubtedly a crucial issue for student achievement. But the experience of MIITEP suggests that poor countries that are experiencing critical teacher shortages may have to relegate quality to a second generation consideration.

MIITEP also highlights the tension between teaching pedagogy and content in SITPD programs. Its strength was in improving pedagogy, while equipping new teachers with just enough content to deliver. The effectiveness of the Handbooks, which Kunje remarked are "probably MIITEP's greatest strength" (Kunje, 2002:318), suggest that scripted curricula are necessary to graduates of crash TPD programs such as MIITEP.

4.2 New York City District #2: Linking staff development to comprehensive instructional reform
With substantial education resources at its disposal, the New York City school system differs in most ways from those in developing countries. It is included in this study because it is a well-documented exemplar of school and district based teacher education[6]. On closer inspection, the case of District #2 of New York City does share many affinities, in particular, with school systems in mega cities of southern countries. District #2 was established through a process of administrative decentralization that many school systems in the south are now undergoing. The diversity and poverty of its student population pose problems that also confront many developing countries. The student body comprised a diverse ethnic mix of immigrants from 100 countries: 29% of the students are white, 14% black, 22% Latino, and 34% Asian. Twenty percent of them used English as a second language, and about 50% lived below the official poverty line. New York City District #2 comprises 24 elementary schools, 7 junior high schools, and 17 "option schools", which are organized around themes with different grade configurations (Elmore, 1997).

District #2 began embarking on a path to systematic reform in 1987, with the hiring of a new superintendent named Alvarado (Elmore, 1997). Upon taking office, Alvarado

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[6] While this case study is based in a 1997 publication, the models of ITPD described here are still in operation at District # 2 (based on personal communication with Elmore, 2003).

informed principals that their mission was to improve instruction in the classroom, and all management and personnel decisions would be in service of this mission. Alvarado soon hired a staff development expert to oversee professional development in the schools. During Alvarado's first eight years in office about 50% of the schools principals were replaced. Alvarado was developing a consistent and compelling message to all administrators and staff that improved instruction was the goal and improved teaching was the means to achieve that goal. Intensive, long-term, and systematic in-service professional development would become the means to improve teaching. The results in achievement eventually became clear. District #2 in 1987 ranked 10th in the city in reading and fourth in mathematics (out of 32 districts). By 1996, it ranked second in both subjects (Elmore, 1997).

The structure of the ITPD program evolved over time, and it combines school-based activities, district-wide sharing, and off-site training - while employing the expertise of external consultants and institutions as well as internal resource persons. Following Elmore (1997) these diverse ITPD activities will presented as five models of TPD[7].

Model One: The Professional Development Laboratory (PDL)
With its simple design, the PDL upgrades teacher skills through a system of mentoring and cross visits among existing teacher staff. The district staff selects experienced teachers who are particularly effective in the teaching topic of interest. These teachers serve as Resident Teachers and agree to accept certain numbers of visiting teachers who apply to participate in this program to upgrade their skills. Each Visiting Teacher spends three weeks in the Resident Teacher's classroom in observation and instruction under the supervision of the Resident Teacher. While the Visiting Teacher is away, an experienced substitute, or Adjunct Teacher, covers their classroom. Before the Visiting Teacher leaves, the Adjunct Teacher spends a week with them to get acquainted with their classrooms, and they then join the Visiting Teacher upon their return to help them incorporate the new practices that they have gleaned. Resident Teachers make follow-up visits to their Visitors to advise on issues of teaching practice. At a given school, about 16-20 Visiting Teachers participate in the PDL per year (Elmore, 1997).

Model Two: Instructional Consulting Services
District #2 employs two different types of consultants: external experts and resource persons from within the district. These consultants are paired up with groups of 8-10 teachers and work with them intensively on a particular instruction-related issue. The consultant and the teachers work together closely over a period of 3-4 months. The resulting working relationships create enabling conditions for sustainable changes in practice. Teachers typically work with their team and the consultant during the common planning time that has been built into school schedules to allow teachers (by grade) to collaborate on issues related to instruction (Elmore, 1997).

The consulting model is a labor intensive and relatively expensive approach to improving instruction of a group of teachers of a particular subject. As Elmore observes,

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[7] It is important to keep in mind that these five models result from a researcher's framework and are not necessarily how the practitioners see them. (see Elmore, 1997).

"Connecting professional development with teaching practice in this direct way…requires making a choice at the district level to invest resources intensively rather than using them to provide low-impact activities spread across a larger number of teachers" (Elmore, 1997:19). In the 1995-96 school year, eleven consultants were working with groups of teachers in different areas (Elmore, 1997).

Model Three: Inter-visitation and Peer Networks
'Inter-visitation' is the term District #2 uses to describe its system of exposing teachers and principals to exemplary practices through visits to schools within the district, as well as to other districts. These visits are used as a management tool by principals to help generate momentum around a particular content area or to encourage change in a particular group of teachers. A group of teachers might also visit an exemplar of a particular practice in conjunction with their consultant-led instructional improvement work. District # 2 budgets for 300 days of professional time for inter-visitations each year (Elmore, 1997).

Model Four: Off-Site Training
The off-site training model resembles the classic professional development activity. Teachers travel off-site to a university or an institute to receive training in a content-specific, time-bound course. District #2 only supports off-site training in topics related to instructional improvement and in areas that can be supported after the course so that instructional gains will be realized. Most funds for off-site training are also reserved for particular ongoing initiatives that have specific instructional goals. "The central idea", according to Elmore (1997) is "…not to provide training in the innovation *du jour*, or whatever the prevailing new instructional idea is in any given year, but to provide continuous support for larger and larger numbers of teachers to learn and teach new content at increasingly higher levels of complexity in a few select areas" (p. 22).

Model Five: Oversight and Principal Site Visits
The routine oversight by the superintendent of schools of principals is another aspect of the TPD program at District #2. The Superintendent and his deputy make visits to principals and review their performance in light of each principal's own action plan for the year. Particular attention is paid on whether the principals' plans and actions are advancing toward improved instruction in the classrooms.

Organizing principles
The in-service teacher professional development models of District # 2 are not discrete models that were preconceived in a grand plan. They are a collection of interrelated activities that have emerged over time to constitute integral components of the district's overall management plan. It is the district's organizing principles that have given rise to this coherent teacher professional development approach. These organizing principles have resulted from a "strong belief system – or a culture of shared values – in the system around instructional improvement that binds the work of teachers and administrators into a coherent set of actions and programs" (Elmore, 1997: 8). These set of organizing principles are arguably more important than the specific models of ITPD that have grown out of them. A summary of the organizing principles are in Table 2 below:

Table 2. Organizing Principles of District # 2

Focus the entire system on instruction and learning.

Instructional change is a long and multi-staged process.

Shared expertise is the driver of change.

Talented people working together generate good ideas.

Maintain a focus on system-wide improvement.

Set clear expectations, then decentralize responsibly.

Nurture a culture of collegiality, caring, and respect among staff

Source: Elmore, 1997

Costs

Due to a lack of a comparison case, it is difficult to assess the relative cost-effectiveness of District #2's ITPD programs. In the three years between fiscal year 1994 and 1997, District # 2 spent between $2.3 and $2.7 million each year on professional development, which amounted to around 3% of the total budget each year. In 1994, teacher compensation (for participating in various activities) was the highest expenditure at $1.1 million, whereas in 1996 contracted service cost $1.2 million, the highest expenditure that year. The only consistent pattern was the Professional Development Lab, which was the least expensive activity in all three years (costing between $233,860 and $275,000 per year) (Elmore, 1997).

Implications

The case of District #2 highlights the importance of strong leadership in promoting a clear vision, and ensuring consistent implementation of teacher professional development over the long term. The ITPD was not an add-on activity, nor was it designed to cater to disparate career development goals of individual teachers. The ITPD was rather embedded in and serviced a district-wide plan that focused on a few priority areas for instructional improvement. The district's TPD is also a mixed-mode approach that effectively combines on and off site activities that are supported by both external and internal experts.

An important lesson of the experience of District #2 is that the district is an appropriate level at which to conduct ITPD. While school-based TPD activities can be effective, individual schools may not be fully equipped to plan, marshal the resources and implement focused TPD programs over sustained periods. According to Elmore, districts enjoy certain 'natural advantages', for example,

> Districts can achieve economies of scale in acquiring the services of consultants; they can introduce strong incentives for principals to pay attention to the improvement of teaching in specific domains; they can create opportunities for interaction among professionals that schools might not be able to do by themselves;

and they can make creative use multipocket[8] budgeting to generate resources to focus on instructional improvement (Elmore, 1997:35)

Part of the genius of the superintendent's leadership was to set a clear agenda for professional development and then decentralize *responsibly*. What can be done at the school level should be done there, but the natural advantages of the district level behoove it to take charge of some functions. The effective leader has to recognize the tension between strong central authority and local autonomy. According to Elmore, "Any systemic strategy has to involve discipline and focus at the center and a relatively high degree of discretion within certain parameters in the schools" (Elmore, 1997:26). This principle echoes Beeby's assertion that the key to improving educational quality,"…lies in the symbiosis of the center and periphery of an educational system: in the interplay of official programs and local or individual initiatives. These two kinds of innovations are subtly interdependent, and neglect of one will weaken both" (Beeby, 1986: 42).

4.3 Cambodia: a content-heavy, experiential teacher training and curriculum development program[9]

The following case describes how a new curriculum and pedagogy - the student field school (SFS) - was introduced in rural Cambodian schools through an intensive school-based ITPD program. This ITPD was part of a series of projects implemented through a collaboration of the NGO World Education (WE/C), the Ministry of Agriculture, Forestry and Fisheries (MAFF), and the Ministry of Education, Youth and Sports (MOEYS). This SFS program introduced experiential methods of teaching science, agricultural and other foundation skills, to students and teachers in rural Cambodia. Project implementation has relied on the participation of multiple stakeholders, such as farmers, professional agronomists, schoolteachers and NGO field workers. Between 1998 and 2002, over 400 teachers had been trained and over 4,000 students had completed a Student Field School in ten provinces (WE/C, 2002).

The Student Field School is based on the Farmer Field School (FFS) that has been developed over the past fifteen years by the Food and Agriculture Organization (FAO) along with several international NGOs and national government agencies in Asia. The curriculum of the FFS is based on Integrated Pest Management (IPM) [10]. The FFS is a season-long training program where farmers meet weekly to observe their crops in a 'learning field' and gather and analyze data.[11] Training activities take place in the fields and are based on experiential, participatory learning methods. World Education began a

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[8] "multipocket budgeting" is the practice of drawing revenue from multiple sources ('pockets') for the same purpose – in this case, teacher professional development activities.
[9] Parts of the following section previously appeared in a research paper of the same author to satisfy course requirements at the Harvard Graduate School of Education, May, 2003.
[10] Since 1990, two million Asian farmers have learned IPM through participating in Farmer Field Schools (FAO, www.communityipm.org cited January 24, 2004).
[11] Integrated Pest Management (IPM) is an environmentally sound method of crop management which is based on a scientific understanding of an agro-ecosystem, including the life cycles of insect pests and plant pathogens. The principal idea of IPM is that insect pests will be controlled by natural insect predators in an agro-ecosystem that can be restored to a balanced, natural state. IPM is a family of practices that seeks to maintain a balanced ecosystem by intervening with treatments according to the life cycles of pests and the needs of the crop.

pilot implementation of the SFS in 1998 with the aim of introducing teachers and schools to an innovative, hands-on way of learning that integrates content from science, mathematics and Khmer language and presentation skills.

The Student Field School (SFS) is the FFS adapted to schools, and thus is relevant curriculum for rural families. Over a 12-18 week period (depending on the crop and location) students plant experimental plots and make observations of the crop and its ecosystem as the crop matures. Students meet weekly for half a day to make routine observations as well as conduct experiments. One basic experiment, e.g., is to compare a treatment plot where no pesticides are used (IPM) to a control plot where the typical regimen of chemicals are applied. The SFS insists on discovery learning at all stages. In sharp contrast to traditional didactic practices in Cambodia, teachers do not lecture from a textbook to passive students. In the FFS, trained agriculture extensionists facilitate farmers' learning; in the SFS students are guided in their learning by teachers who have themselves previously completed a season-long IPM field school.

To learn the new content and facilitation skills, the teachers first had to be trained in a season-long Teacher Field School. Learning from prior experience, the project designers felt that if teachers were to be able to guide students through discovery learning, they should first learn by doing it themselves. The project decided to implement the TFS for a half-day each Thursday - teachers' weekly professional development day as designated by the MOEYS' Education Reform in 1993[12]. The teachers were attracted to IPM and the field school idea because most of them were also farmers, and they were interested in new and engaging ways to introduce the two difficult topics science and math[13]. The fact that the TFS syllabus dovetailed with the teachers' weekly PD days was an added bonus. Professional development was not necessarily the main incentive for teachers to participate in SFS or TFS, however. MOEYS does not have a formal mechanism to confer professional development points or reward teachers who take part in such activities. Most teachers currently participate because they are interested in the content, they enjoy the activity and seeing children actively learning, and they also appreciate the per diem they receive (Geeves, pers.comm. 2003).

Collaboration in implementation
The TFS and SFS program relied on local IPM experts from the Provincial MAFF. These IPM Facilitators were previously trained in IPM through the FAO-supported national program and were experienced facilitators of FFS. Along with WE Field Coordinators, these IPM Facilitators were the principal resource persons for the TFS. In the first stage of implementation, WE staff and the IPM Facilitators met with school directors and teachers at each school to lay the groundwork for the TFS and SFS. Issues discussed included IPM and the pedagogy of SFS, teacher and student selection, identification of experimental fields as well as other physical arrangements. The schools identified and

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[12] Technical Committees at the Cluster are responsible for developing the agenda for these weekly TPD days (Dykstra and Kucita, 1998).

[13] In 1992, less than 1% of Cambodian teachers had finished 11th grade (Dykstra and Kucita, 1998). By 2003, the majority of the teachers were 12th grade graduates (Geeves, pers.comm., 2003). In spite of these gains, most teachers still lack tertiary level training in pedagogy and content.

reserved a rice field to serve as the experimental plot, or "learning field". The plots were about 1,000 square meters in size. Many SFS use fields that are owned by the school and located within 150 meters of the school. Some of the SFS also used fields owned by local farmers and were located up to a half a kilometer from the school (Geeves, 1999).

In order to achieve a critical number of TFS trainees, participating teachers are drawn from the cluster level. The cluster in Cambodia consists of six to eight schools that share administrative and educational resources. The TFS are typically implemented from July - during the summer recess and coinciding with the rainy season - and end in December. The curriculum for the TFS is essentially the same as the SFS that they will end up teaching (see Box 1 below). In addition to the SFS content, teachers also complete a TOT to learn participatory facilitation methods. The TFS were originally facilitated by WE field staff with MAAF IPM Facilitators, but the latter are increasingly taking the lead role. After completing the TFS, the teachers are ready to facilitate the SFS the following July.

Box 1. A Student Field School

At each school, 25 to 30 students (usually half girls, as per WE/C-MOEYS' requirement) participate in the 15-week long SFS. The students meet for four hours every Thursday morning to conduct their experiments and make observations in the experimental field. The fields are divided into five strips, and each strip is maintained and observed by a group of 5-6 students under the guidance of one of the IPM training team members (a teacher, local agronomist, and/or a farmer trainer). Patterns of student selection vary. Most of the participants are primary school students who have completed grade 5 and are continuing to grade 6 (ages 11-16 years). Group sizes range from 25-35 students.

By the end of a season, the students are able to describe important features of their local ecosystems, as well as articulate the principles and practices of IPM. These latter include when and whether to apply pesticides, how to efficiently manage the water flow in a rice paddy, and how to apply fertilizers to ensure highest yields. These are important life skills for students living in a country where 70% of the population makes a large part of their living from farming (Geeves, 1999). At the end of the SFS, the students presented their results to their parents and the community in "Community Field Day" events. These are chances to showcase what they have learned as well as to gain confidence in making public presentations. It is also a chance for parents to get involved in the learning process at the schools.

To implement the SFS, the project introduced a model of a "teaching team", a practice that most teachers were unfamiliar with (WE/C, 2001). After their season-long training and TOTs, the teachers were ready to fully participate on these teams. Each team comprises six members as follows:

	IPM Facilitator	Schoolteacher	IPM Farmer Trainer
Number	2	2	2
Affiliation	MAFF	MOEYS	Community
Qualifications	Experienced IPM trainer	Experienced teacher	Completed IPM FFS and supplementary 15 day TOT

Adapted from WE/C, 2001

In addition to the team of six, a WE/C Field Coordinator provide ongoing monitoring and technical assistance. Members of the team converge on the school weekly to conduct the SFS, with the teachers guiding the activities. In October, half way through the field school, the team of six meets at the province level with WE/C staff and relevant officials to review progress. At this time, the teachers receive specialized advance training and advice on how to improve their SFS facilitation (WE/C, 2001). In sum, teachers learn not only through the intensive season-long TFS and TOT. They also continue to learn as they lead the SFS with technical support from agronomists and WE/C field staff, as well as through the occasional structured, specialized training courses.

Although there is an SFS curriculum and guidebook, the teachers have no text book to fall back on. For the TFS, much of the content is generated and accumulated through the learning process. The teachers literally construct the text book as they go. IPM literature from many countries have described this phenomenon as the "field is the book" (Geeves, 1999 quoting MAFF; FAO). These curriculum development skills will be useful to teachers in the event that the MOEYS enacts a provision (which it is currently considering) to allow schools to locally develop 10% of their curriculum (Geeves, pers. comm. 2003).

Results
Post TFS changes in teachers' practice have not been systematically assessed, but one can make inferences from students' performances in pre and post SFS tests, where the scores increased on average between 23% and 50% between the (Geeves, 1999). While evaluations of students and internal quality monitoring occurred regularly, no external evaluation of the overall implementation of this initial pilot was conducted (World Education, pers. comm., 2003). Certainly the quality of SFS facilitation amongst teachers varies greatly. Anecdotal evidence shows that many teachers are succeeding, but not without intensive technical assistance and scaffolding from provincial IPM Facilitators and WE/C or Provincial Field Coordinators (Geeves, pers.comm. 2003). A critical question concerns when WE/C, MOEYS and Department of Agronomy facilitators can safely remove the scaffolding. According to Beeby, any radical change in instruction likely require "systematic and continuous advisory services to teachers in their own classrooms…not for months, but gradually for years" (Beeby, 1986: p.40). This may be part of the explanation why the project required a methodically executed and rather long pilot phase.

The TFS/SFS curriculum is now well honed and has proven effective and adaptable. Collaboration with the MOEYS has grown very tight, to the point that one of WE/C staff was seconded from the MOEYS to help develop a workable SFS model for widespread MOEYS adoption. WE/C now has a guidebook on how to implement SFS and has presented SFS results at national level conferences. WE/C has also introduced the SFS training course and curriculum into Primary Teacher Training Colleges (PTTC). Through the PTTCs, teachers are now exposed to SFS during their pre-service training.
This adds a pre-service training component to the in-service training and enhances prospects for increased coverage and sustainability of SFS. In the PTTC, the SFS content fits well into the "agriculture" component of the "technology" subject of the national

curriculum (WE/C, 2002). If endorsed by the MOEYS, it is possible that the PTTCs could provide all pre-service teachers with training in SFS at some stage during their two year course. This would be particularly relevant to the teachers who will teach in rural areas (i.e., the majority). Perhaps even more critical would be that the MOEYS perceive SFS as a cross-cutting package of subject matter and methodologies that could be integrated into the general curriculum of PTTCs. Pre-service training represents the best prospects for sustainability of SFS beyond the life of the project. Although the in-service teacher field schools generally have been effective, they relied on significant external expertise, money and quality control that may not always be available.

Costs
The cost of one SFS (30 students) in the initial pilot phase was approximately $500 (WE/C, 2002). This figure is roughly twice Cambodia's per capita GDP of approximately US$ 280 (UNDP, 2001). Certainly the costs had to be lowered in order to be sustainable at the school level. The initial start-up costs were high due to the more expensive external inputs that were needed to train the teachers and get the SFS running. Once trained teachers are available, the cost is roughly $225 for a single SFS run by two experienced teachers. If the MOEYS adopted SFS into the national curriculum and fully integrated it into the pre-service training at the PTTCs, then the school level costs for one SFS would probably decrease to around $150 (Geeves, pers. comm. 2003). WE/C field coordinators have been steadily replaced by field coordinators who are officials of the provincial level Departments of Education. This has ensured increased ownership of the SFS program by the MOEYS and will likely bring more cost savings in implementation.

Implications
Although the TFS/SFS is a relatively new program that has yet to go to scale, reflection on its implementation has generated elements for success that can be instructive for similar education programs in rural Cambodia and in other countries. The main elements are:
1) A curriculum that is grounded in theory and practice, developed through a lengthy research and development process. The curriculum is scripted but must be adapted to local conditions. Creative use and critical thinking are built in to the curriculum;
2) A focus on tangible, relevant content and a process that challenges long held assumptions about agriculture and pedagogy in a supportive environment;
3) An understanding of situated cognition: In the words of practitioners of adult and nonformal education, when designing an educational intervention, one should "start where the people are…not where one wants them to be"; and
4) Multi-stakeholder collaboration: MOEYS, MAAF and WE/C collaborated from the start, and the project design built in measures to transfer project responsibility to MOEYS.

Perhaps the most critical element of the success of TFS/SFS was its capacity building and professional development strategy that focused on specific content as well as intensive training and scaffolding of teachers - at their schools and in their fields - in how to deliver

that content. Elmore observes that research and practice around the world have shown that

> professional development – highly focused on specific content and the pedagogy that goes with it and delivered as close as possible to the classrooms and schools in which it will be used – is a promising way to improve instructional practice (Elmore, 2003:36).

The principles and practices of IPM are counterintuitive to farmers, and experience has shown that only through their own discovery learning will farmers understand IPM and be willing to apply it. Most of the teachers in rural Cambodia are also farmers, and they are similarly skeptical. Furthermore, the student-centered, active pedagogy of SFS represents a significant break with the traditional didactic methods that Cambodian teachers employ. Given these conditions, the best way to prepare teachers to lead SFS is for teachers to first participate in a season long TFS. The curricular, and eventually, instructional reform process begins with the TFS. Teachers begin to consider the implications of using farming to teach students about science and mathematics; that communities and local resources can play a key role in children's learning; and that students and teachers can work collaboratively on long term projects and learn from one another. With its content-heavy, intensive, hands-on approach, the TFS represents a professional development experience that Cochran-Smith would consider "powerful enough to interrupt long-held and sometimes unexamined assumptions about the purpose of schooling…and the implications of subtle as well as overt curricular, instructional and community practices (Cochran-Smith, 1998:936)". The curriculum of the TFS also resonates with participating teacher trainees. Most teachers in rural Cambodia are farmers, and they thus have additional motivation to master IPM. Because the content of TFS appeals so well to teachers' "situated cognition" as farmers in rural villages, high levels of fidelity of implementation of IPM can be expected (assuming the training is of high quality).

5. OUTSTANDING ISSUES AND CONTINUING CHALLENGES

We have seen a variety of configurations of SITPD, each of which was designed to meet the demands of the local context. Each case has generated impressive results, but also continues to grapple with its own weaknesses and constraints. While we can assess each case on its own merits, we are constrained by the paucity of research from drawing sweeping conclusions about the effectiveness of SITPD. In particular, very few studies have explored the cost-effectiveness of SITPD, and few have been able to link SITPD to improvements in student achievement. There are however, general observations that can be made based on the foregoing cases. These observations are not meant to be conclusive, but rather they highlight knowledge gaps for researchers and design considerations for policymakers and practitioners.

Designing SITPD with clear professional development objectives
The goals of professional development, as well as local conditions and constraints, determine which configuration of ITPD is most suitable in a given context. There is a need to clarify, for example, which set of teacher competencies and practices one seeks to improve. Each type of practice may require different approaches, or combinations of

approaches (Putnam and Borko, in Moon et al 2000). The introduction of specific instructional practices, as in Cambodia's TFS/SFS, is most effectively achieved through an intensive school-based approach. Reinvigorating teachers' appreciation for their content areas, on the other hand, might be better done through an off-site immersion in a new learning experience (Putnam and Borko, in Moon et al 2000). This was one approach employed by District #2 in New York City. Naturally, the objectives for instructional improvement are often multifaceted and thus require that a combination of approaches be pursued.

Mixing modes and finding the right locus of intervention
The locus of intervention and the proper mode for ITPD depends on the objectives of the program as well as the governance structure of the country's education sector. District #2's Professional Development Laboratories, for example, take place at the school level. In some cases, however, school-based programs can be self-limiting, and a cluster or district wide effort is most appropriate. According to the OECD,

> "…Conducted in isolation, school-based development is in danger of becoming introspective, and replicating weaknesses that already exist in the school as an organization. Some of the most effective methods of school development therefore combine on and off-site activity and combine self-development with external assistance (OECD, 1998:41).

All three cases exemplify this point. The teachers in Cambodia were drawn from the cluster level for their TFS, and they later implemented the second phase of their learning (conducting the SFS) at their respective schools. District # 2 conducted PDL at the school-level, but the inter-visitations took them to other schools within the district and beyond. MIITEP combined in-college residence with school-based distance learning. When choosing the locus of intervention, one must also be mindful of governance of the education sector. The administrative level at which the school curriculum is developed, for example, may have a bearing on ITPD design. If Cambodia's MOEYS devolves 10% of curriculum development to the school level, this would bolster the WE/C approach and further galvanize local input. Another critical issue concerns to what administrative level teachers are held accountable. Clearly, District # 2 held its schools, principals and teachers accountable, and became the natural prime mover and monitor of ITPD programs.

How many objectives can be heaped onto ITPD?
The MIITEP case shows how an underdeveloped education infrastructure was unable to fully cope with a complex ITPD scheme. High expectations were placed on the schools and on the PEAs to support student teachers, on the colleges to be able to provide feedback on students' written work, and for student projects to benefit their own learning as well as the school and community. The objective calling for the newly certified teachers to return to their schools and transform learning in the classroom also proved to be unrealistic. MIITEP was quite successful in meeting some of its main objectives, but it is not surprising that it could not deliver on them all. The designing of elegant project strategies and the heaping of objectives onto beneficiaries may be an endemic condition

of the project-oriented culture of international development. To check this tendency, it is essential that local stakeholders be involved in the earliest stages of planning.

The intensive intervention in Cambodia focused on specific curricular and capacity building objectives for small numbers of beneficiaries at any given time. Whether this sharp focus can be maintained as the TFS goes to scale through the PTTCs remains to be seen. District # 2 lies somewhere between these two cases. With five models of ITPD running simultaneously across 48 schools, its scope is more ambitious than in Cambodia. Still its program is much less extensive than MIITEP, and it also was not laboring under MIITEP's levels of urgency. In any case, District #2 is an administratively mature system capable of managing complex schemes and myriad objectives.

Cost effectiveness and sustainability

It is difficult to discern from these cases, how SITPD compares with traditional, off-site cascading approaches in terms of cost-effectiveness. There is little research available on the teaching profession in most countries (Chau and Carron, 1996), and the lack of research on cost-effectiveness is even more acute. Craig et al (1998) also observe that there has been little research on the direct and indirect costs of different forms of in-service or pre-service teacher education.

In an intriguing research project, Schiefelbein, et al (1998) conducted a survey of ten education experts and thirty planners/practitioners (in the United States and Latin America) in order to assess the comparative cost-effectiveness of forty common interventions to improve schools. Each of these forty interventions received a numerical ranking for cost-effectiveness. "Teacher training to develop cooperative learning", and "train teachers to use programmed learning materials" ranked a disappointing 23rd and 24th, respectively. Even more telling was the 37th place ranking of "in-service teacher training *without* follow up materials" (Schiefelbein, et al, 1998:11). The experts in this survey clearly believed that in-service teacher training can be very costly unless implementation is of high quality and there is follow-up support. This clearly is an issue that policymakers should consider carefully.[14]

In one rigorous study on cost-effectiveness in Sri Lanka, Tatto et al (1993) showed that school-based distance learning was a more cost-effective means of delivering in-service training than the in-service programs offered at teacher colleges[15]. Distance education at that time in Sri Lanka was an in-service program of 3-5 year duration that was offered to untrained teachers. Of three approaches studied, colleges of education produced the most effective graduates, but they were also the most expensive. Teacher colleges were relatively expensive, but less effective than the colleges of education and the distance learning. Distance learning was by far the most cost-effective – able to upgrade skills and certify many teachers at low cost. Tatto et al (1993) concluded that the circumstances and

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[14] Cost effectiveness of each intervention was the intervention's increase in costs divided by the probable impact. Probable impact was calculated by multiplying the estimated increase in achievement of the intervention by the probability of adequate implementation. The highest ranking interventions – like 'assigning the best teachers in a school to first grade', or 'enforce regulations on the official school year' - were ones that are easy to implement, inexpensive and can be linked to improved achievement.

[15] They evaluated costs borne by the institutions as well as the teacher participants.

program objectives would determine which program should be chosen. Colleges of education are the best means to produce fewer, high quality teachers, and distance learning is the best means to train and certify large numbers of teachers. They were supportive of the distance learning approach in their conclusions, but with a critical caveat:

> Although this approach is the most cost-effective of those studied, at present its future is limited because the large numbers of untrained teachers will diminish in time. As the numbers of untrained teachers is reduced, this program will begin to lose its cost-effectiveness, because economies of scale will be lost (Tatto, et al, 1993:62).

If true, the implications for the MIITEP program are clear. MIITEP is currently a cost-effective way to train large numbers of untrained teachers. But the untrained teachers will (hopefully) diminish over time, and the economies of scale also might be lost.

The large start-up and recurrent costs, and the reliance on foreign assistance, of the programs in Cambodia and MIITEP also raise questions about sustainability. WE in Cambodia was able to bring costs per TFS down to a manageable level over time, but the start-up costs were substantial. A key factor in surviving beyond the foreign assistance is the program's ability to harness a nation-wide cadre of already trained IPM Facilitators from the MAAF and also to increasingly transfer field coordination to MOEYS personnel. Nevertheless, several years of relatively expensive technical assistance was required to introduce the program. The TDMS system in Uganda also experienced similar start-up costs. By the end of 1997, USAID had provided twenty person years of technical assistance (local and international) to help establish the TDMS system (Moulton, 2002).

Portability of models
This review of SITPD from diverse countries raises the question of portability of models between countries. Are the models employed in District #2 appropriate and affordable in developing country contexts? In a sense, the TFS in Cambodia was employing the Instructional Consulting Services model, with IPM Facilitators and WE staff serving as the external consultants who developed working relationships with groups of teachers. However, left to their own resources, Cambodian school clusters would not be able to budget for external consultants in the same way the District # 2 can. On the other hand, the Inter-visitation and Professional Development Laboratories are less expensive models that may be affordable and suitable for Cambodia. Once the teaching force stabilizes in Malawi, and in other similar countries in transition, the PDL and the Inter-visitation could become affordable models that can be adapted to local conditions.

Portability questions can also be raised on the grounds of developmental and cultural appropriateness. O'Sullivan (2002) has confronted this question in her research on the introduction of reflective approaches to Namibia's In-service Education and Training program (INSET). She found that reflective practices, as conceptualized in the West, may not be appropriate in Namibia. This conceptualization makes assumptions about professional autonomy, situational views of knowledge, and educational levels of individuals that endow them with tools of reflection. These assumptions did not often hold in the Namibian context. O'Sullivan found that reflection as originally conceived by

the program was beyond the developmental level of the teachers in the INSET. Ultimately, she concluded that reflection on practice could be an appropriate tool, but it needed to be structured and guided in culturally and developmentally appropriate ways.

5. CONCLUDING REMARKS

This review reviewed the theoretical and practical underpinnings of in-service teacher professional development. It claimed that the 'consensus view' of TPD seems consistent across contexts, suggesting that many practitioners and academics already know what constitutes a good TPD program. Nevertheless, the issue of *how* to effectively implement SITPD remains a significant challenge. To begin to address this question, several cases were presented and analyzed. The cases show that the right approach to TPD depends on local needs and conditions and the objectives of the TPD program. School and cluster-based activities were central features of all the cases, but the mixing of TPD modes also proved to be an effective adaptation. Given the paucity of research, especially about cost-effectiveness, it is difficult to conclude whether SITPD is the most effective approach in every context. Critical questions remain, not only about cost-effectiveness, but also about the locus of intervention, the proper mix of modes, the complexity of SITPD scenarios, the portability of models, and sustainability.

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