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IPR Working Paper Series:

**Determinants of Educational
Achievement and Attainment In Africa**



February 1997

**Institute for Policy Reform
1400 16th Street, N.W., Suite
Washington, D.C. 20036
Tel: 202-939-3450; Fax: 202-939-3458**



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**An Evaluation of the Aga Khan Foundation's
School Improvement Program in Kisumu, Kenya**

Joanne Capper
Consultant, IPR

February 1997

Abstract

This paper reports on research that added variables from the Ministry of Education's school data base to a 1994 survey which included information on students, households, schools and cognitive achievement, and used these materials to investigate the determinants of achievement and enrollment and to explain the deterioration in these factors that occurred over the last decade. The paper finds, among other things, that socio-economic factors are more important than school characteristics in explaining results.

Abstract

This study was an evaluation of a six-year effort to improve the quality of teaching and learning in the primary schools of the Kisumu Municipality in Western Kenya. The treatment involved extensive training of teachers, head teachers, inspectors, and staff of the Municipality's Teacher Assistance Centers. The project was supported by the Aga Khan Foundation, ODA, CIDA, and Comic Relief. It began in early 1990 and concluded in July 1996. During the first three years, the project focused on teachers in standards (grades) 1-3, and in 1994, began also working with teachers in standards 4-6 and head teachers. Workshops were offered on an on-going basis, and each school term, teachers in three schools were offered intensive, classroom-based coaching and technical assistance by project staff with the primary intention to make their teaching more child centered (i.e., children working in small groups; class discussions; activity-based learning; and asking questions that evoke thinking, analysis, and reasoning). The evaluation study compared three levels of the project intervention representing different times and extent of treatment exposure and used a neighboring district as a control. Results showed that pupils in the treatment groups learned significantly more than did control pupils, but all groups performed extremely poorly on tests that measured simple reading and writing in English. Treatment teachers exhibited significantly more child-centered teaching and classroom-management behaviors than did control teachers, but only classroom-management behavior were correlated with improved test scores. Workshop attendance was positively and significantly correlated with increased test scores. Although treatment teachers' behaviors were more child centered, few actually engaged pupils in discussion, asked thinking-type questions, or had pupils work in small groups.

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With our very sincere appreciation,

Joanne Capper
Shelomith Nderitu
Paul Ogula

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Executive Summary
An Evaluation of the Aga Khan Foundation's
Kisumu School Improvement Program
Joanne Capper, Shelomith Nderitu, and Paul Ogula

This evaluation study was conducted at the behest of the Aga Khan Foundation (AKF) and the Institute for Policy Reform (IPR), working under contract with the USAID. AKF's primary concern was to evaluate the effectiveness, cost-effectiveness and the likelihood of sustainability of the Kisumu School Improvement Program operating in Western Kenya. IPR's interest in SIP was as part of a larger collection of studies concerned with the effects of various school improvement interventions on enrollment and achievement in primary schools in Africa.

The School Improvement Program began in January 1990 with the intention to improve the quality of teaching and learning in primary schools in the Kisumu Municipality by promoting the adoption of child-centered teaching methods and developing strategies to institutionalize the process and outcomes of the effort. The strategy involved training teachers in a workshop setting, providing classroom-based technical assistance and support to teachers as they attempted to integrate what they learned into their day-to-day teaching behaviors, and providing instructional materials to support learning.

SIP operated in two phases: Phase 1 from 1990 through 1992, working with teachers in 15 schools in standards one to three; Phase 2 from early 1993 to August 1996, working with teachers in 27 schools in standards one to three and teachers in 13 of the same schools in standards four to six. This evaluation focused on the activities of Phase 2, although comparisons are made with teachers who were involved during Phase 1.

The objectives for Phase 2 were to: extend the project to an additional 27 schools at the lower primary levels and to nine of these schools at the upper primary level; integrally involve head teachers in the training and improvement program; continue making communities and parents aware of the program activities and to motivate parents to contribute toward the cost of the teaching materials; improve the cost-effectiveness of the program; and create a better understanding of child-centered learning.

Study Design

Eleven treatment schools were selected to represent varying levels of SIP intervention. Four T1 schools were involved in the project during Phase I. Four T2 schools were involved in the early stages of Phase 2, having three-years for the training and TA to be internalized. Three T3 schools participated during January through May 1996. Four control schools were drawn from the Siaya district, northwest of Kisumu. Data was collected during June 1996.

The research questions addressed in this study are: did the SIP intervention have a significant impact on increases in student achievement as compared with control schools; did SIP change the way that teachers teach to a more child-centered approach; was a change in teacher behavior associated with increases in test scores; is the SIP model a cost-effective approach to improving teaching and learning; will the impact of SIP be sustained after external funds are removed? Tests were administered to approximately 650 pupils in each of standards (grades) 3 and 6; teachers were observed in these classes; and teachers, head teachers, parents, pupils, MEO employees, and project staff were interviewed.

Findings

Summary of Accomplishments: SIP worked with lower primary teachers in 27 schools and upper primary teachers in 13 schools -- four more than specified in the proposal; they provided instructional materials to over 100 classrooms and teachers and trained teachers in their use; quite late in the project they began working with head teachers; they met with the parents and School Committee for each school to introduce them to the SIP model, to enjoin their participation and support and to encourage contributions toward the cost of materials; they established a close and productive relationship with the MEO and the Town Council resulting, in part, in replacement and training of many of the inspectors and heads of Teacher Assistance Centers; they instilled an ethos of school improvement and attention to the concepts of child-centered teaching throughout the Municipality.

Child-centered Teaching: Although SIP teachers exhibited substantially more child-centered teaching behaviors than did the control teachers, in most cases, their use of these behaviors was limited and often shallow. The more important, yet difficult, behaviors such as asking questions that engage pupils in thinking analytically, having pupils be active learners working in small groups, encouraging children to express themselves and explore ideas or use language to communicate and understand, were rare in most classrooms observed. However, a few teachers exhibited exemplary teaching behaviors.

Student Learning: The analysis of test results was conducted in two stages: an analysis of variance (ANOVAs) to detect simple differences in scores across groups, and regression analyses to control for external factors that may contribute to results but are not attributable to the SIP treatment, such as family income and parents' education.

Standard 3: When family, teacher and school variables are not considered, the SIP T1 and T2 pupils performed significantly better than T3 and control pupils in the English short-answer tests, but only T1 performed significantly better in the math short-answer test. However, when non-treatment factors are controlled for, being in a SIP T2 school has a positive effect on test scores in English and math, as does the number of workshops a teacher attended. Teachers' classroom management behaviors were also a significant influence on English scores, but child-centered teaching behaviors were not. The most consistently influential variables are the number of years a teacher has been teaching and number of workshops attended.

Standard 6: When non-treatment variables are not considered, the SIP T1 test scores were significantly greater than the T3 and control schools in all tests but math open-ended. T2 schools' performance was not greater than the control schools. However, when family variables are considered, SIP had no influence on any of the test scores for this standard.

When test scores were adjusted for family and teacher influence, pupils in T1 schools achieved scores that were 16 percent greater than those of the control group -- across all tests administered for this study, while pupils in T2 and T3 both achieved scores that were 5 percent greater than the control group. Although adjusted test scores at the standard 6 level were not *significantly* greater than scores of the control pupils, the SIP pupils at this level achieved a 13 percent increase in scores across all tests when compared with control pupils. The cost to increase the test scores of the standard 6 pupils was less than the costs for any of the standard 3 groups.

The child-centered teaching behaviors promoted by SIP did not seem to have a positive influence on test scores at either grade level. Students in both treatment and control groups

performed reasonably well on the short-answer and multiple-choice tests, suggesting that they are learning what is in the curriculum in the way that it is taught in the curriculum and textbooks. However, scores were exceptionally poor on all open-ended tests for all groups - around 10%. Many pupils wrote nothing at all or simply rewrote the prompt. There is clear evidence that they are not learning how to read, write, or communicate in English or Kiswahili. Nor are they learning to apply simple mathematical concepts and skills to real-life types of problems.

Parent Involvement and Views: SIP offered training to School Committees in SIP schools and encouraged Committees and individual parents to contribute more to the schools -- significantly more than in control schools. Seventy percent of the SIP parents reported that their children seemed more confident and were more likely to speak freely since SIP involvement. Significantly more SIP head teachers reported an increase in the number of school visits by parents since SIP participation, compared with head teachers in control schools.

Pupils' Views: Almost all pupils in both class levels and in treatment and control groups, reported liking school, liking to learn, and having a teacher who likes them.

Teachers' and Head Teachers' Views: Interviews with teachers and head teachers revealed very positive attitudes toward the SIP project and Program Officers. Teachers seemed to see and believe in the value of child-centered teaching strategies, but were reluctant to adopt fully these behaviors because they felt a pressure to cover the curriculum and ensure that pupils were prepared to take and succeed in the national primary certification examinations.

Materials: SIP significantly enhanced the classrooms in which it worked with instructionally-useful materials, and wisely established a mechanism to ensure that all teachers within the Municipality would have access to similar materials. However, the examinations developed by SIP are not supportive of child-centered teaching and should be discontinued until revised. SIP's research and monitoring efforts were exemplary and useful to the project.

Staff Training: SIP staff were not trained to a sufficient level of mastery to do their jobs. They reported that they had not received any guidelines or training in what to do when they visited a school, nor were they taught how to do a demonstration lesson or give feedback to teachers. They indicated that they would have preferred training and coaching that gave them time to reflect in groups, to read and discuss original source documents, and to have the expert(s) observe them in the classrooms as they worked with teachers.

Shortcomings: 1) SIP waited until very late to work with head teachers; 2) they did not focus on the whole school; 3) SIP staff were not adequately trained; 4) they did not appear to bring project teachers to a sufficient level of skill mastery in using child-centered techniques; and 5) there was a high rate of staff turnover.

Constraints: 1) A high rate of school and MEO staff transfers; 2) a high rate of school closings for multiple examinations, athletic events and music festivals; 3) teacher pressure to cover a very full curriculum and to ensure that pupils are successful in the KCPE examination which is factually oriented and not particularly child centered; 4) a high rate of teacher absences, in part due to the high rate of AID's-related illnesses and deaths in Kisumu but also due to lax supervision on the part of the head teachers and the MEO; 5) pressure to teach in English beginning in the very early grades.

Costs: SIP significantly reduced the cost-per-teacher (educator)-trained by 61% during Phase 2. However, the cost of increasing a pupil's test score by one percent ranged from about Ksh 300/ to 800/, or \$US 5.00 to \$14.00 per pupil. Relative to the standard Kenyan 1993 per-pupil-expenditure of Ksh 2131/, SIP spent about 15% more for each additional percent increase in test scores for pupils in groups T1, T3 and the standard 6 pupils, but 36% more for pupils in T2 schools. These figures are fairly high and probably not viable costs for a government agency with limited resources to incur, but they can serve as a benchmark for comparing with other approaches SIP may try to increase learning.

Sustainability: Overall, the likelihood that SIP's impact will be sustained over time is highly questionable due to a variety of factors including high rates of turnover in school staff and SIP staff, limited transportation, currently untrained SIP staff, triple the size of the target audience due to expanded municipal boundaries, overriding and non-child-centered influence of the KCPE, and quality dissipation in training.

Recommendations

Program

1. Focus on supporting the development of the school as a whole rather than only selected teachers within the school.
2. Develop the head teacher as the instructional leader -- continue working with School Coordinators.
3. Emphasize the teaching of reading, writing and thinking, and develop teachers' questioning strategies.
4. Encourage the MEO to assume more responsibility over school accountability issues such as attendance and school closures and to reduce the burden of multiple examinations.
5. Work with a low-cost school to use as a model to show that teachers can use child-centered practices, cover the curriculum, and help pupils achieve high test scores.
6. Develop, administer and report practice examinations that are consistent with the child-centered approach promoted by SIP.
7. Establish an effective-schools peer review process using research-based indicators.

Training

1. Establish a procedure and measures to ensure that all program staff are trained to mastery in the content and skills needed to do their jobs effectively.
2. Conduct a study of the extent of dissipation in the quality of training and technical assistance as it moves from expert trainer, to program officers, to school coordinators, and to teachers.
3. Consider establishing a centralized training academy for staff developers, district educational managers, and head teachers.
4. Consider using technology, such as CD-Rom, to provide training that will retain the quality of the "expert" trainer and can be used across programs.
5. Consider developing training materials centrally for all AKF education projects.

Policy

1. Conduct a study of teacher training colleges to assess the quality of teaching and supervision of these institutions.
2. Consider ways to influence changes in national curriculum and examinations to make more compatible with child-centered instructional approaches.

CHAPTER 1 BACKGROUND AND PROJECT DESCRIPTION

Purpose of the Study

This evaluation study was conducted at the behest of two sponsors, the Aga Khan Foundation (AKF) and the Institute for Policy Reform (IPR). AKF's primary concern was to evaluate the effectiveness, cost-effectiveness and the likelihood of sustainability of the second phase of the Kisumu School Improvement Program (SIP) operating in Western Kenya. It was also concerned that the problems and recommendations identified in the evaluation of the first phase of the project had been addressed. IPR, working under contract with the United States Agency for International Development (USAID/ART) was interested in Kisumu SIP as part of a larger collection of studies concerned with research that would assist African policymakers in selecting budget allocations for education that would maximize the developmental benefits of educational expenditures. The collection of studies, conducted in several African countries, all intended to clarify the linkages between the inputs to, and outcomes of, the education system. In four of the studies, the purpose was to identify the effects of various school improvement interventions on enrollment and achievement. Toward this end, IPR identified several existing projects that were intending to conduct end-of-term evaluations, and entered into agreements to jointly support these studies. The Kisumu School Improvement Program was one such project.

AKF's goals for this study were to evaluate the extent to which the project was implemented as intended, whether it made an impact on changing teachers' behaviors toward a more child-centered approach, whether the change in behaviors resulted in any improvement in student learning, whether the cost-per-teacher trained was reduced, and to estimate the likelihood that the project would be sustained when handed over to the local government. To measure the extent to which these goals were achieved, tests were administered to pupils in standards (grades) 3 and 6 and data also were collected through classroom observations; interviews with teachers, head teachers, entire school staff, Municipal staff, parents, community members, pupils and project staff.

The Aga Khan Foundation and Its Strategy for School Improvement

The Aga Khan Foundation (AKF) is a private, non-profit organization founded by His Highness the Aga Khan, the 49th hereditary Imam of the Ismaili Muslims. Established in 1967 as a non-denominational philanthropic institution,¹ the Foundation addresses the needs of beneficiaries without regard to race, religion, gender or political persuasion. It is part of a larger group of social, economic, and cultural development institutions generally referred to as the Aga Khan Development Network with origins reaching back to the 1890s, and includes the Aga Khan Health and Education Services, which operate some 500 health and education facilities and programs, primarily in the developing world.

In education, the Foundation supports programs in early childhood care and development, and school improvement, including teacher training, developing and producing affordable teaching materials, and improving the management of schools. Since the early 1980s, the Foundation has promoted a series of school improvement efforts in India, Pakistan, Kenya, Tanzania, and more recently, Uganda. Two approaches have been used: 1) projects focused on individual schools and aimed at changing the ethos of school staff and managers toward teaching and learning; 2) projects

that have focused on influencing a larger number of schools through the use of a team of master trainers who provide inservice training on site at schools.

The intent in both approaches is to increase the extent of activity-based learning through greater student participation in activities and group discussions. Children are encouraged to question more and teachers are encouraged to have pupils work in small groups and to make and use materials to support learning. These instructional strategies are referred to by AKF as a child-centered approach to teaching and learning and are central to the School Improvement Program implemented in Kisumu, Kenya and evaluated in this study.

Background on the Kisumu School Improvement Program

The School Improvement Program (SIP) began in January 1990. The intent was to improve the quality of teaching and learning in primary schools in the Kisumu Municipality by promoting the adoption of child-centered teaching methods and developing strategies to institutionalize the process and outcomes of the effort. The strategy involved training teachers in a workshop setting, providing classroom-based technical assistance and support to teachers as they attempted to integrate what they learned into their day-to-day teaching behaviors, and providing instructional materials to support learning. Support was provided by several donor agencies, including the AKF, the Canadian International Development Agency (CIDA), the Overseas Development Agency, and Comic Relief.

The SIP project was designed in accordance with two themes of the AKF's Strategy on School Improvement: 1) involvement of teachers in developing curriculum materials for their own use in the classroom, and 2) training and coaching teachers in new instructional skills and approaches within the context of their own classrooms.

Other areas of emphasis emerged during the project: staff training for the extended school community including parents, inspectors and TAC tutors; and the establishment of a close working relationship with the inspectors and tutors. (TACs are Teacher Assistance Centers established by the Kenyan Ministry of Education and managed by local Municipal Education Offices (MEOs). These Centers are dispersed throughout the country and were established to provide a resource for teachers in developing instructional materials; coordinating and providing inservice training; coordinating the work of subject panels; providing professional guidance and counseling to teachers; and serving as a link between schools and other educational institutions such as the Kenya Institute of Education, the Kenya National Examinations Council, the Kenya Education Service, the inspectorate, and colleges and universities. The head of each TAC is referred to as a TAC tutor. In Kisumu, the MEO recently established one TAC in each of the nine municipal zones and SIP assisted by providing start-up funds for materials such as textbooks, teacher reference books, copiers, typewriters and office supplies.)

SIP was governed by a Project Implementation Committee (PIC), chaired by the Municipal Education Officer (MEO), with the local Aga Khan Education Service (AKES) Chair serving as the Vice-chair. This structure was designed to establish a precedence of ownership by the Kisumu Municipality. The function of the PIC was to oversee the managerial and financial dimensions of the project and to serve as advisors to the Project Director.

SIP - Phase 1

SIP has been in operation for six years, from January 1990 through August 1996. Phase I

lasted for three years from 1990 through the end of 1992, and Phase 2 from early 1993 to August 1996, at which time the project became a part of the Kisumu Municipal Education Office. There were several differences in the project during the two phases. At the beginning of Phase I, three model schools were selected, beginning with the Aga Khan Primary School, a high-cost school, and shortly thereafter two other schools were included to represent peri-urban and urban low-cost schools.

The Kenyan Education System currently has two types of school designations - public and private. Public schools are those run by parents in the form of a school committee. The parents provide the school facilities while the central government pays teacher and head teacher salaries and provides inspection and supervision services. Within the public-school category, there are both high- and low-cost schools. In Kisumu, high-cost schools are public schools which were once Asian or European schools with high-quality facilities. These schools pay for the services of groundsmen, cleaners, and clerks, thereby requiring that parents pay a higher fee to maintain the facilities. Low-cost schools are primarily community schools that levy small amounts of money for services and school development.

A factor in the selection of one of the first SIP schools was that the lower-primary children were learning in semi-permanent buildings with mud walls. The other school had fairly high-quality facilities but a fee structure typical of the low-cost schools, thereby more likely to accommodate more low-income parents than the Aga Khan Primary School (AKPS). Other selection criteria included a positive attitude toward the project goals, proximity and accessibility of the school to the SIP project headquarters (based on the grounds of the AKPS), community support and involvement, need for improvement, and school security to protect the materials that would be introduced to the classrooms through the project.

Initially, the training and technical assistance (coaching) was offered to teachers in classes 1 to 4, but after the first year class 4 was dropped since at that grade the teachers teach one or two subjects to different classes of pupils rather than teach all subjects to one class. Each of the three charter schools was used as a "model" school and after a year, three more schools were added. By the end of Phase 1, 15 schools had received SIP training and technical assistance.

Phase I Evaluation: At the end of 1992, an evaluation of Phase 1 activities was conducted and the findings of that study influenced the design of the second phase of SIP activities. In that evaluation, data was collected from four schools, one each representing various levels of SIP intervention and one control school. The report concluded that there was evidence of substantial changes in classroom practice but that teachers' use of individualization and group work was limited. They noted that the clinical approach to developing teachers' competence was an effective model. However, it expressed concern that the project was not encouraging sufficient depth in teachers' thinking about the teaching methods encouraged by SIP. There was a concern that teachers may adopt certain practices to please the trainer rather than because the teacher was convinced of the effectiveness of the practices. Moreover, if teachers' understanding of the various practices were not sufficiently deep, or suffered from misconceptions, then they would not know when to apply one practice over another -- for example, when to engage students in group work versus teaching to the whole class.

There was also a concern that the project had not provided sufficient attention to the school as a whole and to the role of the head teacher in school improvement. Specifically, the evaluators indicated that the project had not offered training to head teachers in how to support and monitor teachers in a way that would ensure sustained improvements.

Results showed that student learning had "not declined as a result of the intervention" and the authors reported some evidence of gains in language skills. Classroom environments were viewed as more stimulating and pupils seemed more self-confident and better able to take responsibility for their own learning.

Further recommendations for Phase 2 included: increase dissemination of the project's model by having the Project Director write descriptive papers about their work and have AKF share its work with other donors through international conferences; make clear to the beneficiaries that the project's intent is to "prime the pump" and that improvements made by the project should be sustained within existing local budgets; clarify project duration in relation to staff employment in order to ensure staff productivity throughout the entire project cycle; nurture skills development of project staff; require that the project proposal be more precise in describing intended outcomes; increase attention to systematic self-evaluation.

Many of these recommendations were incorporated into the second phase of SIP: the project began training head teachers and upper primary teachers, although this began quite late in Phase 2; several of the project staff were enrolled in a degree program with a British university and several experts were brought in to conduct training for both project staff and beneficiaries; information on the project model was disseminated at an international conference and with a new AKF-sponsored SIP project starting up in Mombasa; and the project began engaging in self-evaluation through a number of studies of project impact. However, SIP never did address the school as a whole, and although a great deal of effort was put into addressing the future employment of project staff, this issue was still unresolved at the time of the Phase 2 evaluation. Some of the staff were promoted to zonal inspectors by the MEO, one became the new SIP Project Director, one retired from service, and one was hired by a local teacher training college. Only one continued on as a Program Officer for SIP work.

SIP - Phase 2 (September 1993 - August 1996)

New leadership was brought in to guide SIP during the second phase of the project, and under this leadership, SIP became much more expansive, reaching beyond the objectives stated in the project proposal, extending beyond the lower primary classrooms into the upper grades, out to parents, community, MEO staff (including inspectors, TAC tutors), head teachers, and local universities and teacher training colleges. During the three years of Phase I, SIP staff worked in 15 schools, but during Phase 2, 27 new schools were addressed, with occasional visits to the original 15 for a total of 42 schools served. In addition, teachers and head teachers from a number of other schools attended open SIP workshops

A major element of the restructured SIP was to more aggressively collaborate with the staff of the Municipal Education Office, particularly the Municipal Education Officer (MEO), the Deputy MEO, the inspectors, and the TAC tutors. Although this was specified as an element of the first phase of SIP activities, this outreach was not realized and sometimes resulted in an incompatibility between the SIP and MEO activities.

School Coordinators: In Phase 2 SIP introduced the role of School Coordinators. Coordinators were teachers in the target schools and were selected by the school's head teacher as a potential leader in the school.

During Phase 2, the project focused on teachers at both the lower and upper primary levels, including classes 1 through 6. Each academic term, four new schools were selected for focused attention. During that term (4 months), the SIP POs would work with the teachers on a daily basis, but at the end of the term, the attention was reduced substantially, as four new schools became the focus of service. The earlier schools would receive intermittent assistance and support depending on their needs and requests and time available.

Phase 2 schools were selected based on several factors, including: positive head teacher and teacher attitudes towards the program, secure classrooms to house learning materials, adequate desks, and zonal representation. Schools that did not have lockable doors and windows or sufficient desks were required to obtain them as a requirement for participation. This was intended to secure the classrooms against vandalism and theft of teaching materials and resources provided by the project. In fact, during the preliminary visit to Kisumu to prepare for the evaluation study, one school was visited that was in the process of building desks and installing windows and door security. The head teacher was very enthusiastic about the prospect of SIP participation and reported that it served as a motivator for the school staff and parents and helped to generate the funds needed for this hardware.

Assessment: SIP initiated the development and administration of a set of local examinations to provide a standardized measure of program activities, to improve the skill level of teachers in test development, and to have tests that were more appropriate to the local context. They developed a table of specifications similar in mode and format to the KCPE and engaged teachers in project and non-project schools to write test items based on the specifications. These items were then used by four subject panels to moderate the items and to form tests, which were then sent to the KNEC for evaluation. These practice exams were administered to 12 standard 3 classes in 1994 and used in 26 schools in standards 1-6 in 1995 in science, mathematics, English and Kiswahili.

Training: Throughout the three years of Phase 2 a variety of Kenyan experts were enlisted to conduct training for Kisumu educators. Training for teachers was intended to provide the practical hands-on experiences that were not common during their preservice training and to reinforce many of the topics that were covered in teacher training. Workshop topics included questioning, libraries, reading, Kiswahili, curriculum interpretation, art and crafts, and learning centers. Many of these workshops served two purposes: 1) to provide additional training for the SIP staff, and 2) to train the range of other educators within the Municipality, including teachers, head teachers, School Coordinators, inspectors, and TAC tutors. After receiving training from local experts, the SIP project staff conducted subsequent workshops throughout the Municipality. The workshops were then followed up by classroom coaching that included teacher observations, discussions and demonstrations by the POs. Inspectors and TAC tutors were offered special workshops on their role as staff developers and advisors. School Coordinators were offered courses in syllabus interpretation, writing schemes of work, leadership, classroom management and organization, and peer coaching. School Committees and PTAs were offered training in school management, bookkeeping, budgeting, the relationship between the Committee and the school's administration, and the role of the School Committee.

As of May 1996, SIP reported having offered 47 workshops during Phase 2 with an overall attendance of 1,742. Additional workshops were being conducted during the evaluation. Two workshops of two days each were conducted in reading beginning in 1995 after the staff identified reading to be a problem in the schools. It is important to note that attendance at any of these workshops was voluntary and therefore the number and type of workshops attended by teachers

(or head teachers) within a school varied considerably. There was no guarantee that all the lower primary teachers within or across SIP schools had attended the same number or type of training.

In early 1994, SIP began offering training and technical assistance to teachers at the upper primary level (standards 4-6). At the time of the evaluation, teachers in 13 SIP schools had received training and TA. Workshop topics included questioning strategies, pupil assessment, and interpretation and use of examination results.

Training and technical assistance was not typically offered to an entire school staff, although if a staff requested assistance or the PO felt there was a specific school-wide need, school-based sessions were offered. In this regard, the title of the project is a misnomer. The focus of improvement was much more on the individual teacher rather than on the school as a whole. Teacher Development Project would have been more apt.

From late 1994, a greater focus was given to the training of head teachers. Workshops were offered in teacher evaluation, school management and organization, bookkeeping and funds management, leadership, approaches to teaching and learning, qualities of an effective school, and syllabus interpretation. The inspectors and TAC tutors were encouraged to provide follow-up support to head teachers.

Before bringing a school into SIP, the SIP staff met with each school's PTA/School Committee to explain the purpose of SIP and to encourage financial and academic support. In addition, they facilitated parents' visits to other SIP schools to see the impact of SIP services.

Promoting Sustainability: Steps were taken to ensure that SIP efforts are sustained. Increasingly, responsibilities for SIP activities involved or were handed over to the MEO, including planning workshop sessions, conducting workshops, replacing, upgrading, and training inspectors and TAC tutors, and creating the revised reporting format for inspectors to use that is more consistent with SIP instructional strategies.

In addition, a system was established to place the procurement of instructional materials in the hands of the schools and the MOE's office. A central feature of the SIP program has been to provide SIP teachers with classroom materials, generally providing the raw materials and working with teachers to show them how to construct and use the materials as learning aids and learning centers. Beginning in 1995, each parent has been asked to contribute Ksh 50/ - (\$1US) per child per year for the purchase of consumable materials such as manila sheets, newsprint, glue and other items that the SIP project has been supplying. This money will go into a central Municipal fund to allow the purchase of materials in bulk at reduced costs, which will then be distributed to the schools based on the amount of funds submitted.

CHAPTER 2 EVALUATION STUDY

Described in this section are the study questions, study design, data collection procedures, a description of the treatment and control districts, the sample selection, and the data collection instruments, including achievement tests. Detailed information regarding the tests is in Appendix A and marking (or scoring) guidelines for the tests are in Appendix B.

Study Questions

The purpose of this evaluation study was to assess how well the SIP program has operated, whether and how its operations could be improved and its costs lowered, and what needs to be done to maximize the chances that the improvements in teaching practices can be sustained once the operation of the training and supervision system is turned over to the Municipal authorities. The more general evaluation questions are:

- What difference has SIP made in student achievement and participation, independent of other factors that might explain these results.
- What explains the differences found? Which particular aspects of the program seem to be the most important?
- What were the costs involved in achieving these results and which levels of intervention are most cost-effective?
- How sustainable are these results likely to be once the program is turned over to the Municipality?
- What recommendations can be made to improve future operations: to enhance the skills and knowledge base of teachers, the effectiveness of head teachers, and the commitment and involvement of parents, and to reduce the costs of accomplishing these goals in the future?

AKF had several more specific concerns regarding project implementation which are also addressed in this report.

Study Design

No baseline data was collected at the beginning of the SIP project so a pre-post treatment design was not possible. However, an interim evaluation was conducted at the end of Phase 1 and could have served as a baseline for Phase 2, but the data for that study was only collected on Phase 1 schools which were not "treated" during Phase 2. Several other problems precluded the use of that sample and instruments for this study. For example, the English test was not available and the mathematics test appeared to be much easier than the skills found in the standard 3 curriculum. The tests developed for this study were more comprehensive and representative of the Kenya curriculum. In addition, the earlier study did not address the upper-primary level since SIP had not been working at that level. Moreover, only three SIP schools were used for that study, with one being a school from which the master teachers had come -- a practice no longer used. Any findings generated from that study could be attributed to the idiosyncrasies of that particular school and would not necessarily generalize to the population of SIP schools. The sample size for this study was much larger -- 11 SIP and 4 control schools. In addition, since the SIP treatment was focused on the teacher rather than the school, the teacher and his or her pupils were the unit of analysis. There have been a very large number of transfers and even deaths in the Kisumu municipality and the likelihood of finding the same teacher at the same school was small. Moreover, the comparison only would have applied to the Phase 1 sub-sample and not to the Phase

2 sample. However, many of the items used on the teacher questionnaire and classroom observation in the Phase 1 evaluation were included in those developed for this evaluation.

Given that a pre-post design was not the best option, a treatment - control group design was used, with three levels of SIP intervention forming three treatment groups and a control group drawn from a nearby district, since SIP staff reported that all schools within Kisumu had been impacted by SIP in one way or another. In addition, extensive qualitative data was collected from teachers, head teachers, parents and pupils.

Procedures

During the last week of May 1996, local data collection staff were hired and trained and the instruments were pilot tested and revised. Data collection began June 3 and continued through June 20, with each of the 17 sample schools visited by a team of two senior researchers from about 7:45 a.m. until mid-afternoon. (Only 15 of these schools were used in the final analysis. Two schools were included that were not officially SIP schools but had received some SIP impact: several of the teachers at one school had attended many SIP workshops, and the head teacher and a teacher at another school had been "treated" while working at another SIP school. However, it was ultimately decided that generalizations based on a single school would not be meaningful.) Although all SIP schools had been notified that an evaluation team would be collecting data during the month of June, none knew if they were in the sample, nor when the site visit would be conducted, to ensure that school staff behavior was as typical as possible.

The day began with a brief meeting with the head teacher to indicate the purpose of our visit and to schedule the day's activities. In each school, one standard 3 and one standard 6 teacher was observed, typically for two class periods - about 75 minutes each. We specified that we preferred to observe the teachers teaching English, maths, or science. Only eight of the standard 6 upper primary teachers in the sample were SIP trained.

During these visits, each of the teachers observed and the head teacher was interviewed by one of the evaluators. Initially, the teachers were given a questionnaire to complete, but we began to see that they had difficulty responding to some of the questions, so eventually incorporated all questions into a single, interview instrument. Generally the questions seemed to be difficult because of the way they were structured for coding purposes. The head teachers seemed more able to complete the questionnaires on their own, so two separate instruments were maintained. During the lunch period the entire school staff was interviewed in focus group sessions.

We asked if it was possible to meet that day with one or more representatives of the School Committee/PTA, but often found that we needed to schedule a meeting at a later time, in which case, one of the research team members returned for the interview.

On the first day of the last week of the data-collection effort, tests were administered to pupils in all sample classrooms. Invigilators (test administrators) were trained and the evaluators circulated among the schools during the administration and checked on the appropriateness of the procedures. Several irregularities were found due to confusion among the invigilators. In three instances, the invigilators were trying to manage more than one classroom at a time, thereby leaving one class unattended. Although corrections were made when the supervisors arrived, it is possible that this allowed for the possibility of cheating. In fact, during the marking process, we were able to identify several indications of cheating and did not record the marks for those pupils.

The marking sessions were held over the last four days of the study, with the same individuals used for invigilating also used for marking. However, two teachers and two SIP staff who had been trained by the KNEC to mark the Kiswahili exams were used. Although we were reluctant to use SIP staff for marking, the other invigilators hired were not qualified in Kiswahili.

Training was provided for the marking and spot checks was done for each set of tests for each school. The marking of the open-ended items was done over the last two days and, as time ran out, less checking was possible. It is likely that there is less reliability in the scores on the open-ended items, although the results indicated such small variability within a school, and such great variability across some of the schools, that the significance of these differences would be likely to hold.

Individual, unstructured interviews also were held with the Director and Associate Director of the Municipal Education Office and with three of the TAC tutors, two inspectors and one meeting of the SIP Advisory Committee was attended. At several points during the study, two or three of the senior researchers met with members of the SIP professional staff. These were unstructured sessions, but discussions centered around how they were trained, their ratings of their training, what they thought were the strengths and weaknesses of the program, and what they would do differently if they had it to do over, or if AKF were to initiate a similar effort in another region.

To attempt to gauge the quality and style of the training and classroom-based TA provided by the SIP Program Officers (POs), videos of training sessions were viewed. However, few of the videos actually showed the current staff of POs doing training. In several videos, the Project Director was doing the training and in others it was being done by POs who were no longer with the project or by outside consultants. One evaluator observed an hour of a live three-hour workshop on reading, and another observed several sessions where the POs met with teachers in their classrooms to provide coaching and TA .

Description of Treatment and Control Districts

Eleven treatment schools were drawn from SIP schools located the Kisumu Municipality. However, it was not possible to obtain control schools from Kisumu since there were no schools that had not in some way been impacted by the SIP, especially with the high rate of teacher and head teacher transfers and the fact that SIP workshops were open to all who chose to attend, beyond those for whom the workshops were specifically organized. Although a number of schools had recently been added to the Kisumu boundaries, all were rural schools and so were determined to be less similar to SIP's urban and peri-urban schools than those in a nearby district. Schools selected for control comparisons were drawn from a neighboring community in Siaya, Kenya. Each of these communities is described below.

Kisumu Municipality: The Kisumu Municipality is located on the edge of Lake Victoria on Kenya's border with Uganda. It is the largest town in Kenya and scheduled to become a city. It is the headquarters of the Nyanza Province, the commercial center of Western Kenya. In 1994, the population of Kisumu Municipality was about 600,000, the majority belonging to the Luo ethnic group, with about 3,000 Southeast Asians. Several industries are located in Kisumu including: baking, fishing, brewing, pharmaceutical, and agricultural processing. A large number of the population are self-employed through fishing, agriculture, transportation, trading, bicycle and motor vehicle repair, and tailoring. Most of the larger businesses in Kisumu are owned by Asians.

Education in Kisumu: Pre-primary education is offered to children from 3 to 6 years of age and the number of pupils attending pre-primary school has grown from 7,406 in 1990 to 9,638 in 1996. Primary education begins at the age of six and continues for eight years. Table 1 shows the growth of primary education in Kisumu by gender between 1990 and 1996 which has grown by about 6,000 until 1994 when the Municipal boundaries were expanded. For the most part, Kisumu's enrollment growth since 1995 is due to expanded boundaries which brought in almost 100 small, rural schools. Table 2 shows the primary school participation rate by gender in 1994 in comparison with National rates. Kisumu's rate is 10 percent higher than the national rate and just over one percent higher than Siaya's. Table 3 shows primary repetition and dropout rates. Kisumu has the lowest repetition rate at 10.2% compared with about 16% for Siaya and the nation.

Table 1
Primary School Enrollment in Kisumu Municipality - 1990-1996

Year	No. of schools			Enrollment		
	Public	Pvt.	total	Boys	Girls	Total
1990	42	2	44	14819	14904	29723
1991	42	7	49	15541	14789	30330
1992	42	7	49	14101	13811	27814
1993	42	10	52	15432	15069	30501
1994				23167	12738	35905
1995	136	20	156	28148	25482	53930
1996	123	13	136	29996	26346	56342

Source: Municipal Education Office - Kisumu

Table 2
Primary School Participation Rates -
Kisumu, Siaya, and National by Gender - 1994.

	Boys	Girls	Total
Gross Enrollment Rate (Kisumu)	95.2%	88.9%	92.1%
Siaya District (1994)	91.9%	89.4%	90.7%
National Gross Enrollment Rate	83.2%	81.6%	82.4%

Source: Ministry of Education, Statistics Section.

Table 3
Primary Level Repetition and Dropout Rates - 1994-1995

District/Municipality	Repetition Rate	Dropout Rate
Kisumu	10.2	5.8
Siaya	16.8	4.5
National	15.4	5.4

Source: Ministry of Education, Statistics Section.

The primary school curriculum: The curriculum is developed centrally by the Kenya Institute of Education and is the same for all treatment and control schools. It has a strong emphasis on practical skills and includes 13 subjects: mathematics, English, Kiswahili, Mother Tongue, geography/history/civics (GHC), music, science, art and craft, business education, agriculture, home science, religious education, and physical education.

Siaya District: Siaya district is a one-hour drive northwest of Kisumu with a population of about 2,000. It is primarily a peri-urban and rural district with 18 schools and an average pupil-teacher ratio of 1 to 19. The area is very dry with little rain and so does not support agricultural farming. Businesses include trading, bicycle and motor vehicle repair, tailoring, pottery, and blacksmith. The population is largely from the Luo ethnic group. In the Siaya sample, three of the schools selected were urban or peri-urban schools and one a rural school. Two were selected to compare with the top schools in Kisumu on the KCPE -- among the top hundred in the country -- and the other two were taken to be average and could therefore compare with the average schools in Kisumu.

Selection and Sample

Schools from Kisumu were selected for inclusion in the study by the evaluation team with the assistance of the SIP Project Director and the two Deputy Directors. The treatment schools selected for study were chosen based on several factors, but primarily to represent differing levels of time in the SIP project. Other factors included whether the teachers and head teachers who were originally trained at a school were still working at that school; head teacher longevity at the school; and schools where the treatment had been offered to both lower and upper primary teachers. In addition, the socioeconomic and geographic status of the schools was considered. Each factor is described in more detail below.

Duration in SIP: The first selection cut was based on length of time a school could have been exposed to SIP influence. Since SIP had been operating for six years, those schools that had participated in the program during the early years have had more opportunity to engage in SIP-sponsored workshops and to integrate the intended teaching.

T1: Group T1 represents schools that had the potential for the greatest amount of influence by SIP, having initially received training and coaching between 1990 and 1992 during Phase 1, with possible ongoing participation in subsequent SIP workshops offered throughout Phase 2. This category also provides the opportunity to assess the durability of the SIP treatment.

T2: Schools in group T2, began their SIP involvement in the early stages of Phase 2 (September 1993), thereby having a three-year period of time to attend additional workshops and for the training and coaching to be internalized. This is referred to as Phase 2 - 3 years.

T3: Group T3 schools had only participated in SIP during January through May 1996. Schools were not in session in April and the data collection began June, so their involvement as SIP schools has been 4-5 months, although some of these teachers or head teachers may have attended SIP-sponsored workshops over the years. The T3 group is referred to as Phase 2 - 4 months.

Location: Most of the schools that were involved with SIP, were urban or peri-urban. To maintain consistency across the three treatment groups, only urban or peri-urban schools were selected for study. This is one of the reasons that Siaya was selected to serve as a control site,

since it is a peri-urban area and all four of the control schools were peri-urban schools and, therefore, more similar to the treatment schools than would be a rural school in Kisumu.

Based on these selection criteria, four schools were selected for each of groups T1 and T2, and three for T3. One school in each of groups T1 and T2 was a high-cost school and analyses reported later were conducted both with and without these schools to assess the impact of a more well-endowed school facility and parent population. SIP-trained teachers at the upper primary level in two of the T1 schools, all of the T2 schools, and two of the T3 schools. All schools had head teachers that had been working at that school for at least one year, but most for several years.

Instruments

The following data was collected from all 17 schools described above -- 11 treatment and four Siaya control schools and the two schools that had not participated in SIP but had benefited by attending many SIP workshops. All instruments were developed by the three senior members of the evaluation team and were pilot tested and revised during the last week of May 1996. Data collection began June 3rd and continued through June 20th.

Classroom observations: This instrument focused primarily on teacher and pupil behaviors associated with classroom management and child-centered teaching and learning. Although there is considerable variability in definitions and views of child-centered learning, the instrument was developed to document teacher use of the behaviors conveyed in the SIP training. Therefore, the SIP training manual -- which consisted primarily of a collection of the handouts provided at the various workshops -- was the major source used to determine the behaviors to be observed. In addition, the observers documented the language of instruction, the language of pupil's responses, the types of questions teachers asked and their responses to students' answers. The observers took notes on the lessons and at the end of the observation, provided an overall rating and description of the lessons, some of which are described throughout this report.

Household survey: A survey of households that had been used in several other recent studies was modified for use in the Kisumu context. This instrument was intended to capture estimates of family income, family education levels, familiarity with and attitudes towards the SIP program; and whether the parents may have sent their child to the SIP school because it was considered a better school.

Pupil interviews/questionnaire: The pupil questionnaire consisted of 33 items asking about the nursery school the child attended, language(s) spoken in various settings, school affect, locus of control, homework, reading, and TV watching. Fifteen pupils from each of the standard 3 sample classrooms were interviewed in their local language, while all of the pupils in the standard 6 observed classrooms were given the questionnaire to complete in a group setting after the observations had been completed. One of the observers was available to answer questions in the local language.

School staff focus group: A focus-group interview protocol was developed for use with school staff. The interest was in trying to gauge the impact that SIP has had on the school as a whole and on the staffs' views of SIP. There was also an interest in the role that the head teacher played as an instructional leader, so staff were asked about frequency of staff meetings, topics discussed at those meetings, frequency of head teacher's visits to the classrooms, and changes in the frequency and topics of formal and informal staff discussions about issues of teaching and learning.

Head teacher questionnaire and teacher and head teacher interview protocols:

In both teacher and head teacher instruments, the primary interest was of individual's views and perceived impact of SIP. Instruments also included questions about parent involvement, views of the curriculum, language of instruction, teacher/head teacher academic and professional qualifications, perceived locus of control, and perceptions and definitions of child-centered teaching and learning.

School climate checklist: Indicators of an effective school not captured through the instruments described above were included on a checklist to capture items such as, locks on classroom doors, windows that close, running water, cleanliness and attractiveness of school grounds and classrooms, number of teachers absent, etc.

Unstructured interviews: Unstructured interviews were held with the SIP staff, with the Municipal Education Officer, the Deputy MEO, and several TAC tutors.

Tests: Tests were administered to standard 3 pupils in English and mathematics and to standard 6 pupils in English, mathematics, and Kiswahili. Each test is described below and a copy of the open-ended tests are in Appendix A.

Standard 3. The standard 3 English and mathematics tests consisted of two parts: 1) short-answer and matching items, and 2) one or two open-ended passages or questions. The format of the short-answer items was based on standard 3 English language and mathematics Kenyan national curriculum. The English test measured picture recognition, plurals, word endings, antonyms, past tense, use of "a" or "an", and selecting the correct word to complete a sentence. The math test measured basic addition, subtraction, multiplication, division, fractions, and telling time to the five-minute interval.

The open-ended passages had two purposes -- to show how tests can be designed to support child-centered teaching and to measure the more central, integrated skills within each of the two disciplines. The English-language open-ended passage was intended primarily to test pupils' ability to read and write in English. It used simple words to account for the fact that English was not their Mother Tongue, and was intended to show how practice tests could promote the teaching of writing, encourage creativity and imagination, and validate childrens' views and feelings. It was also intended to convey how a writing exercise could be fun for children -- all important aspects of child-centered teaching. Below is the open-ended English passage:

Read the story and answer the question. Write as much as you can.

Birds can fly. If you could fly, where would you go? What would you do when you got there? Draw a picture of you flying.

The two open-ended mathematics questions measured whether pupils can communicate and represent mathematical concepts, whether they understand basic mathematical operations when represented in a word problem, whether they understand Kenyan currency, and were written to "connect" to their lives. The open-ended questions were:

- ◇ *Draw a picture to show your friend how many 10 cent coins are in a shilling.*
- ◇ *Draw a picture that shows that you have three more sweets than your brother. Your brother has 6 sweets.*

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Standard 6 - English. The standard 6 English and math tests used in this study had been developed and used in the evaluation of a primary school improvement intervention in Busia -- a town about two hours drive from Kisumu. Both were based on the National curriculum and each consisted of two parts: 1) a multiple-choice test of 50 items, 2) an open-ended question or passage.

The open-ended mathematics question was added by the SIP evaluators and had three parts, although we later discovered some problems with the question.

Pretend that you are going to plant a garden of maize. The garden is 3 meters long by 3 meters wide. You have 15 maize seeds and each maize plant will need 1 meter of space to grow. Draw a picture to show the garden plot and how you would arrange the maize seeds so that each one has 1 meter of space. Will you be able to fit all 15 maize seeds into the garden plot? If not, how many will be left out?

Standard 6 - Kiswahili. No multiple-choice or short-answer questions were given in Kiswahili -- only an open-ended question designed to measure if the pupils could read a simple passage written in Kiswahili and write a response in Kiswahili. The English and Kiswahili passages are in Appendix A.

The Kiswahili markers were trained markers for the Kiswahili portion of the KCPE. Initially, they proposed to use the marking scheme used for marking English and Kiswahili compositions in the KCPE which consisted of the following scales and point allocations: reading - 2 points; comprehension - 2 points; writing, spelling, punctuation relevancy, vocabulary, and grammar - 6 points; total points possible - 10.

Table 4 is a summary of the instruments used in this study, the target groups interviewed, observed or tested, and the sample size for each group.

Table 4
Summary of Instruments, Target Groups and Sample Size

Instrument	Target Group	Sample Size
Classroom observation	Standard 3 and 6 teachers	34*
Teacher Interviews	Standard 3 and 6 teachers	34
Head Teacher Interviews	Head teachers	17
Head Teacher Questionnaires	Head teachers	17
Parent Interviews	Parents of pupils tested	510
Pupil Interviews (Std. 3)	Pupils in standard 3 sample	255
Pupil Questionnaire (Std. 6)	Pupils in standard 6 sample	634
School Committee Interviews	School Committee Representatives	17
Focus Groups	School Staff	17
English and Maths Tests (Std. 3)	Pupils in standard 3 sample,	617
English, Kiswahili and Maths Tests (Std. 6)	Pupils in standard 6 sample,	610

*The two non-SIP, but high workshop-attendance schools were not included in analysis.

CHAPTER 3 FINDINGS

The ultimate beneficiaries of SIP's efforts to improve the skills and behavior of teachers are the children who pass through these primary schools. In the Phase 1 evaluation, the authors concluded that student learning had "not declined as a result of the intervention" and reported some evidence of gains in language skills. This section reports on whether the second phase of SIP's work with teachers resulted in increases in student learning beyond those found in the control schools. Part of this analysis attempts to correlate teachers' child-centered teaching and classroom-management behaviors, as measured during the classroom observations, with student learning. This is followed by a detailed description of the teaching behaviors observed to assess whether SIP really did contribute to more child-centered teaching in the project schools, as compared with the control schools. A later discussion evaluates the quality of the implementation of SIP and the extent to which the project's objectives, as articulated in the project proposal, were met.

To What Extent Did SIP Impact on Student Learning?

The analysis of test results was conducted in two stages: an analysis of variance (ANOVAs) to detect simple differences in performances across groups, and regression analyses to control for external factors that may contribute to achievement results but are not attributable to the SIP treatment, such as family income and parents' education.

At the time the tests were given in mid June 1996, students had received about five months of instruction, so one would expect that students had not mastered all of the content for that year. Two of the treatment groups (T1 and T2) contained a high-cost school, but none were in the T3 or control schools. It is likely that the parents of pupils at the high-cost schools have higher incomes and educational backgrounds, may be more likely to read to their children, help them with homework, have books and magazines in the home, and provide textbooks and other instructional materials for their children. It is also more likely that classes in these schools are smaller and have other instructional inputs that may enhance learning. All of these factors related to being in a high-cost school may serve to increase test scores beyond those of low-cost schools and beyond what SIP may have contributed, so the reporting of test results shows comparisons between the treatment and control schools with and without the two high-cost schools. In addition, the regression analysis, described later, holds these and other factors constant to assess their influence on test scores in relation to the influence of the SIP treatment.

Overview of test results without controls for external factors

Repeatedly, the test results show that pupils in T1 schools performed significantly better than all other groups, followed closely by pupils in the T2 and/or control schools. The T3 schools -- those that have been in SIP for only 4-5 months -- performed worse than the other treatment schools and almost always less well than the Siaya control schools (See Table 5).

However, one of the T3 schools achieved a mean score of only 8 points on the English short-answer test, bringing the average score down substantially for group T3. The other two schools in T3 acquired 41 and 71 points on this test. If this school's score were removed from the analysis for the English short-answer test, the mean for T3 would be 55, higher than the mean for the control group, but still lower than the mean for T1 and T2 on this test.

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One explanation for the superior performance of the T1 (Phase I) schools is that the teachers continued attending SIP workshops during Phase 2 and so received more training and reinforcement than did Phase 2 teachers. In fact, SIP records support this hypothesis. Teachers in three of the four T1 schools attended a total of 115 workshops during Phase 2.

Table 5
Summary of Test Scores by Class, Subject and Question Type
with and without High-cost schools (HCS)
Mean Percent Correct and (Standard Deviations)*

Test	T 1	T 2	T 3	Control	Total Mean
Standard 3 (N)					
Eng. SA (617)	79 (17)***	64 (24)**	45 (29)	51 (26)	60 (27)
w/o HCS(588)	76 (16)***	53 (21)*			52 (29)
Eng. OE (601)	28 (24)***	9 (15)	4 (8)	12 (13)*	13 (18)
w/o HCS(588)	19 (16)***	4 (8)			10 (13)
Math SA (610)	59 (19)***	51 (18)*	44 (17)	52 (15)*	52 (18)
w/o HCS (604)	57 (18)**	45 (16)*			48 (17)
Math OE (615)	18 (26)***	9 (16)*	3 (8)	9 (13)*	10 (18)
w/o HCS (607)	12 (15)	5 (11)			7 (12)
Standard 6 (N)					
English MC (610)	60 (22)**	54 (23)*	43 (18)	51 (19)*	52 (21)
w/o HCS (630)	55 (20)**	43 (17)*			46 (19)
English OE (274)	18 (24)**	14 (20)**	4 (10)	3 (7)	11 (19)
w/o HCS (238)	14 (22)**	13 (23)**			9 (18)
Math MC (543)	43 (15)**	40 (17)*	33 (12)	37 (11)*	38 (14)
w/o HCS (546)	39 (14)*	32 (11)			35 (12)
Math OE (546)	9 (10)*	9 (10)*	5 (6)	7 (8)	8 (9)
w/o HCS (546)	7 (7)	6 (6)			6 (7)
Kiswahili OE (287)	36 (25)**	28 (17)*	26 (22)	18 (15)	27 (21)
w/o HCS (299)	45 (21)*	25 (17)			26 (21)

*** Means that this group performed significantly better than all other groups.

** Means that this group performed significantly better two other groups.

* Means that this group performed significantly better than one other group.

All reported tests of significance are at the $p < .10$ level unless otherwise noted.

Standard 3: At the standard 3 level, the Siaya control schools, which did not receive any special project staff development during that six-year period of the SIP treatment, performed better than the T3 pupils on all tests and the same as T2 pupils on one test and better on two tests. The T2 pupils only outperformed the control schools on the English short-answer test, and their edge disappeared when the high-cost school was removed from the analysis. Although T1 schools performed significantly better than all other groups on all tests, when the high-cost school was removed, there are only two tests where they significantly outperformed control schools -- the English short-answer and open-ended tests. In short, then, there appears to be little achievement advantage to being in a SIP school until a school has been in the project for at least five or six years, and only on the English tests. And, this advantage may be due in part to higher numbers of workshops attended.

Standard 6: Scores were lower overall at the standard 6 level, although the tests for this level were more difficult than those for standard 3. Across all tests except math open-ended, T1 schools performed significantly better than T3 and control schools, but never significantly better

than T2 schools. T2 schools only performed significantly better than control schools on the English open-ended test, although their scores on this test were only 14 percent. The T3 schools consistently performed significantly worse than the T1 and T2 schools and usually worse than the control schools.

Comparing levels: In both subjects, the standard 6 pupils performed less well than did the standard 3 pupils. Scores on the English short-answer/ multiple-choice tests averaged 60 percent across all groups at standard 3 compared with only 52 percent at standard 6. On the math short-answer/multiple-choice tests, average scores were 52 percent for standard 3 and only 38 percent for standard 6 pupils. Scores declined slightly and variously at both levels when the high cost school was removed from T1 and T2 groups. Scores across all groups on the open-ended tests were very low and are explained more fully below.

Performance on open-ended questions: Pupils in all groups performed poorly on all open-ended tests -- 11 percent or lower across groups. On tests that required pupils to read and write in English, most either wrote nothing at all or simply rewrote the prompt. Performance was somewhat better in Kiswahili, but still poor (average of 27%).

English 3: Pupils in all groups performed very poorly on the open-ended question in English. The total possible points was 14, with 10 points allotted to a written response to the prompt and four points to drawing a picture. Treatment group 1 obtained a mean of 3.9 points out of 14 (27.6%), which was significantly better than any of the other groups but still poor. The Siaya control group performed better than both the T2 and T3 groups. Since almost one-third of the 14 points were allocated to drawing a picture, it is likely that the scores for reading and writing are even lower than the scores recorded in Table 5.

What is particularly notable in these results is that many pupils received quite high scores on the short-answer questions but could not demonstrate that they could read and write in response to a very short, simple prompt. During the classroom observations, we observed that when teachers were teaching English, it was usually a grammar lesson. Only a couple of the teachers actually had the children read, and that simply involved children taking turns standing up and reading a paragraph. They weren't asked to predict what the story or passage might be about, to connect it to their lives or what they already know, to summarize a story, or to create their own stories. We saw no standard 3 teacher teaching children to write, other than to do the exercises in their textbooks. The exercises are generally fill-in-the-blank or matching and do not involve the pupils in communicating; in generating sentences, ideas, or thoughts; or in expressing their own views and feelings. Below is a sample of the range of responses to the English reading and writing prompt.

Prompt (Standard 3)

Read the story and answer the question. Write as much as you can.

***Birds can fly. If you could fly, where would you go? What would you do when you got there?
Draw a picture of you flying.***

Pupil 1 (Score = 1 for written passage; 3 for the picture)

I cant fly.ane kiat canfly I cana fly above
about can flia I can fay if yianf lay I cane slay

This pupil answered 29 of the 36 short answer questions correctly and was able to draw a picture of himself flying.

Pupil 2 (Score = 8; 4 for picture).

I'd go to england I'd go to calofonia and also america then to atlanta* I'd go to atlanta
for skhing playing with ice and having a lot more fun

*This test was given just before the Olympic games in Atlanta.

This pupil answered 35 of the 36 short-answer questions correctly and was from a high-cost school.

Pupil 3 (Score = 1; 0 for picture)

This pupil must have recognized the words "birds" and "fly."

birds hen I sing lypiy batafigns duke ositrh

She answered 23 of the 36 short-answer questions correctly but also drew a bird rather than a picture of herself flying.

Pupil 4 (Score = 9; 4 for picture).

If I could fly, I could go high up in the sky and see the earth below me. I could see the heaven and I could worship the lord my God. I could get blessings from God and see how he could handle the worle world by his power, and how he destroyed the evil singl handedly. And there is no more that the end.

This pupil answered all of the short-answer questions correctly and drew a colorful picture of himself flying in a superman costume and wrote, "I am superman!, flying like a rocket!" He also was from a high-cost school.

Mathematics open-ended: The S3 pupils also performed very poorly on the two open-ended questions for mathematics. Out of a possible 10 points, most groups received less than one point. Pupils in standard 6 received less than one point out of 12 possible points for their responses to the open-ended questions. When compared with their short-answer and multiple-choice test scores, these results suggest that pupils can perform some basic mathematical calculations but do not know how to apply these skills to solve real-life types of problems, nor represent basic mathematical ideas. The open-ended questions and two successful responses are below. Most simply provided no response:

Prompts (Standard 3)

- ◇ Draw a picture to show your friend how many 10 cent coins are in a shilling.
- ◇ Draw a picture that shows that you have three more sweets than your brother.

◇ *Your brother has 6 sweets.*

English and Kiswahili essay questions: Scores on the standard 6 essay questions averaged 11 percent for the English passage and 27 percent for the Kiswahili passage, although pupils in T1 did score significantly higher than any other group. In these tests also, many students wrote nothing or rewrote the prompt. It is both interesting and puzzling to compare scores for English and Kiswahili by school. Table 6 shows the total scores for English and Kiswahili compositions by school and treatment group, as well as the difference between the scores for each school. Several interesting findings are clear from this table. First, the scores on the Kiswahili compositions are higher overall than the scores on the English composition. However, there appears to be no correlation between a pupil's ability to read and write in English or Kiswahili. The difference in a school's marks between the two tests ranges from two to 47 points, and in only two instances is the English score higher than the Kiswahili score (differences are listed as a negative value when the English score is higher).

Table 6
Comparison of Mean Scores (percent) for English and Kiswahili Composition by School and Treatment - Standard 6

School	English Composition	Kiswahili Composition	Difference in Scores
Treatment 1			
1. A (HC)	28 (28)	8 (9)	-20
2. B	8 (9)	55 (19)	47
3. C	10 (18)	37 (20)	27
4. D	24 (31)	42 (19)	18
Treatment 2			
1. E	11 (15)	36 (14)	25
2. F (HC)	20 (6)	37 (14)	17
3. G	26 (32)	17 (14)	- 9
4. H	3 (5)	21 (17)	18
Treatment 3			
1. I	5 (5)	7 (12)	2
2. J	5 (13)	43 (18)	38
3. K	4 (12)	28 (22)	24
Control - Siaya			
1. L	5 (5)	23 (15)	18
2. M	3 (4)	16 (17)	13
3. N	4 (9)	8 (9)	4

Second, there is tremendous variability within each of the treatment groups, with English scores ranging 20 points and Kiswahili scores ranging 47 points within group T1. Interestingly, the school that received the highest scores on the English test received one of the lowest scores on the Kiswahili test. This is likely due to the fact that this school has a high population of Asian pupils. However, the other high-cost school that also has a high population of Asian pupils performed substantially better on the Kiswahili composition. Two of the treatment schools

received very low scores on the English test yet their Kiswahili scores were both 47 points higher. It is possible that the differences in scores was in part due to use of different markers, but since they were using a common marking scheme, significant differences are unlikely. The test passages were very similar in style, format, vocabulary and difficulty level, so are not likely to be the cause of these differences.

Summary of Test Results

In summary, students in standard 3 performed better than students in standard 6 on all tests, and scores on the English tests were higher than scores on mathematics tests. Students performed reasonably well on the short-answer and multiple-choice tests, suggesting that they are learning what is in the curriculum in the way that it is taught in the curriculum and the textbooks. However, there is clear evidence that they are not learning how to read, write, or communicate in English or in Kiswahili. Nor are they learning to apply simple mathematical concepts and skills to real-life types of problems.

Overview of test results with controls for external factors

The test results reported above are limited in that they do not take into account a variety of factors that can influence student learning, such as parents' income and education, the teacher's experience, the pupil-teacher ratio, textbooks, etc. The next section uses regression analysis to control for these factors in determining if SIP had an impact on test scores. Two of the variables used in the regressions are indices of child-centered teaching and classroom management. The explanation for how these indices were arrived at is explained in the section following the regressions.

In each of these regressions, the dependent variable is one of the sets of test scores and the independent variables either tried and/or used include: 1) family characteristics - family income, proportion of income spent on food, land owned in the village, mother's level of education, whether the parents read to their child, whether they help the child with homework, and hours of TV watching); 2) teacher characteristics - academic qualifications, number of years of teaching experience; 3) pupil characteristics - age, gender, nursery school attendance, quality of nursery school; 4) classroom characteristics - class size, percent of pupils in the class who own a textbook, whether the parents pay the teacher to tutor their child; 5) treatment characteristics - treatment group, number of workshops attended by teachers and head teachers, extent of use of child-centered methods and classroom management behaviors. Table 7 shows the number, mean, standard deviation, and scale of measurement for each independent variable.

Family characteristics: Percent of income spent on food and the amount of land owned in the village were both tried as proxies for family income or wealth. However, the variable that proved most robust was an index of parents' source of income. During interviews, parents were asked how they earned their living. Their responses were coded to represent income levels -- i.e., 1=very poor, 2=poor, 3=working class, 4=middle class, 5=wealthy. This code was then entered into the regression equation. The income distribution for Kisumu is almost normal -- surprising in a developing-country context. However, the sample schools were all either urban or peri-urban and it is likely that a larger percentage of poorer families would be found in the rural areas.

Table 7
Independent Variables - N, Mean, SD, Scale

Variable	Number	Mean			Scale
		w&w/oHCS	wHCS	w/o HCS	
Test Scores					
Standard 3					
Eng. SA	677/588	60	52	30/29	36 pts. 100%
Math SA	692/604	52	48	18/17	51 pts. 100%
Eng. OE	661/588	13	10	18/13	14 pts. 100%
Math OE	697/607	10	7	17/12	10 pts. 100%
Standard 6					
Eng. MC	706/630	52	46	21/19	46 pts. 100%
Math MC	621/604	38	35	14/12	50 pts. 100%
Math OE	624/546	8	6	9/7	12 pts. 100%
Eng. Composition	276/238	11	9	19/18	100%
Kiswahili Comp.	337/299	27	26	21/21	100%
Family characteristics					
Source of income	418	3.1		1.15	1=very poor 5=wealthy 3=working class
Mother's education	258	3.4		1.67	1=none to 7=univ. 3=completed primary
Father's education	243	4.2		1.68	4=some secondary Teacher
Characteristics					
Academic qualifications	30	3.5		1.7	3=completed secondary
Years teaching	30	14.4		6.41	
Student Characteristics					
Age (S3)	238	9.4		1.4	
Age (S6)	669	12.6		1.1	
Sex	1794	1.5		.5	1=boy; 2=girl
Attended nursery school (S3)	269	94%		.2	1=yes; 2=no
Attended nursery school (S6)	707	78%		.4	1=yes; 2=no
Classroom Characteristics					
Class size (S3)	15	51		14.7	
Class size (S6)	15	54		16.9	
% own Eng. textbook (S3)	721	52%		.3	
% own math. textbook (S3)	721	52%		.3	
% own Kis. textbook (S3)	720	34%		.3	
% own Eng. textbook (S6)	596	56%		.2	
% own math textbook (S6)	596	58%		.2	
% own Kis. textbook (S6)	497	39%		.3	
% pupils pay teacher to tutor (S3)	243	39.9%		NA	
% pupils pay teacher to tutor (S6)	687	26.3%		NA	
Treatment Characteristics					
Number of workshops (S3)	15	17.5		7.8	
Number of workshops (S6)	15	11.3		7.5	
Child-centered teaching (S3)	15	29		12.0	0-63 pts.
Child-centered teaching (S6)	15	24		9.0	0-63 pts.
Classroom management (S3)	15	11		4.0	0-18 pts.
Classroom management (S6)	15	11		4.0	0-18 pts.

Both mother's and father's levels of education were tried in the analyses and found to have a positive influence in some regressions but not in others. Ultimately, mother's education was used. Three other variables were tested and found not to be significant predictors of scores and so were not used in the regressions reported: whether someone in the household helps the child with

homework; whether a parent reads to the child (although not significant here this variable did have a positive influence on achievement); and the number of hours the child watches TV.

Teacher characteristics: Teacher's and head teacher's academic qualifications in terms of the number of years they had attended school were tested and found not to be significant and so were dropped. This is likely due to the small amount of variance in the amount of education among teachers. Since all teachers are required to attend two years of preservice teacher training, this was not used as a variable. The number of years a teacher had been teaching was a significant factor in pupils' test scores in most regressions and was used throughout.

Pupil characteristics: Four pupil variables were tried: age, gender, nursery school attendance, and the quality of nursery school attended. Nursery school quality was tried because SIP staff indicated that the quality varied considerably and was perceived by the community as being an important factor in pupils' success at the early grade levels. Pupils were asked to indicate the nursery school they attended and the nursery schools were then rated on a 1-5 scale for quality by the MEO staff person responsible for overseeing nursery schools. However, there were not sufficient responses from pupils so the variable was dropped. Almost all of the standard 3 pupils had attended nursery school so there was little variability in attendance at these grades and it too was dropped. The significance of the variables age and gender varied across tests - significant in some and not in others.

Classroom characteristics: Pupils in Kenya are required to provide their own textbooks. Textbook was calculated as the percent of pupils in the class who had a book. However, we discovered that textbook is highly correlated with mothers' education and family income so often becomes insignificant when these variables are in the equation together. In fact, the simple correlations of textbook with test score are fairly low -- .18 to .29. Parents' income and education appear to be determinants of textbook ownership since pupils must purchase their own books. Therefore, textbooks are only occasionally included in the regressions, despite their obvious influence on learning. Class size was tried but found to be insignificant when other variables were in the equation. When only class size and treatment group were included, class size was significant, but in a direction that is counter to what one would expect -- larger classes predicted higher scores. One classroom in the T3 group had 95 pupils and high scores on all tests, so it was removed from the regression to see if it was distorting the results -- class size was still not significant. The percent of pupils whose parents pay their teacher to tutor outside of class was used and found not to be an influence in test scores.

A note on sample size: Although the number of test scores available is high - around 620 per class (grade), the number of cases in the following regressions is only about 15% of that sample. This is because the data included in the regressions are gathered from several sources -- teacher interviews, pupil interviews, parent interviews and classroom observations. In order for a student's case to be calculated in the regression equation, the relevant data must be available for that student from all of these sources. If even one piece of information is missing, that case is dropped from the analysis. Regressions were not done for the open-ended and composition tests since scores for all groups were less than 28 percent and generally less than 20 percent.

Treatment characteristics: The number of professional development workshops teachers attended was often significant. These workshops included SIP and SPRED workshops and those sponsored by the TACs, although most of the workshops were SIP-sponsored. The two indexes created from teacher behavior observed during the classroom visits were used as treatment variables -- child-centered teaching and classroom management -- since these were target

behaviors of SIP training and TA. (See the later discussion in the next section for how these indexes were created.) However, it should be noted that teachers may use these behaviors without SIP influence, so they also could be considered non-treatment variables.

English short-answer standard 3: The first column of the regression Table 8 for the English short-answer test scores shows that the SIP treatment had an influence on scores in groups T1 and T2. However, there is considerable variation in test scores within each group: a 21, 43, 63 and 34 percentage point spread in T1, T2, T3 and control respectively. Much of the total variance in scores on this test can be explained by school effects. Indeed, an equation not shown with dummy variables for schools (dummy variables are variables that take on a value of either 1 or 0, such as 1 if the school or pupil is in T1 or 0 if not in T1) explains 48 percent of the variance compared to only 26 percent for the treatment groups in equation 1 [and 51 percent when both school and treatment dummies are included in the same equation.]. When dummy variables for treatment groups and schools are included in the same equation, the adjusted R² increases to only to 51 percent and coefficients for all three treatment groups and most of the schools are significantly different from zero.

Regression Table 8
Short-answer Tests - Standard 3

Depend. Var. Equation	English				Mathematics				
	1	2	3	4	1	2	3	4	
Constant		42.0 (.00)	4.0 (.63)	-4.4 (.82)	-45.5 (.00)	47.1 (.00)	29.2 (.00)	19.0 (0.3)	4.2 (.65)
T1		36.8 (.00)	22.9 (.00)	21.6 (.04)	3.1 (.57)	11.8 (.05)	9.9 (.04)	11.8 (.07)	5.0 (.37)
T2		22.3 (.07)	14.1 (.11)	19.6 (.07)	12.4 (.12)	3.5 (.58)	2.1 (.63)	11.9 (.01)	10.4 (.01)
T3		2.6 (.87)	1.51 (.85)	8.6 (.54)	4.6 (.35)	-3.2 (.65)	-8.2 (.01)	2.5 (.65)	2.8 (.53)
Family Income			7.43 (.01)	5.4 (.04)	3.1 (.17)		3.7 (.03)	1.2 (.23)	0.6 (.53)
Mother's Educ.			6.20 (.00)	3.5 (.08)	1.8 (.24)		2.6 (.00)	0.6 (.58)	-0.2 (.88)
Years teaching				1.4 (.02)	1.5 (.00)			1.6 (.00)	1.2 (.00)
Workshops Attended					2.13 (.00)				0.7 (.05)
Child-centered Teaching					-61 (.01)				-0.1 (.52)
Classroom Management					3.3 (.00)				0.8 (.33)
Adj R ²		0.26	.50	.40	.41	.07	.29	.27	.28
N		688	106	83	83	703	107	85	82

Note: Figures in parentheses are probabilities that the t-statistic is likely to be greater than the value estimated (but not shown here). Standard errors have been adjusted for heteroscedasticity and clustered sampling within schools.

These results are only modestly affected by the addition of household characteristics (income and mother's education), as can be seen in equation 2. The influence of parents' reading to their children at home was significant in some equations and not in others.

Equation 3 adds the school-level variable of number of years a teacher has been teaching, which is a significant influence on test scores, and when added, T1 and T2 are still significant. Two variables that were tried but found not to be significant were the percent of the pupils in a class that had an English textbook and class size. Books is strongly correlated with mothers' education so when entered into the regression together, the influence of books drops out.

Equation 4 adds variables believed to define the nature of the program: number of workshops attended, an index score for child-centered teaching and another for classroom management techniques used. The workshop and classroom management variables are highly significant and their addition eliminates the remaining effects of the treatment dummies, thus suggesting that they are capturing the treatment effects. Although T2 is not significant, the coefficient is 12.4. However, the coefficient for the T1 schools drops from 21.6 to only 3.1, indicating that workshops attended and classroom management account for a much larger effect on T1 schools than these factors do in the T2 or T3 schools. A similar effect occurs in the mathematics test scores. The T3 coefficient increases considerably when the number of years a teacher has been teaching is added, suggesting that these schools have teachers with less experience than do T2 schools and that progress being made in a T3 school is more likely due to SIP than it is to an experienced teacher. [It is also interesting to note that a similar result occurs when these variables are added to an equation with dummies for schools, suggesting that the workshops and classroom management also explain a great deal of the differences between schools.] Child-centered teaching behavior appears to have a slightly negative effect on test scores while the other two have fairly large effects in the expected direction -- each additional workshop increasing test scores by over 2 points and each additional point on the classroom management index increasing test scores by over 3 points. Group T1's higher test scores but low child-centered teaching scores, are likely to counteract any positive influence of child-centered teaching in the other two treatment groups. The number of years a teacher has been teaching is still significant. Household variables such as income and mothers' education are no longer significant.

The SIP treatment involves several factors, most significantly workshops, classroom-based coaching and learning materials. The only one of these factors measured in this study is the number of workshops attended. Thus the coefficients on the treatment groups when number of workshops are held constant can be interpreted as an estimate of the influence of coaching and materials. The findings are interesting. In equation 4, the coefficient for T2 is much larger than for T1 and T3. This makes sense since it has been longer since the T1 schools received coaching and the impact of the coaching they did receive is likely to have faded and T3 schools were still being coached during the data collection. It is reasonable to expect the effect of coaching to be greater in T2 schools.

Summary: In summary then, three variables have a significant influence English short-answer test scores at the S3 level: the number of years a teacher has been teaching, the number of workshops the teacher has attended, and his or her classroom management skills. Being in a T2 school also seemed to have an effect, although this influence was not significant. Child-centered teaching was not positively correlated with higher test scores.

Mathematics short-answer, standard 3: The regressions for mathematics explain only about half of the variance explained by the English regressions (see Table 7). When only treatment

group is considered, only T1 scores are significantly higher than any other group, and the SIP treatment accounts for only 7 percent of the variance in scores (equation 1). However, when only school is considered (not shown), the effect of school is significant in all but four schools and accounts for 29 percent of the variance in scores. So it appears that school has more influence than does the SIP treatment. Family income and mothers' education have a significant influence when entered with treatment group but not when entered with school, suggesting a colinear relationship between these family variables and the school their children attend. That is, higher income, more well-educated parents are likely to be able to afford to put their children into the high-cost schools or to provide the transport to better schools that are not located nearby.

When the number of years a teacher has been teaching is added to equation 3, it is again highly significant, T1 remains significant and T2 becomes significant. Neither owning a math book nor class size are significant influences on math scores.

In equation 4, the treatment variables are added: the number of workshops a teacher has attended along with child-centered teaching and classroom-management behaviors. Treatment is only significant for group T2, but no longer for T1 schools. Number of workshops and years of teaching are both significant influences on math test scores, but family income, mother's education and child-centered teaching and classroom-management behaviors are not. This may mean that family and school variables have less of an influence in the T2 schools, and that the treatment has more of an influence.

Summary: In summary, for the standard 3 mathematics short-answer test scores, only 28 percent of the variance in scores was explained by family, teacher, and treatment characteristics than was the case for the English test scores for which 41 percent of the variance was explained. While influence of the number of years a teacher has been teaching was consistent, positive, and significant, the influence of treatment was only found in T2 and for number of workshops attended.

English multiple-choice, standard 6: The SIP treatment alone accounts for only 9 percent of the English multiple-choice test scores at the standard 6 level, and when no other variables are controlled for, only T1 is significant (Table 9). However, when family income and mothers' education are added, treatment is no longer significant. The coefficient for T1's treatment effect drops from 14.3 to - 2.7 when family income, mothers education, and teacher's experience are added, but increases considerably for pupils in T3, suggesting that the T1 schools have pupils who come from families with higher income and better education and that the T1 teachers have much more experience than do the pupils in the T2 schools. When the following variables are added, all are positively significant: number of years a teacher has been teaching, and child-centered teaching and classroom-management behaviors. However, these results are highly questionable since the control group's scores for classroom management were higher than any of the treatment groups' scores and about the same as two of the treatment groups for child-centered teaching, and so are not presented here. Therefore, it appears that SIP had little influence on pupil's English achievement at the standard 6 level.

Mathematics multiple-choice, standard 6: As with the English score regressions, the significance of the SIP treatment disappears when family income and mothers' education are added (Table 9). However, unlike for other subjects, years of teaching is not significant unless added with workshops attended and teaching behaviors. When these variables are all entered into the equation together, all appear to be significant, but, as with the English analysis above, the results appear to be unreliable since treatment teachers did not have higher scores on the classroom

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teaching behaviors and so could not be significantly greater in the regressions.

Findings - Summary

Regressions were not done for the open-ended and composition tests since scores for all groups were less than 28 percent and generally less than 20 percent.

Regression Table 9
Multiple-choice Tests - Standard 6

Depend. Var. Equation	English			Mathematics		
	1	2	3	1	2	3
Constant	45.3 (.00)	16.9 (.08)	4.6 (.72)	35.9 (.00)	15.0 (.00)	16.7 (.00)
T1	14.3 (.06)	2.7 (.69)	-2.7 (.68)	7.1 (.05)	5.5 (.16)	3.0 (.43)
T2	9.1 (.39)	2.1 (.75)	-3.2 (.71)	4.3 (.51)	1.6 (.72)	-1.6 (.77)
T3	-2.7 (.72)	0.1 (.98)	8.9 (.29)	-3.2 (.31)	1.7 (.46)	-1.9 (.72)
Family Income		5.2 (.11)	7.8 (.00)		3.8 (.03)	5.5 (.00)
Mother's Educ.		5.4 (.00)	4.2 (.01)		3.1 (.01)	3.3 (.02)
Years teaching			.83 (.17)			-.4 (.50)
Adj R2	.09	.25	.24	.06	.22	.21
N	711	112	96	639	99	85

Note: Figures in parentheses are probabilities that the t-statistics is likely to be greater than the value estimated (but not shown here). Standard errors have been adjusted for heteroscedasticity and clustered sampling within schools.

Summary - standard 3: When family, teacher and school variables are not considered, the SIP T1 and T2 pupils performed significantly better than T3 and control pupils in the English short-answer tests, but only T1 pupils performed significantly better in the math short-answer test. And although the T1 pupils performed significantly better in the open-ended tests, their scores were so low as to not be passable.

However, when family income and mother's education are controlled for, being in a SIP T1 school is no longer a significant contributor to learning achievement, but being in a T2 school does appear to have a positive influence on test scores in both English and math, although not significantly in English. In group T1 schools, the impact of SIP may be absorbed by the number of workshops T1 teachers attended. Test scores are estimated to increase by over two percentage points for each workshop a teacher attended and the T1 teachers attended significantly more workshops than did the T2, T3, or control teachers. SIP appeared to have little impact on the T3 schools at this early stage. Child-centered teaching was not a significant contributor to test scores, although child-centered teaching is highly correlated with workshop attendance and so may have been absorbed in the workshop coefficient. Classroom management behaviors were a significant influence on English scores but not on math, although it not clear that these management behaviors

were influenced by SIP. The most consistently influential variable on test scores is the number of years a teacher has been teaching.

Summary - standard 6: When family, teacher, and school variables are not considered, the SIP T1 test scores were significantly greater than the T3 and control schools in all tests but math open-ended. There was no significant difference between T2 and control schools. However, when family variables are considered, SIP had no influence on student learning at the standard 6 level as measured by these tests. The number of years a teacher has been teaching was not significant as it was at the standard 3 level and the other statistics for the other variables were unreliable for all standard 6 tests and all open-ended tests at both grades.

The child-centered teaching behaviors promoted by SIP did not seem to have a positive influence on test scores at either grade level.

Table 10
Summary of Regressions - SIP Influence Significant (Yes/No)

Test	Mean %	Mean %	In SIP*Workshops		CCT**	CM***
Standard 3	wHCS	w/o HCS				
Eng. SA	60	52	T2 ¹	Yes	No	Yes
Math SA	52	48	T2	Yes	No	No
Standard 6	wHCS	w/o HCS				
Eng. SA	60	52	No	No	No	No
Math SA	52	48	No	No	No	No

Regressions for open-ended tests were unreliable and are not shown. ¹ Significant at p < .12

* Participation in SIP ** Child-centered teaching behaviors *** Classroom management behaviors

KCPE Results

At the end of the eight-year primary cycle, pupils take the Kenya Certificate of Primary Education Examination (KCPE) - a test that is used to provide certification of successful completion of primary school and to select pupils for admission to secondary school. It is reasonable to ask whether SIP had any influence on performance on this examination, but, if there was an influence, it would have been quite limited since SIP did not begin working with teachers in standards 4-6 until late 1994 and the KCPE is administered to pupils in standard 8. Even for the three schools that began participating in SIP in 1990, only the standard 3 pupils would have reached standard 8 by 1995, and pupils in only two of these schools would have had SIP-trained teachers in standards 4-6 and none would have had SIP-trained teachers in standards 7 and 8. One of these two is the Aga Khan Primary School, a high-cost school which has traditionally scored at the top of all schools in Kisumu.

Given these caveats, Table 11 shows several interesting findings: Kisumu's scores on the KCPE were 43 points higher than Siaya's in 1989, but only 35 points higher in 1995. This suggests that Kisumu's schools (or pupils) were better than Siaya's before the SIP intervention and that the disparity between the districts decreased in Siaya's favor. In addition, Kisumu's ranking on the KCPE, compared to schools across Kenya declined from 7th in 1989 to 16th in 1994, suggesting that if SIP did have an influence, it would have been negative.

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Table 11
Mean KCPE Performance - Kisumu and Siaya

	Kisumu		Siaya		Difference Mean score
	Mean score	National Rank	Mean Score	National Rank	
1985	315.94	10			
1986	315.994	12			
1987	311.01	12			
1988	311.66	12			
1989	369.61	7	326.02	33	+43
1990	365.76	11	330.00	34	+36
1991	364.47	11	344.35	24	+20
1993	368.42	13	332.48	32	+36
1994	368.41	16	333.41	33	+35

Source: Ministry of Education, KNEC. Total number of districts ranked is 59 in 1995; 46 in 1991/ 92.

What Difference Has SIP Made in Enrollment, Attendance and Class Size?

Appropriate data were not available to assess SIP's impact on these factors. The MEO was not able to provide school enrollment figures for years before 1993, and generalizations about SIP's impact based on changes in enrollment also would be questionable due to a high rate of AID's-related deaths in Kisumu. However, enrollment rates are quite high in Kisumu -- 92% -- about 10% higher than the national rate and 1.5% higher than Siaya's rate.

Girls were enrolled in slightly higher numbers in groups T2, T3 and the Siaya control schools, with little difference between the genders in T1 schools. On the day of the observations, pupil absences averaged about five in T1, T2, and the Siaya control schools, but were substantially higher in the T3 schools with an average of 17.25 pupils absent. Class size was also much higher in the T3 schools, with an average of 63 pupils per class compared with 44 in the T1 schools, 41 in the T2 schools and 50 in the control schools. The larger class size may have contributed to absences. The T3 schools also had a higher proportion of students with more than two weeks of absences.

Did SIP Have an Impact on Teaching and Learning?

There were several study questions that addressed the impact of SIP on teaching and learning:

- How effective were SIP teachers in implementing child-centered teaching and learning in their classrooms?
- Is there a correlation between teachers' facility at child-centered teaching and students' academic achievement? (Answered in previous section.)
- What are the project teachers' level of understanding regarding child-centered teaching and learning?
- To what extent did the project impact on teachers' and head teachers' effectiveness?

Each question is addressed in order.

How effective were teachers in implementing child-centered teaching and learning in their classrooms?

Procedure. The classroom observation instrument was designed to assess the dimensions of child-centered teaching and classroom-management strategies contained in the SIP workshop materials. One standard 3 and one standard 6 classroom was observed by two evaluators in each of the treatment and control schools. Two lessons were observed for each class and in most cases, the lessons observed were English and mathematics. In the upper grades, several science lessons were observed.

The definition of child-centered teaching as used in this evaluation was derived from various sources, including the project proposal, the handouts provided to teachers at workshops, and, through discussions with SIP staff.

In the following discussion, teachers' behaviors are reported in three ways: a brief overview of the typical teacher behavior found in most schools; indexes of child-centered teaching and classroom-management behaviors comprised of a collection of related classroom behaviors; and more detailed descriptions of individual teaching behaviors that are considered to be aspects of child-centered teaching.

An overview of the typical teacher behavior observed: Overall, we did not consider the teaching in the SIP classrooms to be particularly child-centered. There was remarkable similarity across teachers. Most lessons began with a 10-minute explanation of the topic, with teachers asking a rapid series of closed, factual questions that did little to engage pupils in higher levels of thinking or reasoning. An assignment was then given, pupils collected their exercise books, and spent the remainder of the lesson completing the exercises from their texts or that the teacher wrote on the board. Usually, the teacher went around the room correcting pupils' work and occasionally offered an explanation. Teachers seldom attempted to find out if individual pupils really understood what he or she (mostly she) was teaching. Seldom did we see pupils working together in small groups or talking with each other, although most SIP classrooms had pupils seated in groups. Quite a few of the teachers did use learning aids (manipulatives) to help make a lesson more concrete -- particularly in mathematics. We almost never saw pupils using the learning centers that SIP had helped teachers to develop.

Box 1
Classroom Profile - Standard 3 SIP Teacher

This teacher was using block time-tableing (teaching a class for one or 1 1/2 hours in one day instead of 35 minutes per day over several days) and we observed her teaching a one-hour English class. However, the hour-long block was not well used. She was teaching antonyms and would put a word on the board and ask for the opposite of that word. Most of the responses were group responses and at no time did she ask the pupils to use the words in a sentence or try to connect them to their experiences or other lessons. A lot of time was wasted by taking too long to call on a pupil after asking a question. When pupils wrote misspelled words on the board she neither corrected them nor did she explain why their spelling was incorrect. For example, one girl wrote "ded" instead of "dead." This was a good opportunity to explain both the rule and the exceptions to the rule. Another wrote "bifo" for "before" which would have provided the opportunity to clarify the

pronunciation of before. In 22 minutes the teacher only completed five antonyms, which would have been understandable if she had taken time to ensure that they really understood the words, used them to create their own sentences, and corrected misspelled words. - but she did not. After the first 22 minutes, the children spent the remaining 38 minutes working in their exercise books. On the board at the front of the class she had written, "Good children do not make noise in class."

Indexes of child-centered teaching and classroom-management behaviors:

The classroom observation instrument was designed to assess two main features of a teacher's behavior -- behaviors that could be characterized as child-centered teaching, and how the teacher managed the classroom. For both constructs, specific behaviors were generally drawn from the SIP training materials. An index was created for each of these sets of behaviors, calculated for each teacher and summed across schools within each treatment group based on a weighted sum of selected behaviors. Child-centered teaching behaviors included: active learning in small groups; encouraging pupils to interact, help each other and discuss; conveying high expectations; providing pupils with learning aids; encouraging pupils to pose their own questions and seek answers to those questions; encouraging pupils to think; attending to individual students' needs; pupils intellectually engaging with tasks, creating, shaping, and integrating what they are learning with what they already know, etc.) Classroom-management behaviors included: clearly communicating expectations for student behavior; starting and stopping class on time; using time efficiently for learning; making sure that all pupils are paying attention and are engaged; having control over the class; having all materials ready and available for each lesson; lessons that flow smoothly; smooth transition between lessons and/or activities.

Child-centered teaching Table 12 shows that at the standard 3 level, teachers in all treatment groups exhibited substantially more child-centered teaching behaviors than did control teachers. Teachers in group T2 acquired 61% of the points possible compared with only 31% for the control teachers, and 52% for those in T3. However, the T1 teachers acquired only 42%, the lowest of all treatment groups.

The range for standard 6 teachers was much narrower, with T2, T3 and control teachers acquiring only about 35 % of the points possible, and T1 teachers getting 44% of the points possible.

Table 12
Indices of Child-centered Teaching and Classroom Management Behaviors
Mean Percent and (Standard Deviation) By Group and Class

Group	Child-centered Teaching		Classroom Management	
	S3(sd)	S6 (sd)	S3(sd)	S6(sd)
T1 (4 per class)	42 (4)	44 (9)	44 (1)	60 (5)
T2 (4 per class)	61 (15)	34 (7)	88 (4)	53 (4)
T3 (3 per class)	52 (15)	39 (9)	65 (4)	56 (5)
C1 (4 per class)	31 (5)	35 (12)	58 (4)	65 (4)
Total Mean (30)	46 (12)	38(9)	63 (4)	59 (4)

Classroom management: At the standard 3 level teachers in group T2 exhibited a much higher rate of desirable classroom-management behaviors than did control teachers (88% vs.

58%), and teachers in T3 schools acquired 65% of the points possible but those in T1 schools acquired 14 percentage points *less* than did control teachers.

At the standard 6 level, the control teachers scored higher than all groups of treatment teachers in classroom-management behaviors. SIP made far less of a difference at the standard 6 level in both child-centered teaching and classroom management behaviors.

Summary: At the standard 3 level, teachers in T2 exhibited substantially more child-centered teaching (61%) and classroom management behaviors (88%) than any other group, followed by the more recently involved T3 teachers, suggesting that SIP's work with teachers during Phase 2 did contribute to those teachers' improved classroom practices. The scores for the T1 teachers were lower than the other two treatment groups addressed during Phase 2 and, in fact, the control teachers' classroom management scores were higher than those of the T1 teachers.

All standard 6 teachers exhibited few child-centered teaching behaviors and there was little difference across the groups in either category of teaching behaviors.

Interestingly, these teaching behaviors are not consistent with the pattern found in the test results for standard 3 teachers, where the pupils in T1 schools performed the highest, followed by those in T2 and the control schools, with pupils in T3 lagging behind. However, it is unlikely that the T3 teachers' new teaching strategies would have had sufficient time to have an impact on student learning since they had only been introduced to them within the past 4-5 months. The regression analyses reported earlier controlled for teachers' child-centered and classroom-management behaviors and found a slightly significant but negative influence of child-centered teaching on standard 3 test scores and no reliable influence on standard 6 scores. However, there were significant contributions of classroom-management behaviors for teachers at the standard 3 level.

Box 2 **Classroom Profile - Standard 6 and Standard 3 SIP Teachers**

We observed this standard 6 teacher during a science and a business education class. In science, she was teaching the parts of a flower and most pupils and the teacher had a flower. She had written the definitions of the various parts of a flower on the board, e.g., "Stalk - attaches itself to the plant." The pupils seemed quite motivated and were attentively following along as the teacher explained and showed each part and then drew it on the board. She seemed to have good rapport with the pupils and used good questioning techniques in the business education class, for example, "Suppose all of us - including me - were to contribute 100 shillings each to starting a business (someone count all of us), how much would we raise?"

However, the standard 3, SIP-trained teacher at this same school had no rapport with the pupils. They seemed inhibited, intimidated and withdrawn. It took him a full two-minutes to get a response to the question "What is 5 x 3?" and when the response was incorrect, he said, "You are wrong. Who can help her?"

Components of Child-Centered Teaching

In the next section, observations of component behaviors that comprise both good teaching in general and child-centered teaching specifically are described. These include teacher questioning,

how teachers responded to students' answers, teacher feedback, use of lesson introductions, group learning, availability and use of textbooks, use of learning aids (manipulatives), classroom materials, and caring behavior. Throughout, comparisons are made across treatment and control groups.

Teacher Questioning: Observers documented the types of questions a teacher asked, the type of responses a teacher gave to correct or incorrect answers, and whether the question was asked of a boy or a girl. This was recorded for a ten-minute segment of each class session about five minutes after the class began.

Questions were defined as closed or open in keeping with the definitions in the SIP training materials. A closed question was defined as one that has a very limited number of acceptable answers (usually just one) and typically elicits a one-word or short-phrase response. An example of a closed question is, "What is the body of a fish covered with?" Open questions were defined in the SIP training materials as questions that, "... anticipate a wider range of acceptable responses. They draw on the students' past experience but they also cause students to give opinions and their reasons for their opinions."

Open questions were classified as open simple or open complex. An open simple question may have more than one right answer, but does not particularly encourage children to think and analyze. An example might be, "What are sources of energy?" Open complex questions are intended to engage students in complex thought. For example, the following types of questions may require that students draw upon their own views, cause them to reason and analyze, have multiple possible answers, and may be open to debate: "Why do you think that? How could that have been prevented? What other options are possible? How would you have dealt with the situation? What if . . .? What are some of the factors that may have led to this event? What if X had been different?"

Most of the questions asked by teachers were closed questions requiring short, predictable answers and little or no analytical thinking on the part of the pupils (see Table 13). Teachers asked very few questions that attempted to connect to pupils' lives or prior knowledge -- only about one per class session and most of these were open-simple questions where there can be more than one correct answer but no complex thinking is required. Standard 3 teachers in group T2 asked considerably more open questions than did teachers in any of the other groups or class levels.

Across all observations, only about one percent of the 414 questions asked were open-complex questions that required the pupil to generate information or ideas and/or to engage in analyzing, applying, extending, or reasoning about a topic. Four of these open-complex questions were asked of boys and one of girls. In all categories of question types, boys were asked more than girls, a total of 14% more across all questions.

A high number of questions were posed to the whole class, requiring choral responses, with an average of 7.7 asked per ten-minute period -- almost twice as many as the average number of closed questions asked of individual pupils. Generally these group questions required closed, one-word, or short, predictable responses.

Gender differences: During the ten-minute period of observing questioning behavior, boys were asked 14% more questions than girls across all question types, and four of the open-complex questions were asked of boys compared with only one of girls.

Table 13
Types of Questions Asked by Group and Class

Question Type/*	T1		T2		T3		C		Total
	S 3	S 6	S 3	S 6	S 3	S 6	S 3	S 6	
cb	25	11	20	17	14	17	27	17	148
cg	25	5	16	17	13	11	28	21	136
ccnb	2	0	0	0	0	1	0	0	3
ccng	1	0	0	0	0	0	0	0	1
Oscb	5	5	11	7	1	14	2	2	47
oscg	1	4	12	6	1	1	4	4	33
osncb	0	0	25	2	0	1	4	1	33
osncg	0	0	5	2	0	0	1	0	8
ocb	0	3	0	0	0	1	0	0	4
ocg	1	0	0	0	0	0	0	0	1

* c = closed - not connect; ccn = closed connect; osc = open simple connect; osnc = open simple not connect; oc = open complex; b = boy; g = girl.

Summary: Teachers' questioning behavior was decidedly unsupportive of child-centered teaching or development of childrens' thinking and problem solving abilities. There was little difference in the questioning behavior of control or treatment teachers, although the standard 3 teachers in group T2 did ask considerably more open-simple questions than did any other group.

Box 3 Classroom Profile - SIP Standard 3 Teacher

This newly-trained SIP teacher was teaching English vocabulary. She used a knife as a learning aid to teach the words knife, blade, handle, blunt, and sharp. She had individual pupils come up to feel the sharp and blunt ends, but often waited too long after asking a question before selecting a pupil to respond. While research has found that waiting three seconds instead of one second after asking a question results in several cognitive benefits for pupils, these benefits derive only with questions that may have several responses or require more thinking on the part of the pupils. In this instance, the teacher was looking for only one correct response and her delay in calling on a pupil only served to waste valuable learning time. We observed several teachers waiting too long after asking a question and before calling on a pupil to respond.

In this class, as with many other SIP classrooms, the pupils were seated in groups but did not work in groups. Her written lesson plan was also typical of most teachers we observed, vague and general. It consisted of statements such as: introduce by asking question, write the words on the board, give them work, check their work.

When the teacher began the math class, many of the pupils were not paying attention because they were collecting their exercise books and had to go through the stack of books to find their own.

Teacher Feedback: In 27 of the 34 classrooms, teachers gave pupils regular feedback, both on the responses to questions asked by the teachers, and during the latter half of the lesson when pupils worked in their exercise books. During that time, the teacher would move around the room, check pupils' work, and enter the number correct in their booklets. Sometimes the teacher

would ask a question of the pupil or provide an explanation of something the pupil did not understand. In two treatment and two control schools, the teachers did not provide feedback.

Summary: The quality of feedback provided by teachers in most classrooms could be described as minimalist. Teachers seldom attempted to try to understand what children were thinking, to identify their misconceptions or even accurate conceptions, or to provide explanations that might clarify their understanding. Most of the dialogue with pupils was perfunctory, narrow, intellectually unengaging, and lacked a personal connection. The only classrooms where there was any substantive communication among pupils was in the two high-cost schools. In these schools, the pupils appeared to be much more comfortable and relaxed about interacting with each other.

Lesson Introductions: Lesson introductions are information provided at the beginning of a lesson to assist pupils in organizing the information conveyed in the remainder of the lesson. They are intended to assist students in ordering the subsequent material and help to provide clarity and integration of the material.

Only 11 of the 34 teachers observed introduced their lessons and of those 11, only 7 referred to a previous, related lesson, and only three attempted to connect the introduction to the pupils' own experiences. Standard 3 teachers in group T1 were significantly more likely to use an introduction than the control teachers and standard 6 teachers seldom used an introduction.

Box 4 **Classroom Profile - Standard 3 SIP Teacher**

This teacher taught two excellent lessons that exemplified child-centered teaching. The math and English lessons were highly integrated and the pupils were actively involved. The teacher was friendly and the children seemed quite happy. In the math lesson, she was teaching the topic of shapes. As a form of advance organizer, she asked pupils to recap the previous lesson on shapes by coming to her desk and picking out a particular shaped object. They then discussed each shape and the properties of the shape as the teacher wrote on the board, e.g., rectangle - two opposite sides equal: square - all sides equal.

She then had pupils work in groups to cut out shapes. During the cutting, the pupils discussed what they were doing, for example, one pupil said, "No, all sides equal." When a group finished one shape, they moved on to another without being told. During this time, the teacher moved around the room, expressing interest in each group's work. She summarized the lesson by having the pupils come to the front of the room to fit cutout shapes into a large sheet of paper from which the shapes had been cut.

Even more impressive was her connection between the math and English lesson. The English lesson was on the concept of a circle and she began by having the pupils join hands to make a circle, then break into small groups to make several small circles. She then had them do other things with or about circles, such as making a circle from a rope and then make a sentence to describe what they had done.

She attributed her approach to SIP training and indicated that, while she had acquired some of these methods at college, she had stopped using them until SIP reminded and retrained her.

Group Learning: A key emphasis in the SIP training was to encourage teachers to involve pupils in small group learning. The observations revealed that nine of the standard 3 treatment classrooms were seated in small groups, but none of the pupils in the control classrooms were seated in small groups. Groups were often large, with seven groups having nine pupils in them. None of the standard 6 teachers used grouping, despite the fact that SIP has been working with at least eight of the sample standard 6 teachers.

Although children were seated in groups in many of the SIP classrooms, only four of the 22 SIP teachers had the pupils working together in their groups. This does not represent a significant change from that found in the evaluation of Phase 1 which reported that teachers' use of individual and group work was limited.

Summary: This may be an example of how teachers can adopt the "trappings" of an idea without incorporating the essence into their teaching repertoire. Organizing pupils into groups is much easier than understanding how to engage them in effective learning activities, although it appeared that SIP did provide teachers with a number of materials and ideas for small group activities. Small group work is often dismissed as unworkable in developing countries because of large class sizes. However, many of these classrooms had reasonable enrollments. Those that did engage pupils in small groups ranged in size from 28 to 38.

Textbooks: In 29 of the 34 classrooms, teachers used a textbook during instruction. Pupils used textbooks in only about half of the 34 classes, with about 60% of treatment classes using textbooks, compared with only 37% of control classes. Accurate figures are not available for standard 6 classes since in many cases, the pupils only had with them the book for the class they were currently attending.

Box 5 **Classroom Profile - Standard 6 - SIP**

This teacher's lesson illustrates several activities or behaviors encouraged by SIP. She began by asking the pupils a series of questions aimed at teaching them the use of the conditional tense "I would" or "I'd." Almost all of her questions were connected to the pupils' lives and to their feelings. She began by asking, "Who has seen a rat?" She then asked, "Where did you see a rat? In which room of your house did you see a rat?" After several pupils gave their responses, she asked, "What would you do if you found a rat in your bedroom? . . . in the kitchen, etc," and wrote each pupil's response on the board. Before class had begun, she had drawn several scenes on the board, such as withering crops or bountiful crops. After a series of questions related to the pictures that elicited responses that began with, "I would," she then had pupils pair up and ask each other questions using the conditional "would" such as, "What would happen if there was no rain?" or "What would happen to the farmers' crops?"

This teacher actively engaged the pupils, connected the questions to their experiences, and had them work together in small groups generating and responding to each other's questions. However, the questions they were assigned to ask each other were all scripted based on the drawings she had put on the board. Perhaps if they had been able to generate their own questions and answers they would be more likely to learn a larger variety of contexts for using the conditional tense. In addition, the teacher did not place the lesson within the larger context of tenses and grammatical uses, nor did she use the opportunity to develop pupils' writing skills by, perhaps, having them write short passages or stories using the tense.

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Table 14 shows that pupils in T1 were more likely than any of the other group to have textbooks. Only about half as many pupils in T3 had English and math books when compared with groups T1 and T2, and even fewer pupils had Kiswahili books (21%). The pupils in the Siaya schools were more likely to have fewer books than pupils in groups T1 and T2 but slightly more than pupils in T3 with the exception of Kiswahili books (21 vs. 12%). The regression analysis described earlier revealed little influence of textbooks on test scores, although the correlation of textbooks with mother's education may have counteracted the influence of textbooks when the two variables were entered into the equation together.

Table 14
Percent of Standard 3 Pupils Having Textbooks by Group

Group	English	Math	Kiswahili
T1 (4)	67 (21)	71 (14)	80 (62)
T2 (4)	59 (38)	65 (33)	40 (29)
T3 (3)	34 (18)	35 (15)	21 (23)
C (4)	42 (8)	36 (17)	12 (7)

In many classes, pupils did not have their own books and shared with other pupils. Generally, they shared a book with one other pupil, but in eight classrooms, there were nine instances each in which a pupil shared a book with more than two other pupils and four classrooms where about half of the pupils shared with more than two other pupils. In a number of classrooms there were so many pupils sharing a book that several could not see the book.

Learning Aids: Two-thirds of the SIP teachers used learning aids during their lessons, as compared with only one-quarter of the control teachers. Learning aids were more often used in math classes at standard 3 level. In half of the SIP classes, pupils were encouraged to use the learning aids. These often included bottle caps and sticks for use in multiplication exercises, and small pieces of cardboard with words on them for use in making sentences in English classes. There was remarkable similarity in the use of the learning aids in the SIP classrooms, likely the result of SIP influence. In no instances were boys more likely than girls to have access to the learning aids.

Box 6
Classroom Profile - Standard 3 SIP Teacher

This teacher was also the SIP coordinator at her school. The first lesson was Kiswahili and she was teaching word use using several objects. She would hold up two objects, such as a large and small knife and then ask, "Ni up mkubwa? (Which is the big one?)" "Ni up mdogo? (Which is the small one?)" She then asked for the reasons for their choices. "Kwa nini utachagua kisu hiki? (Why do you choose this knife?)" Children conversed using the words, comparing their choices and making informed preferences.

In the math lesson, children sat in groups and used counters to make sets indicated by the teacher, e.g., "Three groups of two." She then moved to columns and had the children arrange bottlecaps in columns as she called out, "Show me four rows with two bottlecaps each." Although each child was working with his or her own counters, they were discussing with the others in their groups and cross-checking with their peer's arrangements, suggesting that a culture of communication and consultation had already been established.

This teacher also indicated that she had learned some of these methods previously but had stopped using them until SIP came along and reminded her of them-- "Knowing something is one thing, but practicing it is another."

Classroom Materials: SIP classrooms were far richer in materials than were control classrooms. This was the most distinguishing characteristic of a SIP classroom. The materials provided a much warmer, more interesting environment for the pupils -- and for the observers. We received substantial feedback about the value of the materials from teachers, head teachers, and parents and a major concern was to find the funds to provide the non-SIP classrooms with materials. The control classrooms and the standard 6 classrooms that had not participated in SIP were bare. Usually there were no materials of any kind other than teachers' and pupils' books, desks, and a chalkboard.

However, in a few of the SIP classrooms, the materials were faded, dirty and bedraggled and sometimes hanging off the wall. We never observed a teacher referring to or using these materials in any way, other than the learning aids described earlier. The SIP classrooms were also far more likely to have a clock or drawing of a clock (one that could be manipulated to practice telling time), a calendar, learning centers, timetables, and maps on the walls.

Box 7

Classroom Profile - Standard 6 SIP Teacher (High-cost School)

This teacher was the only teacher we observed actually teaching the children to write, and her efforts were reflected in the highest scores of all tested schools in English composition. (most of the standard 6 classes we observed were math or science where writing would not be as likely to be taught.). She began by dictating some spelling words, having pupils collect their exercise books, and the take out their book reports. She reviewed incorrectly spelled words, errors of capitalization, and commented on their handwriting. She encouraged them to reread what they had written and to make sure that it was what they wanted to convey and to make corrections. There was considerable emphasis on how to write, but offered mostly criticism and little praise. She then gave them a writing prompt, "The most interesting story I ever read," and had them write a response. She then asked one girl to tell her story, then another girl. Then the teacher told a story about a girl whose mother was overly protective and eventually she got eaten up by a hyena. Neither observer quite saw the point of the story, nor did it have much engaging detail, but she did encourage them to read and write stories and said they were very interesting. Probably the best part of the lesson was that she talked about summarizing and used as examples her summaries of the stories the pupils had told in class. She ended the class by giving them another writing assignment and encouraging them to correct their spelling. Interestingly, this class of pupils received one of the lowest Kiswahili composition scores.

Caring Behavior: Observers rated teachers on the extent of their caring behaviors. This might have included their tone of voice, smiling, knowing pupils' names and calling on them by name, or touching pupils affectionately. Only one teacher in one of the newer SIP schools was rated as very caring, seven SIP and two control teachers were rated as caring and 13 SIP and four control teachers were rated as neutral. Only one control teacher was rated as uncaring and this teacher was from a control school. In three instances in SIP schools, the teacher appeared to be more caring to girls.

Language of Instruction: Almost all instruction and pupils' responses were in English, even at the standard 3 level. SIP staff indicated that parents expect teachers to teach in English beginning in standard 1, despite the fact that national policy is to teach in the pupils' mother tongue, gradually transiting into English and teaching primarily in English in standard 4. English and Kiswahili are to be taught as second and third languages beginning in standard 1. It was not clear how much of the pupils' failure to respond to the open-ended questions in the tests given for this study were due to their lack of understanding in English, although most pupils performed fairly well on the short-answer and multiple-choice tests that were administered in English. This is an important and complex issue which should be studied further. One of the Maseno University graduate students has submitted a proposal to study this issue. Perhaps AKF could work with the student and his or her advisor to ensure that the study addresses the issue in a technically-and pedagogically-sophisticated way.

Gender Differences: Several items were included on the classroom observation to detect differences in the ways boys and girls were treated. The results showed the following:

- Teachers asked about 14% more questions of boys than girls across all categories of question types.
- Boys were no more likely to get learning aids than girls.
- Teachers exhibited somewhat more caring behaviors to girls than boys.
- In only two instances did teachers exhibit any behavior that indicated that they seemed to expect more of boys than girls.
- At the standard 3 level, there were no significant differences in scores between boys and girls on any test.
- At the standard 6 level, girls significantly outperformed boys in the English multiple-choice test in T1 (64% vs. 57%) and Siaya (54% vs. 48%) .
- A comparable number of boys and girls owned textbooks.

Summary and Discussion

The classroom observations revealed that, although SIP teachers practiced more child-centered teaching behaviors than did control teachers, their use of them was limited and often shallow. The more important, yet difficult, behaviors such as asking questions that engage pupils in thinking analytically, having pupils be active learners working in small groups, encouraging children to express themselves and explore ideas, or using language to communicate and understand, were very rare in all classrooms. Why is this? There are hints that can be derived from previous research, interviews with teachers, and focus-group sessions with whole school staffs, each of which is discussed in the next section.

Box 8

Classroom Profile - Control teachers - Standards 3 and 6

In this control school, the standard 3 teacher was teaching about the local administrative system. The lesson seemed too advanced for these young children. It included how the township administration was organized, the heads of departments, the county council, and the role of each of these offices.

The standard 6 classroom was the only one observed where several of the pupils did not have desks and were sitting on the floor. None of the control classrooms had materials displayed on the walls, except perhaps a lone photograph from a magazine or an old, dusty chart of some sort. However, this standard 6 teacher used several desirable instructional

strategies that she later described as having learned in her coursework at teacher training college, which she had recently completed. She was teaching a lesson on the volume of cubes and cuboids and used a cardboard box as a learning aid. She drew a cube on the board with the length of each side labeled. She then measured the sides of the cardboard box and showed that all sides were the same length. She distinguished between a cube and a cuboid and put the formula for each on the board and asked pupils to put the formulas in their exercise books and gave them several exercises to do. After they were completed, she put their answers on the board and reviewed them. Her lesson was coherent and well organized, although she did not have boxes available for the pupils to use, nor did the pupils work in small groups or discuss what they were doing. When she called on one pupil who refused to respond, she said, "You should be sitting in the front (on the floor). She gave him a second chance and when there was still no response, asked, "You don't know at all? -- can't speak? Sit down," clearly embarrassed and annoyed by the boy's lack of response.

What are the project teachers' level of understanding regarding child-centered teaching and learning?

Each teacher and head teacher was interviewed by one of the senior researchers and was asked about his or her understanding of child-centered teaching, as well as whole language learning, and critical thinking. In addition, the staff at each school were brought together for a focus-group session at which teachers were asked why their use of the child-centered behaviors was so limited. This section begins with a brief review of some relevant research in teacher conceptions and misconceptions, followed by a description of teachers' responses to the interview questions and then the focus-group sessions.

Research on Teachers' Misconceptions: Several studies have found that teachers or head teachers may misinterpret the intent of a new teaching approach or curriculum. For example, a recent study looked at how teachers interpreted the changes they were expected to make as reflected in a new mathematics framework (Cohen et al. 1990).² The framework was meant as a guide for teachers and contained an interpretation of state policy to encourage and guide teachers to change their approach to teaching mathematics. Textbooks consistent with the framework were also made available to teachers. The focus of the framework was on developing students' understanding of mathematical relationships, their ability to reason logically, to use mathematical techniques effectively, to promote attitudes of exploration and invention, to know both how and why skills are applied, and to develop in students a spirit of inquiry and intellectual curiosity toward mathematics.

The teachers in this study were of a high caliber, admired by their colleagues, effective with students, eager to learn and to inspire their students, and comfortable with teaching mathematics. Despite all these admirable qualities, the study found that teachers' beliefs about mathematics and what students should learn in mathematics were inconsistent with those specified in the framework. While the framework focused on helping students to see the inherent beauty of mathematics and to cultivate their own strategies of problem solving, teachers were more concrete in their goals for students. They focused on the utilitarian aspects of mathematics -- on helping students to know how and when to use math. Teachers believed that they had taught something if they told the students about it and provided time to practice the steps.

The authors of the study noted that, "The teachers are firm believers in the traditional method of direct instruction, no matter what else the framework suggests." The method started with an advance organizer in the form of an example of an algorithm. Next came direct instruction on the procedures, making sure that each procedural step was drilled. They relied heavily on rules, procedures, and drill to review, followed by guided practice of text exercises and homework assignments consisting of additional and similar exercises. Teachers viewed good teaching as tracing the steps of a procedure, not tracing the student reasoning through a series of mathematical decisions.

In a similar study of science teaching in Nigeria,³ Olorundare found that teachers did not fully understand one of the essential foundations of the new science curriculum, i.e., developmentalism. Areas of the curriculum they did not understand or found difficult to teach were simply left untaught.

SIP Teachers' Understanding: In this study, we asked both SIP and control teachers about three of the central notions addressed by SIP: child-centered teaching and learning, whole language teaching, and critical thinking. However, after asking about whole language teaching and discovering that none of the teachers knew what it meant, we decided that, although SIP had offered several workshops on reading that may have been consistent with the whole language approach, they may not have used this terminology. However, we did not observe any teachers using whole language teaching strategies except perhaps in one instance where a teacher had pupils using word cards to form sentences.

Below is a sample of teachers' responses when asked if they could describe what you think child-centered teaching and learning is:

(SIP Teachers)

- A methodology whereby a child can be given instruction and guidance, and work with the materials to find things himself. The child uses nature corners and learning centers.
- This is a "bone of contention." It hasn't been fully explained. But I believe it is activity- and project-based teaching guided by the teacher.
- Involves children in the learning and not lecturing to them.
- The children enjoy learning when they are involved.
- Is a method where children find out things by themselves (many teachers made comments similar to this.)

(Control teachers)

- The child takes an active part in the learning process.
- The child has to be creative and teachers help the child.

Examples of child-centered teaching: When asked to give an example of a child-centered strategy they use, most teachers simply responded that they now have the pupils do more of the talking or working in groups using teaching aids. Other responses included:

- *(SIP teachers)*
- If I want to teach about animals, children collect animals, put them in small containers, and classify them.
- In teaching about the rainbow, I make the children make foam from Omo (a powdered detergent) and water and see the colors forming. Then I name the colors. This ensures they observe the colors even when the rainbow is not there.
- Now we have many materials and if I'm sick, children can just take cards from the learning center and do the work.

Interestingly, the control teachers' responses were quite similar. Their question was modified to ask "Do you think your teaching has changed to become more child centered in the past 3 years? Can you give an example of how it has changed?"

- I have improved the use of teaching and learning aids and most of the lessons I plan are practical.
- Children sit in groups and come up with ideas. In a lesson about birds, the children collect birds.
- Counting their own teeth. (This teacher had just taught a lesson on carnivores and omnivores and had the children count their teeth in relation to understanding carnivores.)

Critical Thinking: Teachers were also asked how they help their pupils develop critical thinking skills. Although the term critical thinking may not have been used in the SIP training, the interviewers used several terms to convey the more general notion of developing higher levels of thinking ability. Although some of the head teachers were able to offer reasonable descriptions of critical thinking, the teachers' responses were vague:

- By asking difficult questions.
- Ask questions why, where, how, etc.
- Involving them in discussions where they think for themselves.
- Asking them to solve problems by evaluation.
- We need more training in questioning strategies. "We were taught that our questions should involve reasoning and analysis but we don't know how to tell what reasoning or thinking is."

Inadequate conceptions of child-centered teaching: Although most of these descriptions of child-centered teaching touch on an element of it, most are incomplete and suggest that teachers do not fully understand the concept. For example, several teachers responded that it is a method where children find things out by themselves. . . "Children do most of the discoveries by themselves with the supervision of the teacher." Children can learn on their own." Children work when the teacher is absent." Did these teachers mean that children develop a deeper understanding by engaging in relevant activities that allow them opportunities to discover knowledge? Or, do they literally mean that a teacher's role is diminished and minimal? -- that he or she simply sets out materials and the children do most of the learning on their own. If the second interpretation is close to what they believe child-centered teaching to be, it may help to explain why they were reluctant to use it. It is not likely that they could accept that schooling involves leaving children to learn on their own without planning, organizing, and structuring by the teacher. If teachers believe that child-centered teaching means a "hands-off" approach, then this could be incompatible with their sense of responsibility as teachers and cause them to abandon or substantially adapt the child-centered strategies promoted by SIP.

Cohen's research⁴ found that teachers must believe that the changes they are expected to make will result in a better situation for their pupils. Some innovations that may be intellectually appealing to teachers may be difficult to implement or inconsistent with their instructional repertoire.⁵ This may cause teachers to perceive them as a threat to their students' success and so be resisted. In most African countries, students' and teachers' success is judged by students' scores on national examinations. End-of-primary exams determine which students are allowed to continue to secondary school, and the pressure of the exam exerts substantial influence on teachers' practice.

Orungbem found that Nigerian teachers neglected the child-centered methods advocated in the national social studies curriculum in order to teach to the more factually-oriented national

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examinations. And Alao and Gallagher⁶ found that Nigerian chemistry teachers used the exam study guide to determine the content of their lessons. In Botswana, Rowell and Prophet⁷ found that teachers substantially reduced the number of hands-on science activities in order to give students time to complete worksheets aimed at preparing for the exams.

Perceived Incompatibility with Curriculum: Teachers' comments gathered during the focus group sessions helped to clarify teachers' dissonance. Once we began seeing that many of the SIP-trained teachers were not using small groups or engaging the pupils in discussions, we began reporting this and asking, "Why, when you all seem so enthusiastic about SIP and child-centered strategies, aren't you using these strategies more?" Teachers' responses were honest and revealing and help explain the lack of child-centered teaching we observed in the classrooms. "Their (SIP) methods are time consuming. "We don't do what SIP wants because we need to cover the syllabus and we only have 35-minute periods. In lower-primary (they use timetabling and so) have one-hour blocks (but we don't have that at the upper primary level). "If they cut back on the amount of material covered in the curriculum, we would have more time to engage the children in thinking, but now we avoid asking questions that might require any extra time. Some of the topics are too detailed for primary level and many topics are repeated in several subjects."

Po's explanations confirmed what we were hearing from school staffs. We asked the POs, "Why are we not seeing teachers behaving in ways that are more consistent with what SIP has been promoting?" They responded, "There are several reasons. First, the school examinations work against child-centered methods. Examinations are a high priority in Kenya - perhaps the highest priority when it comes to schooling, and teachers do what they think will cause their children to get higher scores on the exams. I think it's difficult for them to see the direct link between child-centered methods and increased test scores."

"Another reason is that child-centered approaches require more work for the teacher - at least until they have established a repertoire of materials and behaviors and a level of comfort with the new strategies. Often, teachers complain that these strategies are just too much work. Teacher and head teacher transfers are another problem. There are a tremendous number of transfers in the Municipality. The curriculum is also a problem. Teachers have only 35 minutes per core subject per day. This can make it difficult to do activity-based lessons. We have tried to show them how to do block schedules and some schools are using it."

This may be one of the most powerful explanations for teachers' behaviors. The Kenyan curriculum is very full and the end-of-cycle exams are very comprehensive, factually oriented, and not particularly child-centered. This has been an issue of debate throughout Kenya for quite some time and is not likely to be resolved by SIP. Moreover, although there is a lot in the curriculum, we could not find a coherent approach in either the textbooks or the curriculum that would induce teachers to teach reading and writing. There is no subject called reading or even language arts. The English texts teach grammar almost exclusively. Children do have readers, but the stories were dull and uninspired and the teachers did not seem to know how to use them to help children actually understand and make meaning out of what they were reading. This is a serious deficiency in the Kenyan curriculum which perhaps SIP could address at the national level, especially with the assistance of the International Reading Association's international volunteer service. However, reducing the volume of the curriculum or changing the exams may prove intractable.

SIP's assistance with curriculum management: SIP worked with teachers and head teachers in a variety of ways to help them to manage the curriculum. We asked their views regarding SIP's support in this area.

Has SIP been helpful to you in managing the curriculum and, if so, how?

Head teachers: Head teachers' responses revealed some dissonance about the curriculum. Over half of the head teachers felt that there is too much material in the curriculum for the pupils to understand and that some of it should be removed but all (both treatment and control heads) felt that the pupils can learn all of the material in the curriculum if the school staffs do their jobs well. Most of the head teachers in the SIP schools indicated that the SIP project had shown them how to manage the curriculum or to help their teachers manage it.

- I am now in a position to know what the teacher is handling. I used to make only one scheme of work for all years but now I make a scheme each term.
- The activity methods they taught us really take time. We do the curriculum in a concentrated way.
- Improved teaching methods facilitate student understanding so a teacher doesn't have to keep teaching a topic over and over.

Teachers: Teachers' responses were quite varied on this issue and many teachers sounded overwhelmed by the amount of material in the curriculum. However, when compared with the control teachers' responses, SIP teachers seemed to feel more confident about managing the curriculum. We asked, "Please describe how you cope with the curriculum. ease describe how you cope with the curriculum."

- We have extra tuition (tutoring) at games time in the evening; in the mornings before class starts, or during class time if some teachers are absent. (Presumably some of the teachers charge for this.)
- SIP POs have helped us to see that there are topics that cut across several subjects and how to cluster the overlaps.
- Teachers do not teach all the topics in a year
- I am trying my level best to cope but it is too heavy for me. (Several responses were similar to this)

Inconsistent with several of the statements above, almost all of the SIP teachers disagreed with the statement that, "It is impossible to teach it (the curriculum) all well." And almost all agreed that, "There is a lot of material to cover, but the SIP project has shown us how to manage it." Most of the control teachers felt that, "The pupils cannot learn all of the material contained in the curriculum even if they study hard." but only about 20% of the SIP teachers agreed with this statement.

When asked to indicate the three most important factors that influence how much their students learn, the SIP teachers overwhelmingly selected, "How well I teach," (16 of 22), textbooks (17 of 22), and the curriculum (8 of 22). Control teachers were more likely to select textbooks (5 of 8) and the nursery school the children attended (4 of 8). In addition, SIP teachers overwhelmingly indicated that they believe their children are hardworking, willing to learn, and enjoy activity methods. None felt that the students are lazy and only three felt that some of the children are unteachable. SIP teachers are consistent in their acceptance of their responsibility in influencing student learning.

How Effective was the Project's Implementation?

The project objectives for Phase 2 are based in large part on the evaluation findings of Phase 1 described earlier. Specifically, the objectives for Phase 2 were to: extend the project to an additional 27 schools at the lower primary level and to nine of these schools at the upper primary

level; integrally involve head teachers in the training and improvement program; continue making communities and parents aware of the program activities and motivate parents to contribute toward the cost of the teaching materials; improve the cost-effectiveness of the program; and create a better understanding of child-centered learning. Strangely, the proposal said nothing about addressing the school as a whole, despite that being a prominent recommendation in the Phase 1 evaluation.

SIP's progress toward achieving each of these objectives is discussed below but is preceded by a brief summary of their accomplishments and a discussion of their work from the perspective of a systemic view of school reform.

Summary of accomplishments: SIP accomplished a considerable amount during Phase 2. They did work with lower primary teachers in 27 schools and upper primary teachers in 13 of these schools -- four more than specified in the proposal; they provided instructional materials to over 100 classrooms and teachers and trained teachers in their use; quite late in the project they began working with head teachers but worked with School Coordinators from early on; they met with the parents and School Committees to introduce them to the SIP model, to enjoin their participation and support and to encourage contributions toward the cost of the teaching materials, desks, windows, locks, and doors; they established a close and productive relationship with the MEO and the Municipal Council resulting, in part, in replacement and training of many of the inspectors and TAC tutors; they established working relationships with institutes of higher education, including establishing an agenda for research on school quality; and instilled an ethos of school improvement and attention to the concepts of child-centered teaching throughout the Kisumu Municipality.

A systemic approach to reform: This broad range of activities collectively represents a systems view of school reform that acknowledges the complex and interdependent relationships among the various parts of a system and attempts to identify points of leverage in the system to induce change. In a recent review of research and trends in the professional development of teachers, Sparkes's (1993) found that systems thinking was one of the three ideas that had influenced all facets of education reform, including curriculum, textbooks, testing, and teacher training -- the other two being results-driven education and constructivism.⁸ Making improvements that result in changes for all students requires coherent learning for all school staff and develops the capacity of the school as an organization to solve problems and renew itself. Sparke's review concluded that the entire staff should be assisted to pursue incremental annual improvement related to a set of common objectives, such as helping all students to become fluent and engaged readers.

Objective 1: Extend the Project to an Additional 27 Schools at the Lower Primary Level and to Nine at the Upper Primary Level

SIP did meet this objective in that they worked with individual teachers at the required number of schools and, even exceeded the objectives by working with upper primary teachers in 13 schools. However, although SIP addressed the broader educational system in Kisumu, they did not adequately address the school as a system, focusing instead on individual teachers.

In judging SIP's effectiveness in working with schools, we first discuss the evidence regarding SIP's work with the school as a whole and then draw upon the various elements of effective professional development programs revealed in Sparkes' recent review of research to estimate the quality of their work in staff development.

SIP's Influence on the School as a Whole: We fully expected to see evidence of focus on the whole school during our site visits to schools and were surprised at how little we saw. During the focus group sessions, we asked if SIP had had an impact on the school as a whole. Most staff indicated that SIP had not made an impact on the entire school, but a few reported that sometimes the SIP POs would talk to, or train, the entire school staff when they identified an area in which the school needed to improve. Others mentioned that the School Coordinator often shared what he or she had learned in SIP workshops with the whole staff. In some schools, those that attended training returned to their school and trained the rest of the staff. In some instances, what they had learned in the SIP workshops impacted other teachers through the subject panels. At one school, they referred to these teachers as "agents of SIPAK." Several expressed that they hoped that SIP would devote more resources to the upper primary level and would work with the whole school rather than just at the lower-primary level.

However, SIP may have reached beyond individual teachers in some cases. Several of the staffs reported that they talked more about teaching and learning with each other because of SIP. In fact one T2 staff said, "Yes, we talk very often - everywhere - even when we're going home. We teach each other." Another reported, "When SIP came, it came with a lot of work, so we have to sit down and talk about it." A new SIP school reported that non-SIP teachers go to SIP teachers for materials and suggestions. At one school, the staff noted that, "Just the anticipation of a SIP visit would make the teachers work harder." They suggested that one way that SIP could have a greater impact would be to have more frequent visits to the schools.

Skill Mastery: Sparkes' review revealed that effective staff development efforts are ongoing and coherent and based on a clear, compelling vision of how the school system should look. He found that fragmented and piecemeal staff development has contributed to poorly understood innovations with teachers unable to master a new skill before they are expected to move on to the next area of reform. Although SIP's training efforts should not be characterized as fragmented and piecemeal, the fact that most of the teachers seldom exhibited the most central child-centered teaching behaviors during our observations (e.g., having students work together in small groups and discuss with one another), suggests that SIP may have moved too fast with teachers in their race to meet the project goals of working in 27 schools.

In the conversations with the POs, they confirmed this view: "The schedule we have set up to work with schools may be unrealistic. We typically work with 3-to-4 schools per academic term (four months). We would prefer to work with a school for one year in teams of two POs working with two schools per year. In four months, teachers are not able to fully integrate the new behaviors and as soon as we are not there to support and coach them, they fall back into their familiar ways.

SIP had a staff person assigned to conduct research and monitoring studies. It would have been useful for that person to study whether teachers were indeed integrating and retaining the new skills they were learning, and, if not, figure out what it might take to ensure sustained behavior change.

Focus on Students' Needs: Another finding in Sparkes' review is that instead of designing staff development to address teachers' needs, their needs should be situated within a larger context that focuses on addressing students' learning needs. SIP did focus on the importance of meeting students' needs and this priority was expressed occasionally during interviews with teachers and head teachers. "I now know that it's important to be close to the children's needs and problems and that it is helpful to have statistics to evaluate pupils' progress."

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However, we seldom observed teachers working with individual students in a way that would suggest that they were attending to individual needs. So although SIP staff may have promoted this idea, they did not appear to have solidly entrenched the application of it into teachers' classroom practice.

Use Multiple Forms of Teacher Learning: Sparkes also found that multiple forms of teacher learning are viewed as more effective than the traditional away-from-school workshops. Strategies found to be effective involve teachers in studying their craft rather than being handed expert knowledge from above. Other effective strategies include teachers conducting action research, participating in study groups, solving problems in small groups, observing peers, keeping journals, and becoming involved in the improvement processes. Similarly, Wheeler et al.'s (1989) review of inservice policy in Thailand found "one-shot training courses" to be ineffective,⁹ and a study of inservice training in Indonesia found that intensively trained teachers made more substantial changes and had greater student achievement than did those who received minimal training (Anderson and Djalil, 1989.)¹⁰ Raudenbush et al.'s (1993)¹¹ review reached similar conclusions:

The literature seems to indicate that short-term courses without classroom follow-up are unpromising. Effective in-service instruction apparently requires classroom demonstrations, opportunities for teachers to practice and refine pedagogical techniques, and sustained follow-up, supported by classroom observation and feedback. Teacher involvement in the identification of course content and materials may also be important. The effective models appear to be intensive and, therefore, expensive.

SIP certainly avoided the error of providing one-shot courses and did provide classroom demonstrations, opportunities for teachers to practice and refine their techniques, and sustained follow-up and support, although whether it was sufficiently sustained is a central question. However, SIP did not involve teachers in studying their craft. The model used was to have an expert (or novice-expert in the case of the SIP POs) conduct a workshop, have the participants discuss what the expert was conveying in the workshop setting, and then go back to their classrooms to try to implement what they learned -- often with the assistance of the PO.

However, it may have been more compelling to have had school staff meet regularly as a whole (perhaps with other staff from a neighboring school), and have the POs serve as facilitators of craft study. This might include working with the staff to identify problems that they want to work on for a period of time, such as poor reading comprehension, giving the staff reading material such as research summaries written for practitioners, perhaps showing videos of teachers exhibiting desirable behaviors in developing childrens' reading abilities, discussing what they think of the research and videos and how they might try these strategies out in their own settings. The POs could facilitate these discussions as well as teacher exchanges to observe and assist each other in practicing the new strategies or discussing them in follow-up sessions.

As far as we could discern, SIP also did not take advantage of these other research-based effective strategies such as having teachers conduct action research, participate in study groups, observe peers, or work in small groups to solve problems. Each of these strategies is aimed at imbuing the staff of a school to establish a clear vision of quality schooling and to work together as a team to study, analyze, and solve their own problems -- much the same as children would do in a truly child-centered classroom setting. Kisumu school staff were not left with the skills and attitudes to be their own problem solvers, although they were more sophisticated about and receptive to what it takes to ensure quality teaching and learning.

Sparkes' review also found major changes in the role of staff developers. They now provide consultation, planning and facilitation services in addition to conducting training. For example, they may facilitate meetings held by a school to address specific problems or develop long-range plans. This may mean that the SIP POs need to develop their own skills in systems thinking, results-driven education, meeting facilitation, long-range planning and consultation.

Teacher Networking: In Ingram's study of the school change process, he found that the most important feature of a school's improvement was teachers' interaction with other teachers. When teachers worked together, they formed a critical mass that was able to overcome obstacles and provide emotional support. This was supported in Orungbemi's study of curriculum change in Nigeria. He found that over 70% of the teachers and head teachers felt that a lack of professional exchanges affected their ability to successfully implement the curriculum. And Adam's study of teachers' efforts to implement a new mathematics curriculum found that a network approach to staff development had a much greater impact on teacher practice than did traditional staff development or a support-group approach.¹²

The teacher networks described by Adam extended beyond the support-group approach where teachers met on a monthly basis to develop curriculum materials, share experiences and frustrations, and further their understanding of the curriculum innovation. The network approach added a common within-school preparation period for the teachers, cross-school monthly meetings, monthly staff development workshops that linked the "treatment" teachers with non-treatment teachers, intensive summer training, and a "linker" -- a professional whose responsibilities included connecting teachers to an extended body of professional expertise. A critical feature of the network model was the links with professional organizations and resources beyond the teachers' district.

SIP did little to promote teacher networking beyond the times that teachers interacted in the workshop sessions or through meetings held at the TACs. Finding additional ways to implement and institutionalize the networking process, perhaps through nurturing professional teacher associations in the subject areas could help to ensure that responsibility for professional growth is disbursed throughout the educational community in Kisumu.

Summary

SIP did meet and even exceeded the first objective of working with 27 lower primary schools and 9 upper primary schools. However, they did not focus on working with the schools as a whole. Moreover, in their work in training teachers, they did not appear to bring teachers to a sufficient level of skill mastery in using child-centered techniques, in part because they moved from one school to the next before the new techniques and philosophy had been fully integrated. Although SIP did promote an ongoing and somewhat coherent professional development agenda supported by classroom based work with teachers, they did not take advantage of several other forms of teacher learning that have been shown to be effective, such as teachers studying their craft or teachers networking with organizations and resources beyond the their district.

Objective 2: Integrally Involve Head Teachers in the Training and Improvement Program.

Research on Head Teachers: The role of the head teacher consistently has been found to be central to the success of an effective school. If a head teacher disapproves of or dislikes an

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innovation, success is unlikely, but if he or she provides guidance and moral support to teachers, change is favored. For example, a recent study of factors associated with the most effective schools in Pakistan¹³ found the two most important contributors to successful schools (i.e., those that steadily improved their educational quality) were the presence of a strong head teacher and a vigilant and supportive community.

The head teachers in these successful schools fostered collaborative relations among the school staff, which in turn resulted in cooperation and experimentation. Teachers encouraged and assisted each other and this cooperation enabled them to continuously improve their teaching methods. In contrast, there was limited contact and sometimes conflict among teachers in the control schools. While all the schools encountered similar problems, the successful schools, aided by the participatory environment fostered by a strong head teacher, were able to overcome problems through active problem-solving, both inside the school and with the community. The poorly functioning schools often took a shallow approach to problem-solving and often at the initiation of those outside the school. The successful schools also had a sense of shared goals among the teachers, students, and community.

Raudenbush et al.¹⁴ also found head teacher supervision of teachers to be the most cost effective of three approaches to inservice teacher training in rural primary schools in Thailand. The approaches compared were: inservice training courses, external supervision by district or circuit supervisors, or internal supervision by either head teachers or teacher leaders based at the school. Internal supervision was as effective as preservice education but external supervision had no effect on student test scores. The advantages of internal supervision are its regularity and the fact that it is based on direct observations of teaching behavior. External supervision lacks the regularity of internal supervision.

The critical component in this study was estimated to be the head teacher's ability to create and sustain an academic focus and an "ethos of improvement" which, for example, encouraged teachers to come to school on time, to use test results to evaluate instruction, and to discuss teaching and learning during lunch breaks. The more effective head teachers also were successful at motivating the community to provide resources to purchase instructional materials and at identifying district level resources. Internal supervision also has obvious cost benefits since the supervision is conducted by those already employed and at the school.

SIP's Work with Head Teachers: The Phase 1 evaluation report expressed a concern that SIP had not provided sufficient attention to the school as a whole or to the role of the head teacher in its school improvement efforts. Despite this concern and recommendation, SIP did not begin training head teachers until late in 1994, 18 months into Phase 2. In interviews with teachers, head teachers and school staff as a whole, all agreed that the head teacher did not serve as an instructional leader, seldom visited teachers' classrooms, and, in fact, did not even see it was a role they were supposed to be playing.

Head teachers may have attended SIP or other workshops offered to teachers or open to education staff within the Municipality before late in 1994, but no deliberate, systematic effort was aimed at the head teachers in Kisumu until then. Once SIP began offering the training, SIP head teachers seemed to take advantage of it. Those interviewed reported attending substantially more workshops (either SIP, SPRED, or other non-SIP workshops) than did control head teachers. Head teachers in T1 attended an average of 22 workshops, in T2 - 18 workshops, and in T3 - 17 workshops, but in control schools only 3 workshops. (These were not necessarily separate workshop sessions, but rather different workshop topics that may have been addressed within a

single session.) However, when the number of workshops attended by head teachers was entered into the regression equations, they did not seem to have an influence on students' test scores as did teachers' workshop attendance. This may be because a number of the workshops for head teachers were aimed at administrative and fiscal issues. It was only recently that SIP began working with head teachers on instructional leadership.

School Coordinators: SIP did institute the role of the School Coordinator in the SIP schools and they did serve in some ways as instructional leaders. Coordinators were teachers in the target schools and were selected by the school's head teacher. They served as resident experts working alongside their colleagues and received additional training to help them assist teachers in implementing SIP activities once the SIP team moved on to other schools.

SIP head teachers reported that the School Coordinators had been useful in serving as a link between teachers and the SIP staff, sharing what they had learned in the SIP workshops with teachers, and training staff in what the Coordinator had learned in the workshops. Several head teachers reported using the School Coordinator as an assistant to the head teacher in working with teachers. One of the T2 head teachers, however, reported that the Coordinators (there were two at that school) had been helpful until he (the head teacher) had gotten SIP training himself, suggesting that the head teacher then felt empowered to assist, guide and train teachers himself. However, two of the head teachers in T1 reported either not using the Coordinator or that the Coordinator had not done much, in contrast with the teachers at those same schools who reported that the Coordinator had helped teachers to implement the curriculum, make teaching aids, and provided materials and teaching advice.

Half of the SIP teachers responded that the coordinator's role was an important one and should be maintained when SIP activities are absorbed into the MEO. However, during the focus group sessions with the entire school staffs, several teachers reported that they weren't sure what the School Coordinator's role was and suggested that it should be clarified. One T3 teacher reported that the coordinator encouraged teachers to cooperate with each other so as to work in a good atmosphere and that she (the Coordinator) keeps checking to make sure that teachers are in class. "Some people need to be reminded." Another acknowledged that, "The Coordinator understands our problems much better than the head teacher" and yet another said that the coordinator encourages teachers to use teaching aids and answers the teachers' questions promptly. One of the Coordinators interviewed reported that he felt that he improved as a teacher because of the opportunity to supervise other teachers.

What Did the Head Teachers' Think of SIP? During the interviews with head teachers, they were asked several questions about SIP's influence on their views of teaching and learning and their practice as head teachers. Their responses indicated considerable support and enthusiasm for SIP and its message. For example:

- Teaching has not changed much in the upper classes, but SIP has changed me very much. I now try not to dominate the lesson and I sit down while the teachers teach me. I also use a variety of instructional strategies now.
 - It has enhanced my abilities in leadership.
 - I now know how to approach teachers and guide them without quarreling.
- **What Did Teachers' Think of Head Teachers?** Each teacher was asked to indicate if there had been any change in the quality of guidance provided by head teachers, and if so, how the guidance and support had improved. Half of the SIP teachers interviewed indicated that the guidance from their head teacher had improved since SIP began. However, almost half of the

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control teachers also felt that their head teacher's guidance had improved over the past three years - also by a lot. Teachers' comments included:

- He comes to class, observes a lesson and positively points out areas that need improvement.
- He has asked parents for money to buy more materials and encourages staff to use the materials.
- He encourages me to use child-centered methods.

Inspectors and TAC Tutors: SIP also had responsibilities to work with the school inspectors and TAC tutors. When asked if there had been any improvement in the guidance from inspectors since SIP had begun, only seven of the 22 SIP teachers indicated that the guidance had improved. Some of their comments on inspector guidance were:

- He gives advice on grouping and use of learning aids.
- He is discouraging and negative (another teacher from the above school).
- He assists with helping to make the schemes of work and lesson plans more efficient.

When the control schools were asked about the inspectors, one staff reported that, "The last time they came, the staff felt disappointed. There was a lot of harassment. A few of the teachers were not prepared and inspectors capitalized on that. They leave teachers with a scar -- they're too rigid. They should come as advisors - not fault finders."

Several of the head teachers indicated that the workshops offered by the TAC centers are more relevant and practical since SIP's involvement, and that they are more likely to be based on having identified teachers' needs than previous workshops. During the last year of SIP, several of the TAC tutors were replaced at SIP's urging and SIP began working more closely with the tutors to include them in training, technical assistance, and planning activities. However, only five of the 22 SIP teachers indicated that the guidance from the TAC tutors has improved since SIP began.

- The number and frequency of workshops has improved.
- He helps the teacher to make better teaching aids (several comments).

A notable feature from our observations and interviews is the fact that all but one of the head teachers at the schools in the study sample were male, as were most of the TAC tutors and inspectors. However, about half of the SIP staff were female.

Summary

The intent stated in the project proposal was that head teachers would "take charge of the ongoing teacher training on completion of the project and" . . . with the TAC tutors would "train the other teachers in the school." It is unlikely that the head teachers in Kisumu are sufficiently equipped to assume this responsibility, primarily because SIP began working with them late in the project and because much of the training they did receive addressed administrative and fiscal issues rather than instructional issues.

The head teachers we interviewed seemed to be very receptive to and appreciative of the new ideas and skills they were learning through the SIP workshops and contact; some were even beginning to exhibit behaviors of effective school leaders.

Although SIP did incorporate the School Coordinators into the schools to support teachers' ongoing development, it is disappointing that SIP waited until almost five years into the project to begin training head teachers to be instructional leaders, especially with the abundance of research pointing to the central role of the head teacher in school and teacher effectiveness. It is quite likely

that SIP's impact would have been much greater if it had involved head teachers from early on. The continuation and sustainability of positive change in schools depends on the presence of a strong head teacher, a committed teaching staff who work as a team, and the monitoring and support of the community.

In addition, changes are sustained when those who undertake the changes remain in the school so that the changes become routinized. Transfers of school staff in Kisumu were rampant, but it was unclear who was responsible for the transfers. This is another factor that will need to be addressed if SIP's efforts are to be sustained over the long term.

To SIP's credit, it made a concerted effort to upgrade the quality of the Municipal staff whose responsibilities are to support educational improvement. They did this by encouraging the MEO to replace ineffective staff and by working closely with the inspectors and TAC tutors to introduce them to SIP's views and rationale for school improvement.

Objective 3: Continue Making Communities and Parents Aware of the Program Activities and Motivate Parents to Contribute Toward the Cost of the Teaching Materials.

School Committees are groups of parents and community members from the school's locale who are responsible for the fiscal oversight of the school. In the Kisumu Municipality, School Committees and PTAs have been combined to form one organizing body. School Committees meet at least once-a-term (three-times-a-year) and, based on the interviews, are responsible for the following issues: providing physical facilities for the school such as land, buildings, desks, water, and electricity; providing labor for building facilities; raising funds; maintaining a school budget; overseeing the expenditure of school funds or funds raised for building projects; serving as a link between the school, parents, community, MEO, and Ministry of Education; providing learning materials such as textbooks and library books; and ensuring teacher and pupil discipline. One School Committee also reported that they had established a burial and benevolent fund for pupils, teachers, and parents in response to the recent AIDs crisis in the community

SIP approached each School Committee prior to involving the school in SIP and at those meetings specified the role and responsibility of the Committee in providing secure classrooms, etc. in order for the school to become a SIP school. A few of the Committee members reported that they had attended SIP training and found it very useful and inspiring. They particularly liked the sessions on school management, bookkeeping, budgeting, the relationship between the Committee and the school's administration, and the role of the School Committee. Most requested more training from SIP. When asked if the training they received from SIP has led to improvements in the school, responses included:

- Yes, we've added more desks and tables to the classrooms.
- The School Committee has agreed to sustain the SIP project.
- We began our participation with SIP in February 1996 and since then have constructed wire mesh windows and added three doors. Plastering of the floors is in progress. Pit latrines have been dug and we are planning to build furniture for the head teacher's office, cupboards for books, chairs, and tables.

Committee members were asked if the community's view of teachers in their school has changed since SIP began, and if so, to describe the changes. Responses included:

- We now like teachers because they now teach better and there is more cooperation between them and the community.

- Since this project started, the standard of education in this school has greatly improved. Our children can now read and write. Now they do their homework at home. We are very happy with our teachers because they sacrifice their free time to teach our children.
- Teachers are now responsible, they come to school regularly.

During the focus group sessions with school staff, we asked teachers what influence they thought SIP had on parent and community involvement. The responses were quite inconsistent across schools. One school reported that the materials provided by SIP has influenced more parents to want to enroll their children in that school and to contribute money to buy materials for their own child's classroom. However, another said that parents are staying away from the school because they think that the school will ask them for money or that their children have done something wrong. "Many have not even come to collect last term's grades." Another said that, "The parents were ready to pay to buy the materials when they heard that SIP was winding up."

Inconsistent responses were also offered to questions about increases or decreases in school enrollment due to SIP. At three schools the staff reported that the enrollment at the higher grade levels had actually declined because of poaching. "Parents feel that their children have a better opportunity to get into a private school because of what they learned in SIP at the lower grade levels, but the teaching at the upper grades is not seen as high quality."

Contributions to SIP Schools: About half of the SIP parents reported having attended a *harambee* (fund raising activity) since 1994, but SIP parents were no more likely to have attended than were control parents. However, 55% of the SIP parents reported providing assistance (labor, materials or cash) to the schools in their village this past year and schools in T2 and T3 were significantly more likely than control schools to have provided assistance. When asked to specify the amount of labor, materials or cash that they had provided, the average amount for T1 was Ksh 394/, for T2 was Ksh 715/, for T3 was Ksh 895/, and for control schools was only Ksh 167/. T3 parents provided significantly more than parents in T1, and parents in T2 and T3 schools provided significantly more than parents in the control schools. T3's contributions may have been higher because schools coming into SIP are expected to provide for secure windows and doors, and other physical facilities in order to "qualify" for SIP participation.

Views of Their Child: Seventy percent of SIP parents reported that their child seemed more confident since the school became involved in SIP, and 68% reported that their child is more likely to speak freely since SIP involvement.

Involvement in Their Child's School: SIP parents were more likely to know what the School Committee does than were control parents, and T1 and T2 parents were significantly more likely to have spoken with their child's teacher about their child's performance than were T3 or control parents. Seven of the 11 SIP head teachers indicated that the number of school visits by parents had increased since SIP began and only one SIP school reported a decline in the number of visits by parents. None of the control schools reported any change in the number of parent visits.

Summary

SIP did meet its objectives with regard to parents and community. They offered training to School Committees in SIP schools and encouraged Committees and individual parents to contribute more to the schools -- significantly more than in control schools. Seventy percent of the parents reported that their children seemed more confident and were more likely to speak freely

since SIP involvement. Significantly more SIP head teachers reported an increase in the number of school visits by parents since SIP participation compared with head teachers in control schools.

Objective 4: Improve the Cost-effectiveness of the Program

In the following discussion, two cost analyses are provided: the first compares the costs-per-teacher trained between Phase 1 and Phase 2; the second estimates the costs expended by SIP to increase pupils' test scores over those of the control pupils.

Comparisons between Phase 1 and Phase 2: The evaluation of Phase 1 asks whether the cost-per-teacher-trained could be reduced further, and the Phase 2 proposal states that an objective is to seek to improve the cost effectiveness of the program. In the cost analysis for Phase 1, Black estimated the costs in British Sterling. However, since the exchange rate has varied markedly from one year to the next, all calculations provided here are in Kenyan shillings. During Phase 1, 36 teachers were trained at a total cost of Ksh 10,353,000/, resulting in a cost-per-teacher-trained of Ksh 287,583/. During Phase 2, approximately 168 teachers, head teachers and other education staff were trained (see below) at a total cost of Ksh 31,661,000/, an average cost-per-education staff-trained of Ksh 188,458/. This is even less when adjusted for inflation. Between 1991 and 1994, the GDP deflator increased from 143.6 to 241.3, reducing the cost per-teacher-trained in real terms by 68% to Ksh 112,177/, or Ksh 175,406/ less than the cost-per-teacher-trained in Phase 1 -- a 61% reduction.

Table 17
Cost per Teacher Trained - Phases 1 and 2

Total Costs (Ksh)	Number of Teachers Trained	Cost per Teacher Trained
Phase 1		
10,353,000	36	287,583
Phase 2		
31,661,000	168	112,177.

During Phase 2 SIP worked with lower primary teachers in 27 schools ($3 \times 27 = 81$) and with upper primary teachers (standards 4 - 6) in 13 of those schools ($3 \times 13 = 39$), bringing the total number of teachers with which SIP worked directly to 120. During Phase 2 they also worked with head teachers, TAC tutors, inspectors, and School Coordinators -- each of which worked directly with teachers to expand and sustain SIP's effectiveness. We can assume that in all, these would amount to roughly 30 additional staff, bringing the total to 150. It should be noted however, that Phase 1 teachers continued attending significant numbers of SIP workshops during Phase 2 and so continued to benefit from the funds expended during the second phase. In addition, the regression analyses show that attendance at these workshops was a significant factor in increasing students' test scores. So, for these purposes, half the number of teachers treated during Phase 1 are added to the Phase 2 estimate (+18), since they attended workshops but did not receive the classroom-based service provided by SIP. This brings the approximate number of professional staff trained during Phase 2 to 168.

Cost per Increase in Student Learning: In this section, the cost of the amount of learning gains produced by SIP are estimated. To do this, the coefficients produced through the regression analyses are used, which adjusted test scores for family income, mother's education, and the number of years a teacher had been teaching -- all significant influences on student learning in most regressions. The coefficients show what pupils' test scores would be in relation to the

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control group's, holding these non-project variables constant, and are more accurate reflections of SIP's influence on test scores than if non-adjusted scores were used.

Total project costs for the six years were Ksh 42,014,000/. An estimate of the total number of pupils served over the six years is 10,920 (using Black's figure of 70 pupils per class; the average class size for the classrooms in our study is lower, but may not be representative of all schools in the Municipality), resulting in a per-pupil cost of Ksh 3,847/. During Phase 1, approximately 2,520 pupils were served. However, the teachers of these pupils continued attending workshops and pupils continued benefiting from the classroom materials, so their proportion of the project costs should be greater than would the T2 or T3 teachers who began receiving SIP services more recently. To adjust for differences in the amount of exposure to SIP, costs in T1 are multiplied by 1.5, in T2 by 1, and in T3 by .5. The analysis estimates the cost-per-percent gain in test scores for each of these groups at the standard 3 level, but at the standard 6 level, combines the scores and costs since all teachers at that level began participating in SIP during Phase 2. Test score gain is defined as the difference between control and treatment school mean scores across all tests for that level (with statistical adjustments for family income, mother's education, and the number of years a teacher has been teaching). The total percentage points gained was divided into the total percentage points possible across all tests. So, for example, the T1 pupils' scores were an average of 65 percentage points higher than the control pupils' scores. However, there were a total of 400 percentage points possible, so 65 is 16.25% of the total percentage points possible.

Table 18 shows that the cost-per-percent-increase for a T1 pupil Ksh 361, or \$6.56. T2 pupils only had an average of a five percent increase over the control pupils, resulting in a cost-per-percent-increase per pupil of Ksh 769, or \$13.98. Adjusted scores for T3 pupils were the same as those for T2, but since their exposure to the SIP treatment was for a much shorter length of time, the cost-per-pupil is adjusted by half, resulting in a cost-per-percent-increase per pupil of only Ksh 385/, or \$6.99. Since the adjusted gains for pupils in T1 were so much higher, their per-pupil cost is lowest of the three groups, but close to that of the T3 pupils who have been in the program for only a short period of time.

Standard 6 pupils achieved a 13% increase across all tests, resulting in a low per-pupil per-percent cost of Ksh 296/, or \$5.38 -- lower than that of any of the standard 3 groups. The average per-pupil expenditure at the primary-level in Kenya is Ksh 2,131/. So, SIP spent about 15% more for each additional percent increase in test scores for pupils in T1, T3, and the standard 6 pupils, but spent 36% more for pupils in T2 schools.

Table 18
Cost Per Percent Increase in Test Scores*

Group	Percent Increase Per Pupil	Cost Per Pupil Ksh	Cost Per % Increase Per Pupil - Ksh	Cost in US\$ Per % Increase
Standard 3				
T1	16%	5,771	361	\$ 6.56
T2	5%	3,847	769	\$13.98
T3	5%	1,923	385	\$ 6.99
Standard 6				
(T1+T2+T3)	13%	3,847	296	\$ 5.38

* Test scores across all tests given at that class level

The cost of expanding the SIP program to other municipalities or districts is not calculated since our recommendations do not include maintaining SIP, as it is currently conceived, as the preferred treatment.

In most cost-effectiveness analyses, one or more approaches are generally compared. However, the only comparison groups available for this study are either the control group, which represents "business as usual," - what happens when no external intervention is provided, or comparisons of costs and accomplishments between Phase 1 and Phase 2. It would be instructive if AKF were to systematically vary the approaches tried within a project when they begin a new initiative so that a comparison could be made of various approaches to improving schooling. Two examples of such comparisons are briefly reviewed here for illustrative purposes.

A 1991 study compared the cost-effectiveness of three approaches to teacher training in Sri Lanka and found that distance education was substantially more cost-effective than residential training programs offered in colleges of education or teacher training colleges - about 4.5 to 6 times more cost-effective.¹⁵ Although the distance education program was not the most effective in changing teachers' behavior, its low comparative costs made it a viable policy option, especially since the teachers in the distance program continued with full teaching loads, while the other two groups did not. However, the study also found that teachers' knowledge of what they had learned in the training substantially declined over time.

In Raudenbush's study described earlier, inservice supervision of teachers by the head teacher was more cost effective in improving teachers' performance than was preservice training or external supervision provided by inspectors or circuit supervisors.

Print-based distance education often has been shown to be cost-effective, but usually suffers from exceptionally high attrition rates since it requires more discipline on the part of the learner. An alternative distance approach using multimedia-based training is discussed in the recommendations section of this report. Multimedia (i.e. CD-Rom) offers some of the cost benefits of print-based distance but is more engaging to users and thus can preclude high attrition rates while maintaining consistently high quality not controlled in training-of-trainers-type approaches as used in SIP.

Summary

SIP significantly reduced the cost-per-teacher (educator)-trained by 61% during Phase 2. However, SIP's ultimate benefits in terms of pupil learning were less dramatic and fairly costly. The cost of increasing a pupil's test score by one percent ranged from about Ksh 300/ to 800/, or \$US 5.00 to \$14.00 per pupil. Relative to the standard Kenyan 1993 per-pupil-expenditure of Ksh 2131/, SIP spent about 15% more for each additional percent increase in test scores for pupils in groups T1, T3 and the standard 6 pupils, but 36% more for pupils in T2 schools. These figures are fairly high and probably not viable costs for a government agency with limited resources to incur, but they can serve as a benchmark for comparing with other approaches SIP may try to increase learning.

Objective 5: Create a Better Understanding of Child-centered Learning. This objective was addressed in an earlier section.

Describe the Project Implementation Strategy and the Extent to Which it Has Been Successfully Effected.

The project's implementation strategy was described in detail in the first section of this report and generally coincides with that described in the project proposal. A significant deviation from the was that it specifically stated an intention to avoid the "dilution of the original 'message' by" not using the cascade model of teacher training. Based on discussions with the SIP POs about their own training to be trainers and to provide classroom-based coaching, it appears that some of this dilution may have still occurred. The issue of the training of SIP staff addresses another of the study questions, to identify the main constraints in the implementation of Phase 2.

SIP Staff Training: SIP Program Officers (POs) were selected from the ranks of classroom teachers within the Municipality and most had been considered exemplary teachers. They were the front-line contact with teachers and head teachers in SIP schools and are the individuals who worked most closely with teachers, providing demonstration lessons, explaining the rationale for various approaches, commenting on the teacher's lesson, negotiating new teaching strategies, and working with the head teacher and School Coordinator to ensure that follow-up support was provided and school practices were supportive of the SIP agenda to promote more child-centered teaching and learning. The evaluation team met several times with the Program Officers to obtain their views regarding several dimensions of the project and the training they received that would allow them to provide teachers with high-quality training and technical assistance. The following information is based on these discussions.

The POs reported that they received no training for their jobs during the first phase of the project. However, at the beginning of Phase 2, when the new Project Director arrived, they received training in leadership styles, collaborative decision-making, and interpersonal skills (e.g., how to begin coaching sessions by telling teachers about the positive things they see them doing), among other topics.

In the beginning of Phase 2, the POs attended a one-week intensive workshop conducted by a professor from St. John's College in the U.K. in classroom arrangement and management, discipline, and tracking of pupils' progress. In December 1993, they received training in child-centered methods, learning centers, reading, and imagined literacy (i.e., how to promote children's development of literacy skills from their environment and how to make classrooms literature rich.) The Project Director conducted much of the training for the POs, including training in the whole language approach to literacy. The POs reported that most of the training was conducted in a lecture format with numerous activities and group discussions. Most of what they learned was somewhat familiar to them from their preservice coursework, although they commented that the SIP training allowed them to see how the topic was carried out in other contexts.

When asked, they reported that they were not offered opportunities to read or discuss original source material in conjunction with any of their training sessions, such as research articles or summaries of research on how children learn to read. Instead, they were given handouts that summarized the points covered in the workshop sessions. Moreover, they reported that they were not provided with opportunities to reflect on what they learned as a group.

When asked to rate the training they received to do their jobs, the evaluators created a rating scale with endpoints of 1 and 10. Point 1 represented training where only the theory was explained and point 10 represented opportunities to master the content, skills and procedures in which they were expected to train and coach teachers. A point of 10 would have included in-depth

coaching of the POs until they had mastered the essential skills and concepts. The mid-point of 5 represented training that provided theory, opportunities to discuss, and group activities, but no observation, coaching or feedback as they worked with teachers. All POs present at the discussion with the evaluators rated their training between 4 and 6. They indicated that they would have preferred training and coaching that gave them time to reflect in groups, to read and discuss original source documents, and to have the expert(s) observe them in the classrooms as they worked with teachers.

They did report that they had weekly meetings in which each PO had prepared a written report of what had happened in the field during that week. They would discuss their reports and the Project Director would offer suggestions for how to deal with various situations. They also reported that they received feedback and support from the Project Director on the workshops they conducted for teachers, and that the Director would review the workshop materials with them prior to the workshops. In addition, most of the workshops were videotaped and the videotapes were reviewed and critiqued by SIP staff.

They reported that they had not received any guidelines or training in what to do when they visited a school. Nor were they taught how to do a demonstration lesson or give feedback to teachers.

In late 1994, the AKF sponsored eight of the POs, an inspector, a TAC tutor, and 12 teachers from the AKES network in East Africa to participate in an undergraduate degree program with Exeter University in Great Britain. The coursework consisted of three sessions and a research project. The first session was on learning theories, including the Social Constructivist theory of Vygotsky; the second was on teacher education; and the third was on curriculum, comparing Kenya's curriculum with those of Great Britain, the Caribbean, Fiji, and several other African countries. Each PO then selected a research topic which they were still conducting or writing during the evaluation visit. The topics selected were: 1) the language of instruction, 2) the head teacher's contribution to the quality of teaching, 3) the inservice needs of primary school teachers and the capacity of the TACs to meet those needs, and 4) special needs students. All of the POs enrolled in the Exeter program gave it the highest possible rating and were very enthusiastic about it.

However, even this program was not tailored to the day-to-day responsibilities of the POs. A more appropriate degree program might have been designed that would have developed their expertise in ideas and skills such as: clinical supervision; higher-order thinking and questioning strategies; a whole language approach to teaching reading, writing, and language development, especially aimed youngsters learning in a second or third language; applying child-centered, constructivist teaching strategies to each of the core subject areas; classroom-based coaching of teachers; etc.

Observations of SIP Program Officers Working in Classrooms and Conducting Training: The evaluators asked to observe the SIP POs working with teachers in their classrooms since this was such a critical aspect of the SIP treatment. In addition, several videos of SIP workshops were previewed and one live training session was observed. The observations of the POs confirmed the inadequacy of training they received to conduct the classroom-based coaching sessions and revealed deficiencies in the quality of the project's implementation.

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Observation - PO #1: The Program Officer asked the standard 3 teacher if we could observe the teacher teaching a lesson. This was agreed and we sat in the back of the room and observed for about 35 minutes. In the lesson, the teacher did not involve children in the teaching and learning process nor did she have them work in small groups. She did not have the pupils use textbooks and did not interact with the children as she moved around the room. After the lesson was over, the PO discussed the lesson with the teacher and offered several suggestions. A summary of the PO's comments follows:

That was a nice lesson, but there were some children who were not following. It might be better if children had an opportunity to form their own words. If children finish their work early, you could give them cards to work with and could have them write words on the chalkboard. Also, the children were seated in homogeneous groups, but it would be better to put them in heterogeneous groups. You'll need more desks for that. I'll talk to the head teacher about it. The PO then told the teacher that he would plan a lesson with her on Monday for her to teach on Tuesday.

Observation - PO #2: The PO explained to the teacher that she would like to do a demonstration lesson. The teacher agreed and seemed eager to see it. The PO started the lesson by asking, "Tell me any word in English that begins with the letter B." Before the children could respond to the question, she asked them the same question in Luo (the local language). Although the PO was enthusiastic and appeared to know the subject matter well, almost all of the questions asked were closed questions requiring only simple one-word or short-phrase responses, with little or no complex thinking. Children were seated in groups but there was no group interaction and very few children seemed to be engaged with the lesson. No teaching aids were used and choral answers were encouraged. After the lesson the PO asked the teacher for comments about the lesson.

At a subsequent meeting with the whole group of SIP POs, the evaluators asked if they had received any specific training for working with teachers in the classroom. They indicated that they had not received training in the procedures of conducting demonstration lessons, evaluating teachers' lessons, or giving feedback to teachers. In addition, there does not appear to be any written guidelines for use during school-based TA.

Observations of SIP workshops: Fortunately, SIP has made videotaped recordings of almost all of the workshops they have conducted and these were previewed by one member of the evaluation team. However, other than the Project Director, only one of the current POs was depicted conducting any SIP training and that session was in the Luo language. The Project Director was leading many of the workshop sessions, and in almost all cases, the participants were seated in groups and during various stages of the workshops, were involved in activities or group discussions. Most of the other presenters were either former POs who were no longer with the project or external experts.

One hour of a live two-hour reading workshop session was observed, attended by seven teachers and led by two of the POs. There was a considerable amount of time spent addressing the importance of getting to know the pupils, and trying to connect the lessons to what the pupils already know, experience or feel, and another portion of the workshop devoted to the use of learning aids. Although there was some question-and-answer dialogue with the participants, the POs did most of the speaking and, during the one hour observation, there were no group activities or discussions. Strangely, they spent only about two minutes on methods for teaching reading,

citing only the look-and-say and phonics approaches and saying nothing about the whole language approach. However, this session may not have been representative of those that are offered for a longer period of time. The POs seemed pressed to cover the material in the short time available.

Staff Turnover: SIP had a very high rate of staff turnover. We did not realize this until we began viewing the videotapes of the training sessions and did not recognize any of the trainers. We were told that many of these trainers were previous POs who had moved on to other positions. Although it is not clear why the turnover was so high, each time a staff person leaves, a new person must be trained and the effectiveness of the program is diminished. This is not a cost-effective approach to project management. AKF might wish to review their projects to assess the extent of staff turnover, and if it is determined to be unreasonably high, to try to identify the reasons and take steps to reduce staff turnover.

Summary

There were several main constraints to increasing the project's success in changing teachers' behaviors, in improving schools' effectiveness, and in increasing student learning. Some of these were due to inadequate project management and some were beyond the project's control but within their realm of influence: 1) SIP waited until very late to work with head teachers; 2) SIP did not focus on the whole school as the unit of improvement; 3) SIP staff were not adequately trained; and 4) there was a high rate of staff turnover.

Other constraints included: a high rate of school and MEO staff transfers; a high rate of school closings for multiple examinations, athletic events and music festivals; and a high rate of teacher absences, in part due to the high rate of AID's-related illnesses and deaths in Kisumu but also due to lax supervision on the part of the head teachers and the MEO. Although SIP staff did encourage school and Municipal staff to address these issues, there was little evidence that they were successful in evoking significant improvements.

Were SIP's Materials Useful and of High Quality?

A prominent feature of SIP's focus was on instructional materials for use by teachers in the classrooms. It appeared that the Project Director favored these materials above other elements of the SIP program, such as teacher training and coaching. The materials generally were made of construction paper and were created into charts and maps and either hung on the classroom walls, set up as learning centers around the classroom, or used as learning by teachers and pupils. For example, SIP taught teachers to make small cards with words on them that the children could use to form sentences in small groups. Or in math, they were taught to use sticks and bottle caps to help children learn the concepts underlying the basic mathematical operations.

The materials had an invigorating and warming effect on the classrooms, in stark contrast to non-SIP classrooms, often within the same school. Everyone loved the materials and were constantly calling for the provision of similar materials for other teachers in the school. And, in fact, SIP worked with the MEO to establish a system for doing just that. Each parent was to pay Ksh 50/ per child per year to be collected by the head teacher and deposited into a central account managed by the Municipal Council who would then purchase materials in bulk at discount rates. The intent was to make the collection and use of the funds transparent. However, a copy of a memo from the new Project Director to AKF Nairobi headquarters dated October 1996 reported that in some instances Ksh 100/ was collected instead of the prescribed Ksh 50/ and expressed

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concern that "A lot of it [these funds] has been collected but not put to right use and has been documented by KSIP." It appears that there are problems that make this process less transparent and effective than was originally intended.

The regression equations discussed earlier suggest that either the materials and/or the coaching provided by SIP (as represented by the treatment group variable) contributed to an increase in test scores -- at least at standard 3. It was not possible, however, to sort out the relative contribution of materials versus coaching.

Although we often observed the SIP teachers using the learning aids (sticks, bottle caps, etc.) in their lessons, we seldom saw the children using them in small groups as infrequent. We never observed them using the learning centers, nor did we see teachers refer to the charts on the walls. However, it is quite likely that the teachers may have felt pressured by our visits and reverted to teaching strategies with which they felt most comfortable. Another observation was that all of the materials looked the same. It did not appear that most teachers had used the concept of creating materials to fashion some of their own, or to have children create their own. For example, according to the whole language approach of teaching reading and writing, teachers might have the children work together to create their own stories, which the teacher could then form into a large-print book and use as reading material. It might be useful for SIP to place a greater emphasis on showing teachers how to be more creative in producing their own materials.

At each of the SIP workshops, handouts were provided to participants. Eventually, these handouts were collated and bound together into a newsprint book -- without a cover. Although the evaluators found the quality of these materials less than coherent and were inconsistent in their style, clarity, and utility, most of the SIP teachers reported that they thought the handouts were clear and helpful and that they used them to refresh their memories of what they learned in the workshops. However, few of the teachers reported seeing the bound book and none pulled out their materials to show us. They did indicate that they would have preferred a more step-by-step description with examples of some of the things they learned. Only two SIP teachers felt that the ideas in the workshops and materials were unrealistic for the teaching situation in Kisumu.

Since AKF works in similar projects across many sites, it may be worthwhile to centrally produce manuals or handbooks for the various audiences that these projects address, such as teachers, head teachers, inspectors, parents, etc. In this way, it would save the cost of having each project repeatedly devote time to creating such materials and could ensure high-quality, meticulously clear products based on the latest research in teaching and learning. This would not preclude projects from developing additional materials to suit local needs.

An example of one of the SIP produced materials that could be improved is the observation checklist for head teachers' use in observing teachers. As mentioned earlier, the form is far too long and complicated. Both teachers and head teachers can feel overwhelmed if they feel they are aiming for too many targets. It is better to focus on changing a few highly important teaching behaviors (such as having students work and discuss in small groups, or asking questions that encourage children to think) and ensuring that the teachers master these behaviors, rather than introduce too many behaviors that make them feel it is hopeless to even try.

Exams: SIP also worked with teachers and other educators to produce practice exams leading to the national leaving examinations. As discussed more fully in another section, these exams, in the evaluators' views, are not at all child centered and actually undermine the child-centered teaching strategies SIP is trying to promote. Moreover, there are very few items on the

exams that measure higher-order thinking skills and there are also serious problems with the exams, despite the fact that they were reviewed by the Kenya National Examinations Council. It is quite likely the items were reviewed solely for their statistical properties and not for their pedagogical validity. For example, the standard 1 science questions were in English, despite the fact that the children have not yet learned English! One of the items even has the word germinate -- far too difficult a word even for native English speakers at that age. A standard 4 reading comprehension passage seemed entirely inappropriate for young children. It was a short story about a "very black man" who had fierce eyes and chased children asking for food until the men in the village chased after him with spears and told him not to come to the village again. In the last sentence, the women who went for water could not find their children, suggesting that the hungry man had kidnapped them. Not only does this passage not show compassion for the poor and hungry, and instills fear in the children, it also suggests that being very black inclines one to be dangerous and someone to be afraid of. Another item has four words that are to be arranged to form a sentence, but actually has two correct answers. Only one is allowed. These examinations should be revised to be technically and pedagogically valid and supportive of child-centered teaching strategies before they are used again.

Research and Monitoring: The Phase 1 evaluation included a recommendation to increase attention to systematic self evaluation. SIP was exemplary in this regard. It hired an experienced and skilled researcher and conducted several studies throughout Phase 2. In most cases, the results of these studies were used to help shape next steps. As mentioned earlier though, it would have been useful to monitor the extent to which teachers were integrating and retaining child-centered teaching strategies into their instructional repertoire.

Summary

SIP significantly enhanced the classrooms in which it worked with instructionally-useful materials, and wisely established a mechanism to ensure that all teachers within the Municipality would have access to similar materials. However, materials used to convey teaching skills and concepts were inconsistent in their quality and dissemination and should be centrally produced by AKF to ensure consistency in quality and save time and funds across AKF's many school-improvement projects. The examinations developed by SIP Kisumu are not supportive of child-centered teaching and should be discontinued until revised. SIP's research and monitoring efforts were exemplary and useful to the project. It may be helpful for SIP or AKF Nairobi to work with the MEO to encourage continuation of such research and monitoring activities by MEO staff.

VIEWS OF SIP

Information was gathered from teachers and head teachers regarding their views of SIP overall and the technical assistance and training provided by SIP. Pupils in both treatment and control schools were also interviewed to determine if SIP had had an impact on their views of schooling, their teachers or learning. Where appropriate, comparisons are made with control teachers, head teachers, and pupils.

Teachers' and Head Teachers' Views of SIP

Statements and perceptions below were gathered during interviews conducted with each of the teachers observed and the head teacher at that school, as well as from the focus group sessions with the school staff. A range of questions was asked about their perceptions regarding the

influence of SIP. Control teachers and head teachers were asked similar questions where possible, but without reference to SIP. For example, "Have you (the head teacher) changed the way in which you work with teachers over the past 3 years?"

In what ways have the SIP Program Officers been helpful to you in your teaching/role as head teacher?

(Head Teachers)

- Offered classroom-based training for teachers.
- Encouraged the lower primary teachers to put more effort into their teaching so that the head teacher could pay more attention to the upper primary. However, some of the other teachers got resentful when they didn't get the materials.
- Advised us how to manage the staff and evaluate teachers.
- Run courses; demonstrate lessons in class; make and give us resource materials.

(Teachers)

- Reminded me about child-centered teaching methods. We were taught this in teacher training college but most of us have forgotten what we learned.
- Demonstrate lessons and help us to make teaching aids.

We asked the POs if they had seen any change in attitudes in schools since they began working with SIP? They responded, "The attitudes in the SIP schools are much more positive than before SIP began. Teachers are more positive and open and much more friendly to the children. Parents are more aware because their children are more likely to talk about what happens at school. In addition, School Committees and PTAs are now more involved in their schools. When SIP began, the teachers rejected the SIP staff, but now they come to the team members for help. Teacher attendance at workshops has increased. In the beginning, only one or two teachers would attend, and now most workshops are full."

Has SIP made a difference in the quality of teaching and learning in your school?

One school reported that teachers had worked together across grades to prepare common schemes of work, and staff in several schools reported that the children are now more comfortable expressing themselves. Some of the strengths of SIP that were offered included:

- They've improved the standards.
- Lots of encouragement.
- Promote grouping of children and better questioning.
- We used to just lecture to the children and give them a little work. Since SIP, there's more work and involvement for the children.

Pupils' Views

A random sample of 15 standard 3 and all of the standard 6 pupils from each of the study classrooms completed a survey asking about attitudes towards school and learning, whether they read at home, whether they understand what they learn, etc. Pupils in standard 3 were interviewed in their first language by trained data collectors while pupils in standard 6 completed the survey after the evaluators completed the classroom observations. One observer fluent in the local language, stayed with the pupils to give them instructions and answer questions. Results are reported below.

Do you read at home? In standard 3, 77% of the pupils reported that they read at home, but only 32% were able to name a book they had read (textbooks were not counted). Almost all of the standard 6 pupils reported reading at home and about 75% of the pupils in T1 and T2 could name a book they had read, while only 35% of the pupils in T3 could name a book, but 84% of the pupils in the control group were able to do this.

Do you like school? Several questions were asked to assess pupils' attitudes toward school. There was little variability in pupils' responses. Almost all pupils at both class levels reported liking school, liking to learn, having a teacher who likes them, and liking their teacher, although only about three-fourths of T1 pupils reported liking their teacher compared with 95-98% in the other groups. However, when asked whether they would rather stay home than come to school, about 25% of all of standard 3 and the standard 6-T3 pupils responded "Yes," while only 12% of T1 and T2 standard 6 pupils responded "Yes." Only 8.5% of the Siaya pupils said that they would rather stay home.

Locus of control: Research indicates that one is more likely to perform well at something if one feels in control over that area of one's life, and of one's life overall.¹⁶ For example, individuals who feel that luck or fate works against them are not as likely to take the steps needed to ensure that things work as they hope and intend. Several questions in both the pupils' and teachers' surveys were included to assess locus of control, for example, "When I pass a test, it's because 1) I worked hard, or 2) I have good luck (bahati/hawi).

Almost all of the pupils in all groups responded that they will get good grades if they work hard and that if they fail an examination it is because they did not study hard enough -- not because the teacher didn't like them. However, at the standard 3 level, 14% of the T3 pupils answered that they passed a test because they were lucky instead of because they worked hard. The figures were all below 10% for the other groups.

Do you understand what you learn? Almost all the pupils indicated that they understand what they are learning - or understand some but not all. Almost none indicated that, "I just memorize it - I don't understand it."

Do your parents pay your teacher for tutoring? About 50% of the standard 3 pupils sampled in groups T1 and T2 reported that their parents paid their teacher for extra study, compared with only 20% for T3, and 26% for the Siaya control schools. There was a great deal of variation in the responses to this question, ranging from 0 to 88% per school.

At the standard 6 level, the differences are even more marked. Three-quarters of the pupils in groups T1 and T3 reported that their parents paid their teacher for extra study while 50% of those in group T2 reported paying and 29% in the control group pay. The regression analyses indicated that tutoring did not have a significant influence on students' test scores and so may not be a worthwhile expenditure for parents, although it is possible that scores may have been lower without the tutoring. Pay for tutoring is against national and municipal policy, but clearly is not enforced.

Number and Rating of Workshops Attended

Number attended: Each teacher and head teacher was asked to indicate the number of SIP workshops they attended, as well as workshops sponsored by the TACs and by SPRED. SPRED

is another teacher professional development initiative sponsored by the ODA and focuses on training in the subject content.

Table 16 shows that in groups T1 and T2, standard 3 teachers attended an average of seven more workshops per teacher than did standard 6 teachers. However, in the T3 schools, which just began participating in SIP in January 1996, both standard 3 and 6 teachers attended 12 workshops, about half as many as those attended by T1 standard 3 teachers (25) and three-quarters of those attended by T2 standard 3 teachers (16). All SIP teachers at the S3 level attended more workshops than did the control teachers (9), but at the standard 6 level, control teachers attended more workshops (12) than did the T2 teachers (9) and as many as the T3 teachers (12). Most of the workshops teachers reported attending were SIP-sponsored workshops. The influence of the number of workshops attended on test scores was discussed in the regression analyses reported earlier and found to be a consistently significant and positive factor in student achievement.

Table 16
Mean Number of SIP and Non-SIP Workshops Attended
by Teachers by Group and Class

Group (N)	S3 Teachers		S6 Teachers	
	SIP	Non-SIP	SIP	Non-SIP
T1 (4 teachers per level)	23	2	14	4
T2 (4 teachers per level)	16	0	7	2
T3 (3 teachers per level)	11	1	11	1
C (4 teachers per level)	NA	9	NA	12

* One school missing.

Ratings: Teachers and head teachers in all treatment groups rated the workshops as being helpful and influencing their practice. Most consistently rated the workshops between helpful and very helpful (4.5 on a 5-point scale).

Summary of Findings

In this section, we briefly review the findings of this study and then consider the likelihood that SIP's efforts will continue once external funds are no longer available and the management of SIP is absorbed by the Kisumu Municipality.

SIP worked with lower primary teachers in 27 schools and upper primary teachers in 13 schools; they provided instructional materials to over 100 classrooms and teachers and trained teachers in their use; quite late in the project they began working with head teachers; they met with the parents and School Committee for each school to introduce them to the SIP model, to enjoy their participation and support and to encourage contributions toward the cost of materials; they established a close and productive relationship with the MEO and the Municipal Council resulting, in part, in replacement and training of many of the inspectors and heads of Teacher Assistance Centers; they instilled an ethos of school improvement and attention to the concepts of child-centered teaching throughout the Municipality.

Although SIP teachers exhibited substantially more child-centered teaching behaviors than did the control teachers, in most cases, their use of these behaviors was limited and often shallow.

The more important, yet difficult, behaviors such as asking questions that engage pupils in thinking analytically, having pupils be active learners working in small groups, encouraging children to express themselves and explore ideas or use language to communicate and understand, were rare in most classrooms observed. However, a few teachers did exhibit exemplary teaching behaviors. Although SIP teachers did engage in a more child-centered approach to teaching, these behaviors did not appear to have a positive influence on test scores at either grade level.

At the standard 3 level, when non-treatment factors were controlled for, being in a SIP T2 school has a positive effect on test scores in English and math, as does the number of SIP workshops a teacher attended. Teachers' classroom management behaviors were also a significant influence on English scores. The most consistently influential variable was number of years a teacher has been teaching. At the standard 6 level, when non-treatment variables are controlled for, SIP had no influence on any of the test scores when compared with those of the control schools.

Pupils in both treatment and control groups performed reasonably well on the short-answer and multiple-choice tests, suggesting that they are learning what is in the curriculum in the way that it is taught in the curriculum and textbooks, although standard 6 mathematics scores were weak. Scores were exceptionally poor on all open-ended tests for all groups. There is clear evidence that children are not learning how to read, write, or communicate in English or Kiswahili. Nor are they learning to apply simple mathematical concepts and skills to real-life types of problems.

SIP parents and School Committees contributed significantly more financial resources and in-kind services to their children's school than did parents in control schools. Seventy percent of the SIP parents reported that their children seemed more confident and were more likely to speak freely since SIP involvement.

Interviews with teachers and head teachers revealed very positive attitudes toward the SIP project and Program Officers. Teachers seemed to believe in the value of child-centered teaching strategies, but were reluctant to adopt fully these strategies because they felt a pressure to cover the curriculum and ensure that pupils were prepared to take and succeed in the national primary certification examinations. They were not able to reconcile these goals. In addition, teachers may have misconceived the meaning of child-centered teaching and learning, which further inhibited their use of these strategies.

SIP significantly enhanced the classrooms in which it worked with instructionally-useful materials, and wisely established a mechanism to ensure that all teachers within the Municipality would have access to similar materials. However, the examinations developed by SIP are not supportive of child-centered teaching and should be discontinued until revised. SIP's research and monitoring efforts were exemplary and useful to the project.

SIP staff were not trained to a sufficient level of mastery to do their jobs. They reported that they had not received any guidelines or training in what to do when they visited a school, nor were they taught how to do a demonstration lesson or give feedback to teachers. Other shortcomings include: SIP waited until very late to work with head teachers; they did not focus on the whole school; they did not appear to bring project teachers to a sufficient level of skill mastery in using child-centered techniques; and there was a high rate of staff turnover.

How Sustainable are These Results Likely to be Once the Program is Turned Over to the Kisumu Municipality?

Given this mix of findings regarding SIP's effectiveness, what is the likelihood that SIP-trained teachers will continue to use and expand their child-centered teaching strategies once AKF's support is withdrawn. Moreover, will the other dimensions of SIP's work continue and grow under the new leadership of the Kisumu Municipal Education Office? AKF's support was scheduled to end in July 1996 and the staff and activities of the project were to be absorbed by the MEO. Several factors suggest that sustainability may be a challenge. In addition to the evaluators' views on this issue, teachers, head teachers, and school committees, were asked to speculate about the likelihood of sustainability and the factors that would contribute to, or undermine, the chances of success. Suggestions for increasing the likelihood of sustainability are contained in the recommendations at the end of the report.

Staffing: Only one-out-of-eight SIP Program Officers, one secretary, an office messenger, a stockroom clerk, and three drivers have been transferred to the MEO's payroll and supervision. Another PO became a zonal inspector. The new Project Director is being maintained on the AKF payroll until December 1996. There are several administrative problems that have prevented absorbing more of the POs into the MEO. If the POs are not employed by the Teachers' Service Commission (TSC), then they cannot be employed by the MEO since the TSC pays their salaries and the MEO's office only has budgetary approval for the staff listed above.

In October 1996, it was reported by the current SIP Project Director that new Program Officers would be hired to bring the total number of POs working for the MEO to nine. The individuals hired will be drawn from the ranks of practicing teachers who would continue drawing their salaries from the TSC. These teachers will need to be trained to provide training and technical assistance services. The training of the previous POs was a rather lengthy process that continued throughout Phase 2, and there is little evidence that we were able to gather to verify the proficiency of the POs in these respective tasks. The feedback from teachers and head teachers regarding the POs as a group, indicates that they are quite skilled at positive and productive interactions with school staff, but the very limited observations of two PO classroom visits and one workshop session by members of the evaluation team suggests that they may benefit from additional training and support in constructivist training and coaching strategy.

It is our view that the POs should be masters of the skills which they are exhorting teachers and head teachers to adopt and that any project of this sort should design training for project staff to ensure mastery of all of the component skills and subskills, including those aimed at the ultimate target audience -- children (e.g., child-centered teaching methods, questioning strategies, whole language approach to reading, clinical supervision, etc.) and those skills needed to perform their jobs (e.g., participatory training, classroom coaching, etc.). In addition, the recent research literature suggests that staff developers also need expertise in systems thinking, group facilitation skills, long-range planning, and results-driven education. This would require articulating a detailed curriculum for PO training as well as a set of measures for each of the skill areas to use in assessing their mastery. What can happen without this level of quality control is that they may have an understanding of a skill or concept that is not-quite-right, and as it gets disseminated down through the various levels of training and TA, the quality control steadily dissipates. The current approach to SIP training and TA is likely to have suffered from quality dissipation. In addition, there was considerable turnover of POs throughout the project, causing the staff training process to be virtually ongoing.

Resources: While the SIP project staff had access to three vehicles that allowed them to get to schools and workshops on a daily basis, the current effort has only one vehicle. The POs are not likely to be able to accomplish their intended goals of providing training and TA to teachers if they are not able to get to the schools regularly.

An office within the MEO complex has been renovated and furnished to house all of the POs, Municipal inspectors, and other Municipal education staff. This represents a significant commitment on the part of the Municipal Council and the MEO and may promote the spread of SIP views and strategies through collegial interaction with other MEO staff.

SIP has and continues to offer training to the TAC tutors and inspectors. While this may enhance the consistency of the SIP message, the inspectors are not likely to offer much in the way of regular assistance to schools since most of the teachers and head teachers reported that the inspector came to the school only once-a-year. At the least, the inspections will not work against what SIP is trying to accomplish as was the case at earlier stages of the project, but it is not likely that they will be a major contributor to sustainability. However, since the TAC tutors offer training and TA to schools, they are more likely to be able to make a difference. Here too, the quality of their training and TA skills is at issue.

An Unstable Target Audience: The Western Kenya region of Africa has a particularly high incidence of AIDS and Kisumu is no exception. In many of our visits to schools, we encountered staff making collections to help pay for funerals, teachers out on long-term leave due to illness, or absent so they could attend a funeral. The former Project Director reported a high number of AIDS-related teacher deaths in project schools. In addition, teacher and head teacher transfers were numerous and frequent. These two factors combined suggest that SIP-trained teachers and head teachers may not remain in the Kisumu schools for one reason or another and that large numbers of new staff will need to be trained. If replacements are not trained to a high level of expertise, then the impact of SIP will dissipate rapidly. Moreover, the number of schools in the Municipality has tripled in the past year, adding approximately 100 new, small, rural schools to the MEO's responsibility. If SIP POs are expected to address the needs of these schools also, particularly with limited transportation and new staff, their impact is highly questionable.

In the next section, the views of teachers, head teachers, and school committees regarding the likelihood of sustainability are summarized.

Teachers' and Head Teachers' Views of Sustainability: Teachers were asked how confident they were that the quality of training and support provided by SIP will continue after AKF support is removed and were asked to explain their answer. Their responses indicated an optimism derived from the achievements and motivation already engendered by SIP, but there seemed to be great concern about the management abilities of the MEO and whether materials would continue to be provided to teachers and classrooms once external funding ceases. Below is a sample of their responses:

Those that expressed **confidence** cited the following reasons. Note that most of their comments are conditional . . . if . . . then . . . :

- If the whole SIP team goes to the MEO's office and they continue in their current roles, there will be no change - SIP will continue.
- The training and TA already provided have established a sound base.
- If the POs provide support to the inspectors and head teachers, there is no question if it succeeding.

Those that expressed **doubt** cited the following concerns:

- It will all depend on the management by the MEO.
- Most of us are not equipped yet and we still need them (SIP POs).
- I haven't seen the MEO staff handle this type of work.
- The politics within the MEO may undermine SIP's effectiveness.
- There are new inspectors who need inservice training. They don't understand the types of instructional strategies that SIP has promoted.
- Parents might not be able to buy the materials. Teachers will always work hard when materials are available.

Related to the issue of sustainability, teachers and head teachers were asked if they felt it is important to maintain the role of the SIP Project Officer?

- What they are doing is what the TAC tutors should be doing. They need to reconcile their roles with the other MEO staff.
- They need to be here to help other schools.
- Because most schools in the Municipality have not implemented what was supposed to be implemented, SIP has not taken off properly.
- Without them, the teachers would relax - they won't sustain what they learned in the workshops; the SIP POs encourage teachers.

Summary:

Overall, the likelihood that SIP's impact will be sustained over time is highly questionable due to a variety of factors including high rates of turnover in school staff and POs, limited transportation, currently untrained POs, triple the size of the target audience, overriding and non-child-centered influence of the KCPE, and quality dissipation. There is also some question regarding the management capability of the MEO

CHAPTER 4 DISCUSSION AND RECOMMENDATIONS

Discussion

SIP was quite successful in engendering broad-based support for what it was trying to accomplish. Attitudes toward the project are positive and widespread. Parents, teachers, head teachers, TAC tutors, inspectors and MEO administrators all expressed glowing goodwill toward the project's goals and its staff. SIP has been exceptionally successful in getting all facets of the Kisumu education system to rally round SIP and to want to try to make it work. Everyone we spoke with knew about SIP and, almost to a person, were enthusiastic. The enthusiasm seemed most directly aimed at the materials and secondarily to the cooperative and helpful spirit of the SIP staff.

SIP staff tackled all levels of the system. They worked closely with the MEO's senior managers; offered training and technical assistance to the front-line MEO staff, inspectors and TAC tutors; encouraged the MEO to upgrade and expand the TACs; rewrote inspection guidelines to be consistent with SIP objectives; motivated head teachers to get parents to support the building of latrines, and the addition of doors, wire mesh screens, locks, desks, and chairs. Two head teachers we visited in schools about to enter SIP could hardly contain their excitement and insisted that we see the new desks that were being built. It is really hard to imagine how SIP could have been more successful in the area of public relations, commitment, and cooperation.

However, we did not consider the teaching in the SIP classrooms to be particularly child-centered - the major focus of the SIP training. Teachers' explanations of child-centered teaching and learning were generally shallow and often represented misconceptions of the notion. Although, Phase 2 teachers who have been in the program for several years exhibited significantly more child-centered teaching behaviors than did teachers in all other groups, few teachers actually had pupils work in small groups, engaged pupils in group discussions, or asked open-ended questions that would promote thinking, analysis or reasoning. SIP had little impact on the child-centered teaching behaviors of the upper primary teachers. Moreover, the regression analyses showed that child-centered teaching did not have a positive influence on test scores, although good classroom management did. This is likely because the child-centered strategies were not integrated to a level that they would make a significant difference. Perhaps more importantly, we saw very little evidence that SIP had made an impact on teachers' skills in teaching reading or writing, despite having held several workshops in this area.

Comments made during the teacher interviews and the focus group sessions with school staff suggest that the curriculum and exams exert a more powerful influence on teachers' behavior than does the pedagogic appeal of child-centered teaching. "We don't do what SIP wants because we need to cover the syllabus and we only have 35-minute periods. "If they cut back on the amount of material covered in the curriculum, we would have more time to engage the children in thinking, but now we avoid asking questions that might require any extra time. Some of the topics are too detailed for primary level and many topics are repeated in several subjects. "SIP methods require too much time." Most teachers feel that the curriculum is too full and that they must press through all the topics in order to cover everything that the students will need to pass district, zonal, municipal, and national examinations. The success of their pupils is their highest priority, and success is judged by performance on the KCPE and by the interim regional and local exams.

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In addition, each class period is only 35 minutes, making it difficult to do activity-based lessons in such a short timeframe. SIP addressed these issues in several ways: they showed teachers and head teachers how to do a block schedule that would allow them 60-to-90-minute lesson segments. They taught teachers to identify and combine topics taught in several places in the curriculum. And they worked with teachers and other Municipal staff to develop a set of Municipal exams that would better reflect the local context. However, they may have actually undermined the child-centered teaching they were promoting by these exams. The exams were almost identical to the type administered by the KCPE and not supportive of child-centered teaching and learning. This is a critical leverage point that can be manipulated to create an environment more supportive of child-centered teaching and is discussed further in the recommendations.

With regard to changes in student achievement, there are limitations in the conclusions that can be drawn from the findings due to the fact that pre-program test data was not collected. Pre-post data would provide greater confidence in judgments about achievement gains attributable to SIP. However, the fact that there was such a clear distinction among the three levels of SIP intervention suggests that the impact of SIP is more likely to be felt over time. But, it is possible that SIP selected better schools to participate in the early stages of the program and that poorer schools were selected later. In fact, there is some evidence of this. For one thing, the T3 schools had a much higher number of pupils absent from school on the day of the observation, 17 absences versus 6 and 4 for T1 and T2 respectively, and the average class size is much larger in the T3 classrooms we observed -- 71 versus 49 and 45 for T1 and T2 and 54 for Siaya.

On the tests given for this study, when external factors were not controlled for, the schools that were involved in SIP during Phase 1 consistently performed significantly better than all other groups at the standard 3 level, and significantly better than the T3 and control schools at the standard 6 level. However, the control schools outperformed the T2 schools in two of the tests and performed about the same in another four tests -- without the extra training and TA provided by SIP. The control schools outperformed the T3 schools in every test.

When external factors such as family income and mother's education were controlled for in the regression analyses, only T2 schools performed significantly better than the control schools at the standard 3 level in both the English and mathematics short answer tests, confirming that SIP did have a positive influence on pupil learning during Phase 2. SIP's workshops also had a significant and positive impact on pupil learning. For each workshop a teacher attended, a pupil's test score was likely to increase by over two points and teachers in the T1 group attended significantly more workshops than did any other group. This helps to explain the higher scores of pupils in T1 schools who, across all tests, achieved scores that were 16 percent greater than those of the control group, while pupils in T2 and T3 both achieved scores that were 5 percent greater than the control group. Although adjusted test scores at the standard 6 level were not *significantly* greater than scores of the control pupils, the SIP pupils at this level achieved a 13 percent increase in scores across all tests when compared with control pupils. The cost to increase the test scores of the standard 6 pupils was less than the costs for any of the standard 3 groups.

Students in both treatment and control groups performed reasonably well on the short-answer and multiple-choice tests, suggesting that they are learning what is in the curriculum in the way that it is taught in the curriculum and textbooks. However, scores were exceptionally poor on all open-ended tests for all groups - around 10%. Many pupils wrote nothing at all or simply rewrote the prompt. There is clear evidence that they are not learning how to read, write, or communicate in English.

Despite a recommendation in the Phase 1 evaluation report, SIP did not work with the whole school nor did they begin working directly with head teachers until late 1994. Since there is an abundance of research pointing to the importance of a strong instructional leader, it is likely that SIP could have had a substantially greater impact if it had engaged head teachers early on. SIP did, however, use School Coordinators to some extent for this purpose but their impact varied considerably from school to school.

Most of the head teachers we interviewed had no idea that they should be working with teachers to improve their instruction. They saw their roles as much more administrative, encouraging teachers and students to come to school and be on time, to collect fees and meet with parents, but not to observe or help improve teaching. The few head teachers who had attended SIP training in clinical supervision (observing and guiding teachers using a SIP-developed instrument aimed at child-centered teaching methods and classroom management) were enthusiastic about it and indicated that they planned to use it. However, their enthusiasm could easily slip away when confronted by the many other pressures of their jobs. In fact, most head teachers also teach several classes each day. This raises the question as to how much time they would actually have to observe and coach teachers. Perhaps sufficient time would be available if both the head teacher and School Coordinator were to work on instructional leadership tasks. Another possibility is to involve the MEO in trying to reduce the teaching load of the head teacher.

In many of the schools we visited we found that teachers were absent, the school was closed, or some of the classes were away. Teacher absences were often due to illness or to attend funerals. But school closures and non-teaching days were generally due to music or sports festivals or to one of the many exams given by the various administrative levels of the system. These non-academic activities take place during the school day and are frequent and extended. For example, when we visited one of the newer SIP schools, the teacher was sitting at her desk relaxing while the children worked independently. When we told her that we would like to observe her teaching a lesson, she told us that she had not prepared because she was exhausted from the activities of the music festivals and that this was her first day at school in two weeks!

There were about three days out of the three week data-collection period where some or all schools were closed due to events. Although national policy limits school closures for these purposes and requires that festivals and athletic events be held after school hours, the policies are ignored and not enforced by the MEO. These closures undermine the efforts of SIP and the aim of improved school quality and illustrate the importance of the MEO in articulating high academic standards and enforcing national policy that supports them. In fact, we found that one senior MEO official was unavailable for several days because he was attending athletic events in another district.

Recommendations

Toward the end of the data collection period, two members of the evaluation team met several times with the SIP Program Officers to interview them regarding their views and experiences in implementing SIP. Their perspectives are particularly valuable in that almost all of the POs came directly from primary classrooms in Kisumu and so are able to view the effort from the perspective of SIP's target audience. The evaluators asked the POs what they would do differently if they were designing a new school improvement program - or what recommendations they would offer to other communities designing a SIP-type project. Their suggestions were remarkably similar to the informal thoughts and discussions that the evaluation team members had as we visited schools, observed classrooms, and met with various representatives of the Kisumu school community.

Although we have no structured data to support this contention, we all felt that the head teacher made the difference in the school. Where the head teachers were enthusiastic and highly engaged, school activities seemed to be more organized, efficient, and engaged. Where the head teacher was either uninterested or lax, the ethos of the school was also lax -- teachers were absent, there was more milling about, facilities were in disrepair, etc. POs' views were consistent with the extensive research documenting the importance of the head teacher as instructional leader.

PO Recommendations: The following list contains the suggestions offered by the SIP Program Officers and is followed by the evaluators' comments and suggestions based on the study findings, informal observations, and recent research in school improvement, staff development and effective schools.

- Courses should be practical, based in schools, with follow-up provided immediately. Workshops are currently offered in central locations and there is often considerable time between the workshop and follow-up.
- All staff in a school should be trained together, including head teachers. They felt that school based training and assistance would result in a more sustainable intervention. Train TAC tutors, inspectors, and head teachers before training teachers so that the management of schools is supportive of, and consistent with, the skills and practices being promoted by SIP. They believe that it was a serious mistake to not train head teachers early on in the project and feel that SIP has had little impact in schools where the head teacher resisted SIP.
- Offer a one-month intensive training session for POs before they begin working with teachers. The training should include the following topics: project management, interpersonal skills, negotiating skills, school administration, school record keeping, school management skills, communication skills, and other topics based on the inservice needs of the teachers they will serve. They suggested that the training be sequenced so that they receive training in one or two topics, practice them in the schools or as they conduct workshops, receive feedback and coaching, and then move on to the next topics.
- Schools should be serviced in order of their needs. Those that have the most dire need should be attended to before those that have fewer and less significant needs. The level of intervention should vary based on a school's needs.
- The staff should be involved in analyzing their work from a cost-effectiveness perspective.
- The project should be evaluated every 18 months and changes made based on those evaluations.
- Reduce the number of schools to be serviced. Phase 2 specified that the project work with 42 schools in a three-year period. Both the project staff and the Project Director reported feeling stressed with having to meet the "numbers," when they often felt they were moving out of schools before the schools had fully integrated the new philosophies and practices.
- Dealing with fewer schools at a time would allow the staff more time to work together and to reflect on their work and make changes where needed. They reported that they often worked in isolation from each other because they were so busy.
- Begin by training one person at each school, such as the school coordinator, who could provide intensive and ongoing support and guidance to teachers. There was some debate about whether the school-based person should be the head teacher or a school cooThis person's services would be backed up by the POs and TAC tutors. Intermittently, the POs would provide intensive assistance to a school staff, perhaps staying with that school for a full week. There is some questions as to whether head teachers would have the time to be instructional leaders even if they had the time and inclination to do so.
- Address the physical conditions and materials deficiencies of the school before beginning teacher training.

Evaluators' Recommendations: The following are categorized into training, programmatic, and policy recommendations.

Training

Study quality dissipation and improve training of project staff: We believe that a major reason for SIP's limited impact is because the project staff were not trained to a sufficient level of mastery to do their jobs well. This is not intended as an indictment of the Program Officers. They were dedicated, very smart, hard working and eager to learn. However, this is a problem that has plagued many similar projects and we believe is a problem that has not been faced head on in the development world. Very little is known about how much of the original training intent and quality is maintained as training proceeds down the line from the "expert" to other trainers and end-users. SIP POs are central to this model of teacher improvement and they are trained by experts; they then train others (such as the School Coordinators), who sometimes train others (such as teachers). How much of the lack of child-centered teaching was due to inadequate training and quality control of the training? There is evidence to suggest that the POs were not trained to mastery. They did not demonstrate mastery during our observations of their workshops or classroom coaching. The POs reported that they did not receive training in coaching or consulting skills, and that they did not receive in-depth coaching as they worked to develop their own skills and knowledge. Nor did they have opportunities to read and discuss relevant research - other than in the degree program, or have structured time to reflect on their craft with each other. And, the degree program, while perhaps intellectually invigorating, did not seem to be practically oriented to the tasks and responsibilities of the POs.

Another related issue is the length of time it takes to achieve a sufficient level of mastery for something to take hold. SIP POs reported that the teachers often had not solidified their understanding of the strategies before they (the POs) had to move on to another school. If a teacher does not quite understand how something is done, it is unlikely that he or she will incorporate the new skills into his or her teaching repertoire.

Quality control is critical to the success of the SIP model. To ensure that the training and coaching delivered to teachers is accurate and effective, the POs need detailed, comprehensive training-to-mastery in a range of skills and knowledge, including child-centered teaching as applied to core subject areas, results-driven education, systems thinking, instructional leadership, group facilitation, planning, consulting, classroom-based coaching, student assessment, multiple forms of staff development, and strategies for promoting teacher networking.

Two recommendations are offered. First, a small scale, ethnographic-type study should be conducted across several sites to assess the dissipation of training quality as it moves down through the levels, and to determine what it takes to retain quality. Second, a detailed curriculum and assessment system should be developed for those who will work as staff developers and their competence determined before they are allowed to assume full responsibility for their jobs. A greater degree of quality control may be built into this training if it is conducted through a central source, which leads to our next recommendation.

Consider establishing a centralized training academy for staff developers, district educational managers, and head teachers: Although one option is to address the training of these role groups at the local level, another is to establish a centralized training academy. The need for training in these areas is broad and the curriculum needed rather extensive. It is not clear that a local project could either have sufficient quality control or be cost effective. A



centralized academy could ensure both. Individuals who successfully complete the training for staff developers could then be assigned to local district offices to carry on the training and support efforts at the local level. Perhaps a requirement for participation would be that the district or municipality would guarantee that the individuals trained would assume appropriate roles of responsibility within a coordinated system when they complete training -- and remain in those roles for a specified period of time.

With regard to head teachers and other district administrative staff, a better selection process and criteria may be needed. It appears that current selection is not always based on qualities related to performing the job well. Perhaps as a requirement for sending staff to the training academy, a district or municipality may be required to demonstrate that they have a defensible procedure and criteria for selecting individuals to serve as head teachers or inspectors -- individuals who have the commitment and temperament for instructional leadership and community engagement. They might also be required to indicate how they plan to ensure a gender balance in head teachers. All but one of the head teachers in the study schools were males, while most of the teachers were females.

A training academy could service several projects or even an entire country or region. After having proven its effectiveness in producing high-quality staff (head teachers, staff developers, district administrators, TAC tutors, etc.), it may be able to charge for these training and development services with the intention that eventually it could become financially self-sufficient.

Produce materials centrally: One way to make the impact of such an academy more cost effective is to use centrally produced materials. Since AKF works in similar projects across many sites and countries, centrally produced training materials could be developed for district-based audiences, such as teachers and parents, as well as serving as supports for those who attended academy training. In this way, AKF would save the cost of having each project repeatedly devote time to creating such materials and could ensure high-quality, meticulously clear products based on the latest research in teaching, learning and school leadership. This would not preclude projects from developing additional materials to suit local needs.

One form of training materials that has been proven to retain quality, induce learner engagement, and be cost effective when used with a large number of users is interactive video-based training materials, e.g., CD-ROM, digital video, etc. Interactive multimedia offers several advantages over traditional training models, the most important being that once the quality is built into the program, it is there each and every time it is used. Once the program is developed, multiple copies of the instructional software can be made very cheaply and distributed anywhere in the world, only requiring refilming and retaping for different ethnic and language groups. The essence of the instructional program would likely remain the same for a role group across sites.

Other advantages include: learners can receive training when and where they need it; the user is an active learner, able to control the pace and sequence of the material, and can review information repeatedly; the program can be viewed individually, in small groups with or without a trained leader, or in large groups, and can serve as the basis for discussion and analysis among the participants; the same multimedia equipment can be used to support a variety of software training programs; the user can view and interact with realistic imagery to assist in comprehending difficult concepts and to see how a teaching strategy actually works in a classroom setting.

Regardless of how well POs are trained, they cannot master all the subjects, skills and topics for which school staff need training. If POs can be trained to be effective school improvement

facilitators, the multimedia-based training can provide the high-quality content and skill based training needed across many sites and subjects.

Promoting craft study -- increasing access to research literature and exemplary materials: Recent research on staff development reveals that it is important for educators to be actively engaged in studying their craft, rather than be more passive recipients of training. In order to study one's craft, it is necessary to read relevant professional literature. Although SIP staff and other educators in the Municipality had some access to research literature through SIP's Professional Development Resource Center, the materials in the Center were limited and often out of date. The research materials that the evaluators brought with them were borrowed and copied repeatedly. The staff were hungry for more and we believe it would be useful for them to have access to more current and regular publications and exemplary materials, such as those produced by the International Reading Association, or journals on teacher training. It is difficult to visualize effective strategies when one has seldom seen or read about them. The concepts are vague. Reading the research in an area and seeing how others have addressed it in the form of exemplary materials provides mental images that trainers and teachers can draw upon to guide their professional development. We suggest that the training of staff at all levels (POs, inspectors, TAC tutors, head teachers, and teachers) include reading either original research articles, or popularized research summaries and descriptions or copies of exemplary materials, discussing these in various group settings, talking about what the findings mean for their settings, how they might try it out, trying it out, observing and coaching each other, and meeting again several times to refine their thinking and use of what they have read. This, coupled with the video-based training materials described above promotes a craft-study approach to professional development and is more likely to infuse a deeper level of understanding and use.

Program

Address school rather than teacher: We agree completely with the PO's and the Phase 1 evaluation that the focus of SIP efforts should be on the school rather than on individual teachers within the school. School staff should be nurtured to work as a team to identify and solve problems and to renew itself. The head teachers, POs, TAC tutors, and inspectors should be trained to assist the staff to pursue incremental annual improvement related to a set of common objectives, such as helping all students to become fluent and engaged readers. Rather than focus primarily on child-centered teaching strategies, child-centered teaching should be promoted within a broader framework of continuous school improvement and developing teachers' subject expertise.

Develop the head teacher as instructional leader: In order for a school to pursue incremental improvement, the head teacher must be able to create and sustain an academic focus and an ethos of improvement. He or she also must be able to motivate the community to provide resources and other forms of support. SIP has recently begun to address the role of the head teacher as instructional leader and these efforts should continue, perhaps even reducing the focus on teacher training in lieu of head teacher training.

In order for head teachers to be effective instructional leaders, they will need training in the strategies of clinical supervision (observing, evaluating, and providing feedback to teachers), and in effective instructional strategies within specific subjects, especially reading, writing, math and science. It is also important for them to understand the notion of school improvement and how others have approached it successfully. If SIP POs and head teachers are trained at a central academy, then the head teacher is equipped to serve as an instructional leader and the PO is able to

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provide the external support needed to facilitate schoolwide improvement.

Facilitate teacher networking: Teacher networking has been found to have a much greater impact on teacher practice than traditional staff development (Adams, 1992). Teacher networks involve teachers meeting with other teachers on a regular basis to develop curriculum materials, share experiences and frustrations, and further their understanding of an innovation. The most effective approach also involved a common within-school preparation period for teachers, cross-school monthly meetings, monthly staff development workshops that linked the treatment teachers with non treatment teachers, and a "linker" -- a professional whose responsibilities included connecting teachers to an extended body of professional expertise through links with professional organizations and resources beyond the teachers' district.

One way to support teacher networking is to nurture subject specialists within a school. These might be teachers who are more skilled and knowledgeable in a particular subject area and could be provided with the additional training in the subject and pedagogical skills associated with that subject. These specialists could then be responsible for either teaching all of the classes in that subject, or providing assistance to other teachers. SIP could contribute to nurturing professional subject associations, such as the math teachers' association, providing them with exemplary materials and research summaries of teaching and learning in their subject areas. They could initially facilitate monthly meetings of these associations with the aim that these groups can assume a greater responsibility in the provision of the subject-based development of, and networking for, teachers.

Emphasize the teaching of reading and writing and questioning strategies: Clearly, there are serious deficiencies in the teaching of reading and writing in Kisumu (and in the control district). In part these deficiencies derive from their lack of emphasis in the curriculum, which focuses more on teaching decontextualized grammar than using language to understand and communicate. SIP has begun work on teaching reading, but much more needs to be done and should be a top priority in SIP's future efforts. Current models of training teachers in reading and writing is to have them experience being readers and writers. This experience of the process helps them to understand the intellectual engagement and challenges their pupils will face and encourages them to be model readers and writers for their pupils. The International Reading Association has an international volunteer service to assist developing countries in this area and can be a valuable and cost-free asset. Moreover, several teachers asked for training in how to ask higher-level thinking-type questions. This would be very useful, especially since almost no thinking-type questions were asked during our observations.

Develop, administer and report child-centered examinations: As mentioned repeatedly, the examinations exert a powerful hold on teaching and learning. SIP can capture the power of the exams and redesign them to nurture child-centered teaching. Instead of developing practice exams that promote superficial, fact-based teaching, they can develop exams that measure higher levels of thinking and problem solving, reading and writing, and the application of knowledge and skills to real-life problems and situations. Central to using examinations as a point of leverage is the timely reporting of exam results in a way that points out weaknesses and suggests teaching strategies that will lead to better exam performance in the future and are child-centered. That was the main purpose of including the open-ended questions in the exams administered for this evaluation and for developing detailed marking schemes. The questions measured important skills not measured in the "traditional" exams - reading and writing - communicating ideas and concepts. They were intended to connect with pupils' lives, feelings, and experiences and to elicit pupils' views. They were intended to elicit imagination and creativity,

and were marked for important writing skills, such as coherence. SIP (or the MEO) could provide teachers with sample test preparation exercises that embody these ideas. If the exam results are reported for each teacher, based on the ideas represented in these marking schemes, teachers will teach to the exams - in this instance, a desirable end. The inevitable question is whether these types of practice exams will undermine pupils' performance in the national exams. Possibly, but not likely. The Kisumu pupils were not able to read and write in English - the language of the examinations. Certainly that is a major hinderance to high performance. In our view, there are no more important skills to achievement across all subjects than reading, writing (communicating), thinking, and problem solving. It is a proposition worth trying, and, if results are positive, could even encourage changes on the national examinations.

If this strategy is tried, Kisumu staff would need training in developing these types of exams and in reporting the results in ways that encourage better teaching. In addition, since it is a new strategy in Africa, the process and impact should be studied and reported broadly.

Establish a model school: Teachers may not believe that they can really complete the curriculum while doing child-centered teaching. It may be useful to take one school - preferably a school that is not privileged in any way - and work with the head teacher and staff until they have mastered school quality, child-centered teaching, and also have high test scores. This school could be used as a model for other schools to see that it truly can be done.

Establish an effective schools peer review process: Research-based indicators of effective schools have been identified and could be used to establish an evaluation and improvement system within the municipality. At the present time, it is not clear that school staff are consciously aware of the factors that make up an effective school. School and municipality staff can work together to decide which indicators are appropriate for their local context and jointly design a procedure whereby a school is reviewed periodically - say once every year or year-and-one-half. When a school knows it will be reviewed in several months, and knows the criteria being used in the review, the staff may be motivated to analyze their own situation and work to make targeted improvements. Recall one teacher's comment that, "Just the anticipation of SIP visits makes teachers work harder." Based on the school review findings, the school staff and peer evaluation team could jointly establish specific goals for improvement for the next evaluation period. Ideally, staff from other schools and parents and community members, as well as faculty from the universities and teacher training colleges would all serve on review teams. This would require that staff at the MEO be trained to train the peer review teams -- an appropriate task for AKF-SIP.

Encourage MEO Responsibility: It is clear that SIP cannot assume full responsibility for the success or failure of schools in Kisumu. The MEO must exert a greater influence over school accountability. The MEO is responsible for ensuring that schools are in session when they should be in session and that festivals are attended after school hours. They should be more vigilant in checking on attendance and should work with SIP and other administrative levels to streamline the burden of multiple examinations.

Policy

Study of teacher training colleges: Teacher training colleges are a "black box" in the system of educational inputs. Little is known about their curriculum, the quality of teaching or supervision, or the adquacy of their facilities. A study of these institutions and the role they play in preparing teachers and head teachers may be revealing and may suggest strategies for improving a



key part of the educational system in Kenya.

One of the POs who had been on the faculty of a teacher training college prior to coming to SIP, reported that he had previously felt that it was sufficient to present teachers with the theory behind the practice, but since his experience in working with teachers in the classroom, he sees the importance of providing teachers with a clinical, or practical, dimension to their teacher training experience. Perhaps this is an explanation for the gap between what teachers learn in teacher training and what they practice in the classroom. However, we suspect the problem may be broader. In our discussions with the faculty at Maseno University, we probed about the nature of the education curriculum and got the sense that it may be very much outdated. Since every teacher in Kenya goes through the teacher training colleges, helping to ensure that these institutions represent the best possible training may be a very cost-effective strategy for school improvement. Although most studies of preservice training have found it to be less cost-effective than inservice training, this may be due to poor quality of the preservice programs rather than to the inherent nature of preservice training.

Attempt to influence the design of the KCPE and the national curriculum:

Although the KCPE is a quality test in many regards, especially in that the KNEC prepares and disseminates detailed reports of exam results with suggestions for instructional strategies, the examination is not at all child-centered. This is particularly true with regard to the extensiveness of the topics and subjects covered by the exam, which in part is a reflection of the controversially overburdened curriculum. One of the overarching principles of constructivism is the notion of meaningful learning, that is, learning which has meaning to the child. Numerous studies have shown that much of the learning that occurs in schools is superficial learning. Superficial learning is prompted by teachers feeling a need to cover an overly full curriculum. They press on even when they know that not all children understand the lesson. Meaningful learning requires deep-level understanding, which in turn, requires that sufficient time be devoted to a topic. It also requires that learners be actively involved in constructing the knowledge. None of this is new to AKF -- it is the reason for the focus on child-centeredness in its school improvement projects. But the concepts are not reflected in the Kenyan curriculum or examinations. AKF's school improvement projects will continue to encounter this obstacle of an overly full curriculum and national examination, but it is not at all clear how to overcome this obstacle.

Collect baseline data: All new AKF projects should collect comprehensive baseline data at the beginning of their projects for use in subsequent evaluation studies.

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