99386

PN-ACD-978

Teaching and Learning in Mangochi Classrooms: Combining Quantitative and Qualitative Information to Study Twelve Primary Schools in Malawi

By
Shirley J Miske, Ph D
and
Amy Jo Dowd

Submitted by
CREATIVE ASSOCIATES INTERNATIONAL INC

Under
Malawi GABLE
Policy, Planning and Curriculum Project

Contract No
612-0237-C-00-6041-00

Funded by
United States Agency for International Development USAID

May 1998

CREATIVE ASSOCIATES INTERNATIONAL INC
5301 Wisconsin Avenue N W Suite 700 Washington DC 20015

Teaching and Learning in Mangochi Classrooms: Combining Quantitative and Qualitative Information to Study Twelve Primary Schools in Malawi

Prepared by

Shirley J Miske, Ph D
and
Amy Jo Dowd
with
Joseph Chimombo,[1] Evelyn Chingwuo,[2] and Demis Kunje[3]

Prepared for

Creative Associates International, Inc
5301 Wisconsin Avenue, NW
Suite 700
Washington, DC 20015

May 1998

[1] Joseph Chimombo is Senior Research Fellow, Center for Research and Training (CERT), Chancellor College, University of Malawi
[2] Evelyn Chingwuo is Girls Attainment in Basic Literacy and Education (GABLE) Desk Officer, Government of Malawi
[3] Demis Kunje is Research Fellow, Center for Research and Training (CERT), Chancellor College, University of Malawi

TABLE OF CONTENTS

			Page
Executive Summary			4
I	Background		8
A	Questions for the Two Studies		9
	1	Questions for the Quantitative Study of Student Learning	9
	2	Questions for the Qualitative Classroom Observation Study	10
B	Methodology		10
C	Methods		11
	1	Quantitative Methods	11
	a	Validity and Reliability of Measures	12
	2	Qualitative Methods	12
D	Major Findings		13
II	Quantitative Results		14
A	Descriptive Statistics and Scores for the Full Sample		14
B	Comparisons by School Type		15
	1	Repetition, Attendance, and Transition	15
	2	Test Scores	17
C	Comparing Scores by Age		19
D	Comparing Scores by School		20
E	Comparing Scores by Sex		23
F	Summary of Quantitative Findings		26
III	Qualitative Results		27
A	School Conditions		27
	1	Class Sizes	27
	2	Presence of Teachers	28
	3	School Facilities	29
	a	Shelter	29
	b	Sanitation	29
	c	Water	29
B	Teaching Strategies		30
	1	Lesson Plans	30
	2	Teacher/Pupil Interactions	30
	a	Individual vs Choral Response and Repetition	30
	b	Small Group Work	32
	c	Dealing with Pupils' Mistakes	33

	3	Curriculum	33
	a	Textbooks	34
	b	Teaching Aids	34
	c	Homework	35
C	Language Use and Language Learning		35
	1	Pupils	35
	2	Teachers	36
	3	Language Teaching	37
D	Institutional Support for Classroom Teaching and Learning		38
	1	Supervision	38
	2	Leadership by Head Teachers	40
	3	Community Support and Mobilization	40
E	Girl-Friendly Schools		42
F	Summary of Qualitative Findings		44
IV	Conclusions		45
V	Recommendations		46
VI	Bibliography		48
VII	Appendix A	Item Analyses	51
	Appendix B	Analysis of Attrition Bias	52

EXECUTIVE SUMMARY

BACKGROUND

In early 1994, Save the Children Federation (US) and partner communities in Mangochi District established four Village Based Schools (VBS) to provide access to quality primary education for the local communities These schools followed the national curriculum, using standard textbooks and teacher guides, but abbreviated the curriculum to focus upon mathematics, English, Chichewa, and general studies From 1994, the VBS also aimed to keep classes at the recently announced national norm of one teacher to 60 pupils Communities provided school buildings, and, together, SC and the communities set school schedules and selected local teachers with primary school certificates SC trained these paraprofessional teachers using a participatory approach and supervised them frequently in addition to providing in-service training every other month Finally, SC worked with the elected school committees to enhance their skills in and expand their support roles in education

RESEARCH QUESTIONS

The mid-term evaluation (Hyde et al, 1997) and a report by Strickland and Williams (1997) recommended two further studies to learn from this pilot effort (1) pupil learning gains, and (2) classroom observations In both of these previous efforts and in this study, the VBS are compared to grant-aided (GAS) and government schools (GS) to offer contrasts that both highlight similarities and offset the differences This study brings both quantitative and qualitative evidence to bear in answering eight questions that explore teaching and learning in the VBS and other Mangochi primary schools Using the achievement data four research questions concerning the learning of student across the span of the 1997 school year can be addressed

1 Do the scores of *all Standard 2 pupils* show gains over the course of the school year? Are they equal in all school types?

2 Do the scores of Standard 2 pupils *of all ages* show equal gains over the course of the school year? Are they equal in all school types?

3 Do the scores of Standard 2 pupils *at all schools* show equal gains over the course of the school year?

4 Do the scores of Standard 2 *boys and girls* show equal gains over the course of the school year? Are they equal in all school types?

Strickland and Williams 1997) raised several key questions about VBS that are central to the classroom observation study design A preliminary analysis of the pretest data (Dowd forthcoming) reinforced those questions and prompted others The study design drew upon this information and sought answers to the second set of four questions

5 Teaching and learning What are the conditions for teaching and learning in the classroom and in the school? What patterns of instruction can be observed in these 24 Standard 2 and 3 classrooms? What materials are used and how are pupils involved in the lessons? What insights can these classroom observations provide for understanding the previous year's achievement test scores?

6 Pupil-friendly, girl-friendly schools Williams and Strickland hypothesized that VBS schools are pupil friendly and especially girl friendly What evidence of this do we see in VBS? What are the patterns across school types?

7 Language use Which languages are spoken by pupils and teachers? How are first, second, and third languages used by teachers and pupils in the classroom?

8 Institutional support for teaching and learning What is the content and frequency of instructional supervision and support for teachers? What support is there from the school and community (school head, parents, and others) for teachers and pupils and for teaching and learning in the classroom? How do the community, the school, and the district support classroom teaching and learning?

MAJOR FINDINGS

- On average, VBS students learn more over the course of a Standard 2 school year than do their GAS and GS counterparts, who learn at equal rates
- Girls in the VBS are learning significantly more in every subject than girls in the GAS and GS A similar pattern of significantly higher gain by boys in the VBS is clear
- Comparing boys and girls, they show equal learning gains in both English and Chichewa. In math, however, boys learned more than girls in the 1997 school year in all types of schools
- Looking across ages, these data suggest that the VBS are more effective in teaching children of all ages, however, analysis of learning over time using larger sample sizes would provide more conclusive evidence
- The qualitative classroom observation study revealed important information about pupil success and effective teaching in different types of schools
- Teaching in VBS is characterized by well-prepared, interactive, pupil-centered teaching and on-going opportunities for improving teaching through supervision
- VBS are organized for and around pupil and teacher learning

- The VBS environment is "girl-friendly," promoting gender equity in the school and classroom

- Connections between pupil learning gains, teaching and learning in the classroom, and organizational support for teaching and learning are interrelated and inseparable While select innovations from the VBS pilot study can lead to improved education in Mangochi schools, the relationships between the innovations and how one innovation builds on another must also be considered in the context of the "whole package "

CONCLUSIONS

The quantitative and the qualitative studies provide important information about learning in Mangochi's Village Based, grant-aided, and government schools Taken together, one study informs the other, moving inquiry beyond supply and demand factors in education to the central questions of teaching, learning, and learning gains for primary school pupils in Malawi

The qualitative data explored questions the quantitative data hinted at, and, in so doing, exposed the complexity of pupil-teacher interactions, teaching and learning, and language use in school classrooms As the VBS pilot comes to a close, the lessons for enhancing the quality and quantity of primary education in Malawi can be fruitfully explored by examining particular innovations introduced in the pilot together with lessons learned from this study

RECOMMENDATIONS

1 Strengthen supervision of teachers in the classroom The VBS pilot and other high achievement schools suggest three ways that this might be achieved in Mangochi's primary schools and beyond

- the local placement of PEAs near the school for which they are responsible,
- the extension of head teacher supervision skills and responsibilities, and
- the foundation of peer teaching groups in schools

2 Support, encourage, and give time and aid to teachers to reflect upon their teaching practice Emphasis should be given to checking student learning and providing constructive feedback

3 Inform and involve parents and communities in their children's education Communities should know what is happening in the school and be involved beyond constructing school blocks in such efforts as checking pupils' daily work, encouraging pupil attendance, supporting teacher performance, checking teacher punctuality, etc

4 Undertake additional research and project implementation to explore questions and concerns raised in this report, including lower achievement and gain by girls in mathematics second language teaching and learning, textbook usage, and increased

learning benefits for pupils studying inside classrooms in two shifts (taking into account educators' concerns, such as pupil alertness)

5 Girl-friendly learning environments must continue to receive high priority, they are constructed through intentional, intensive work Resistance to girls' education is still very evident in Mangochi GABLE efforts, particularly those of the GAC unit, should be continued and expanded. Creating leadership opportunities for girls, and increasing the number of girl leaders, and women teachers, head teachers, and school committee members should receive high priority Laws punishing male teachers and male pupils for sexual harassment of girls should be strictly enforced

I BACKGROUND

The rate of literacy in Mangochi District on the southern tip of Lake Malawi is low compared to the rest of Malawi, in particular, girls' literacy lags behind boys' Early initiation, betrothal, and marriage practices of the area vie for importance with completing basic education The reality of poverty in families, and of opportunities for income through child labor in tea and tobacco estates in the area, along with tourism, fishing, and prostitution also compete with children's schooling Mangochi was the only district in all of Malawi where the GABLE Social Mobilization Campaign's (SMC) Theatre for Development troupe returned a second time to encourage communities to send their girls to school, due to the lack of girls' increased enrollment in school For these reasons and more, USAID chose to be involved in Mangochi District and to fund the Village Based Schools pilot project that Save the Children Federation-USA (SC) had initiated in the district

Following the May 1994 multi-party elections, the winning United Democratic Front declared Free Primary Education in October 1994 That year, enrollment at the primary level increased from 1,895,432 to 2,860,819 pupils and enrollment in the first class alone rose by 374,246 pupils [4] This created a resource crisis in Malawi's education system, as planners estimate a need for 22,000 teachers and 38,000 classrooms to meet increased demand [5] In rural areas of Mangochi District, three types of schools struggle to meet this increased demand for primary education They are

1. *Village based schools* (VBS), pilot schools supported by Save the Children (SC) with funding from United States Agency for International Development (USAID) and the Ministry of Education (MOE),
2. *Grant-aided schools* (GAS), established by a non-governmental organization (e g , the Catholic Diocese of Mangochi, the Muslim Association of Malawi) then supported by the MOE, and
3. *Government schools* (GS), established, developed, and supported by the MOE

The institutions supporting these school types allocated resources differently between 1994 and 1997 to support teaching and learning All school types use the national curriculum, textbooks, and teacher guides, although the VBS have abbreviated the curriculum to focus upon mathematics, English, Chichewa, and general studies Also in the VBS, partner communities constructed buildings with material support from SC and with funding from USAID and SC, the communities also determined school schedules and selected local teachers As there were insufficient teacher candidates available locally with the minimum government requirement of a Junior Certificate of Education (two years of secondary school), the bulk of the teachers were hired with primary school certificates SC trained these paraprofessional teachers to teach in their own villages and worked with the elected school committees to broaden and enhance their

---

[4] Government of Malawi Ministry of Education Basic Education Statistics Malawi 1996, 3-9

[5] World Bank Third Education Sector Credit Project Preparation Mission Aide Memoire (February 1995) 3-7

support roles in education[6] SC undertook these training and support roles using a participatory approach and then supervised the teachers frequently (once or twice a month) in addition to providing in-service training every other month[7] The VBS also aimed from 1994 to keep classes at the recently announced national norm of one teacher to 60 pupils

Previous studies of the VBS pilot project included the Hyde et al mid-term evaluation (1997) that compared VBS primary schools to other government schools Subsequently, Strickland and Williams (1997) looked at indicators of pupil achievement, costs, community participation and ability to sustain VBS, replicability and larger policy questions They recommended two further studies (1) pupil learning gains, (2) classroom observations Achievement tests given on one occasion, as Hyde et al conducted for the mid-term evaluation, provide a glimpse of pupil progress Administering an achievement test at the beginning and end of the year, however, as recommended by Strickland and Williams provides the opportunity to look at pupil progress during the Standard 2 year These scores offer an opportunity to compare the impact of the different inputs and priorities in primary education provision in the three types of schools The quantitative portion of this study undertakes an analysis of mean gain in score among Standard 2 pupils in the three types of school, and looks at scores according to variables of policy interest in Malawi

The achievement test offers important information on pupil learning gains in 12 schools four VBS, four GAS which receive assistance from SC, and four GS in Mangochi District The analysis of the test, however, raises a number of questions that cannot be answered by such quantitative data. Answers to those questions are found through qualitative research methods that include school and classroom observations

The achievement test data were collected during the 1997 school year and the classroom observations were made at the beginning of 1998 Therefore, one study is not intended to and does not explain another Examining the two together does, however, give very useful information about teaching and learning related to pupil achievement and the support for teaching and learning going on in these 12 schools

A QUESTIONS FOR THE TWO STUDIES

1 Questions for the Quantitative Study of Student Learning

The questions asked using the achievement data all concern the learning of student across the span of the 1997 school year Considering the students grouped by school types, ages, schools and then sexes, we can ask and answer the following four questions

---

[6] Hyde, et al report that this was agreed upon with the Ministry of Education since there were no JCE or MCE holders in Save the Children's partner villages

[7] Approach to training as well as frequency of supervision visits and inservice trainings in 1997 reported in Dowd Amy Jo *Training and Support for Paraprofessional Teachers and School Committees to Enhance Quality in Primary Education Save the Children Innovations in the Village Based Schools of Mangochi Malawi* forthcoming

1 Do the scores of *all Standard 2 pupils* show gains over the course of the school year? Are they equal in all school types?

2 Do the scores of Standard 2 pupils *of all ages* show equal gains over the course of the school year? Are they equal in all school types?

3 Do the scores of Standard 2 pupils *at all schools* show equal gains over the course of the school year?

4 Do the scores of Standard 2 *boys and girls* show equal gains over the course of the school year? Are they equal in all school types?

2 Questions for the Qualitative Classroom Observation Study

Strickland and Williams raised several key questions about VBS that are central to the classroom observation study design A preliminary analysis of the pretest data (Dowd, forthcoming) reinforced those questions and prompted others The study design drew upon this information and sought answers to the following questions

1 Teaching and learning What are the conditions for teaching and learning in the classroom and in the school? What patterns of instruction can be observed in these 24 Standard 2 and 3 classrooms? What materials are used and how are pupils involved in the lessons? What insights can these classroom observations provide for understanding the previous year's achievement test scores?

2 Pupil-friendly, girl-friendly schools Based on estimated transition rates, enrollment rates, and numbers of women teachers, Williams and Strickland hypothesized that VBS schools are pupil friendly and especially girl friendly What evidence of this do we see in VBS? What are the patterns across school types?

3 Language use Which languages are spoken by pupils and teachers? How are first, second, and third languages used by teachers and pupils in the classroom?

4 Institutional and organizational support What is the content and frequency of instructional supervision and support for teachers? What support is there from the school and community (school head, parents, and others) for teachers and pupils and for teaching and learning in the classroom? How do the community, the school, and the district support classroom teaching and learning?

B METHODOLOGY

To answer the above questions quantitative and qualitative research studies were designed The achievement test administered in 1997 begins to look at what pupils are learning relative to the curriculum The qualitative study undertaken in 1998 asks How can we make sense of these findings? What is going on in classrooms and schools that might explain them?

The quantitative data aim to define discernible patterns in the scores of students, in this case, according to school type The qualitative research aims to consider the patterns and suggest possible sources The goal of the qualitative study, at its most basic level, is to describe a setting, a process, behaviors, or interactions, and, at another level, is to understand and interpret the complexities of something--here, teaching and learning in classrooms--in the larger context (Kane, 1995) A challenge of qualitative research is to observe and raise questions, not evaluate or inspect teachers' instruction and pupils' participation

What counts as evidence in qualitative research? Observations, interviews, documents, and other carefully-gathered information (such as is described below) provide evidence for hypotheses generated One piece of evidence is not sufficient for generating a hypothesis, a minimum of three sources are used in the triangulation process to substantiate findings that emerge from a thorough analysis of the data (Bogdan & Biklen, 1982) The researcher's presence is acknowledged and taken into account in the data and the interpretation of data, it does not discount the findings but informs them

C METHODS

1 Quantitative Methods

To compare school types quantitatively, the study uses 1997 pretest-posttest score gains Pretests were administered in March and posttests in October 1997 to test mathematics, English, and Chichewa (local language) skills using a test based on the national curriculum's Standard 2 content in these three subjects The pretest sample comprises 238 non-repeating, non-transfer pupils in Standard 2 in Mangochi District [8] The sample of 12 schools represent four each of the three types noted above The VBS were the pilot schools first established and supported by SC in Chilipa Zone The GAS were randomly selected from 29 schools that SC works with in Chilipa Zone The GS were randomly selected from a list of schools accessible by four-wheel drive compiled by the District Education Office and SC [9]

At each site, data collectors used the Standard 2 class registers to obtain a sample of 10 girls and 10 boys, selecting names identified as both non-transfer and non-repeater from top to bottom on the alphabetical lists [10] The pupils thus make up three comparison groups of 80 children each who attend the three different types of schools At the time of the posttest, a smaller sample of 176 pupils (73 9% of the original sample) was available for testing This prevalence of absence required an investigation of whether absence from the sample varied according to school type prior to analysis of gain scores Mathematics gain score will be the primary measure of effectiveness as numerous studies suggest that mathematics scores are more sensitive to school and/or teacher effectiveness than reading or language scores (Mullens, Murnane & Willett 1996,

[8] The sample originally comprised 240 children However, one test was lost and another pupil was dropped from the analysis as she became ill after answering 13 of 66 pretest questions

[9] Damage to roads and lack of repairs for several rainy seasons made this criteria necessary

[10] The probability of being in the sample is thus related to last name but is not biasing the sample vis a-vis test scores or absence

Rock 1995, Behrman & Lavy 1994, Lockheed & Longford 1991, Reimers 1991, Lockheed & Komenan 1988, Murnane 1975)

a Validity and Reliability of Measures

The achievement test used in this study was devised by a 1996 evaluation team led by Dr Karin Hyde It is based on the Standard 2 national curriculum's content in mathematics, English, and Chichewa According to the report of Hyde et al , mathematics items include "counting, number recognition, addition, subtraction, multiplication, division, and money problems set in everyday context," while English and Chichewa items "covered reading of alphabet letters, words, sentences, writing, and reading comprehension" (p 26) The total possible score by subject is 26 in mathematics, and 22 in both English and Chichewa for, a total of 70 points [11] This coverage of subjects, and the involvement of Standard 2 teachers in nearby Zomba in developing the test, give the instrument a measure of content validity Confirmatory factor analysis assessed the validity of the measurement models for each set of skills (counting, etc) within subjects In each case, the models fit, confirming that mathematics, English and Chichewa achievement are reflected in the measurement of subject skills by this instrument

The internal-consistency reliability of measures (calculated using Cronbach's alpha) for each of these subject categories was reported by Strickland and Williams (1997) as 83 for Mathematics, and 75 for both English and Chichewa. As they noted, in this scale 6 to 8 is considered moderate to strong In the current sample of pupils, the corresponding reliabilities calculated on the pretest were 86 for mathematics, 92 for English and 96 for Chichewa. All of these 1997 internal reliability coefficients meet Nunnally's (1978) suggestion of 80 as a threshold of acceptable reliability Finally, item analysis of the skills within subjects noted above (counting, etc) found the measurement of 15 out of 18 skills reliable at a moderate, at 6 level or higher and 7 of 18 skills measured with strong reliability at 8 or higher (see Appendix 1)

2 Qualitative Methods

In the qualitative portion of this study, the same 12 schools in the Mangochi District were studied over a two-week period Research teams[12] visited six schools for three days each and six schools for one-day each Included in the longer three-day visits were three village based schools, two grant-aided schools, and one government school that did not receive assistance from SC In brief, one-day "snapshot" visits,[13] the same kinds of information were collected but without the

[11] While the original test administered by Hyde et al was scored with multiple points for some language questions, this was not done consistently during this administration Therefore, a simple 0-1 score was used

[12] Joseph Chimombo, Evelyn Chingwuo, and Demis Kunje, served as team leaders The teams each consisted of two or three research assistants from the USAID/GABLE Social Mobilization Campaign and a trilingual (Yao Chichewa and English) interpreter (former primary school teacher/administrator) from Mangochi

[13] Snapshot visits were first conducted in the Fall 1997 GABLE II program evaluation in Malawi Data collected from those field visits corroborated or challenged information the GABLE team gathered from other sources, and raised new issues and questions for research and consideration in future GABLE planning Miske (1997) coined the term snapshot' to acknowledge forthrightly both the significance and the limitations of information captured by three researchers in one school over a brief four to five hour (12-15 person hour) period As in that study, the data

benefit of three days of sustained classroom observations Each of the three teams was comprised of two or three research assistants, a Yao language interpreter, and a team leader

Classroom observations are at the heart of understanding and improving education (Miske & Prouty, 1996) and were focus of this study School research team members observed teachers and pupils in Standard 2 and 3 classrooms in each school for one to two hours (two to three class periods each day) for each subject These two standards were selected since VBS include only standards 1-4 and these two standards had the potential to provide the most information about the Standard 2 cohort of the previous year Researchers took detailed field notes in mathematics, Chichewa, and English classes and, where possible, recorded these lessons on audio tape This resulted in approximately 70 class observations over the two-week period

Researchers examined documents that included enrollment records and repetition data from the official school register and from the teacher's register (where available), the latter being more current Team members interviewed teachers, headmasters, parents of school children and school committee members, and conducted separate interviews with mothers only since previous experience had demonstrated that women would speak less with men present. Five girls and five boys from Standard 3 were selected at random and interviewed on their aspirations for level of schooling and occupation. Three girls and three boys in Standard 2, whom teachers identified as the pupils absent most frequently, were interviewed on the reasons for their absences

In each Standard 2 and 3 classroom, researchers developed a classroom map, showing the number of pupils, where girls and boys are seated, and the teacher's "action zone" (i e , where the teacher moves around in the classroom) Classroom maps also indicated the location of charts and other teaching materials on the walls and in the room Researchers examined the teacher's timetable as well as enrollment and attendance records, and, finally, counted the number of textbooks in use or available to pupils in classes

D MAJOR FINDINGS

- On average, VBS students learn more over the course of a Standard 2 school year than do their GAS and GS counterparts, who learn at equal rates

- Teaching in VBS is characterized by well-prepared, interactive, pupil-centered teaching and on-going opportunities for improving teaching through supervision

- The VBS school environment is "girl-friendly," promoting gender equity in the school and classroom

- Girls in the VBS are learning significantly more in every subject than girls in the GAS and GS A similar pattern of significantly higher gain by boys in the VBS is clear

---

do not nor are they intended to be representative of the Malawi education system neither can they provide in-depth information on the dimensions and dynamics of school and classroom cultures

- Comparing boys and girls, they show equal learning gains in both English and Chichewa In math, however, boys learned more than girls in the 1997 school year in all types of schools

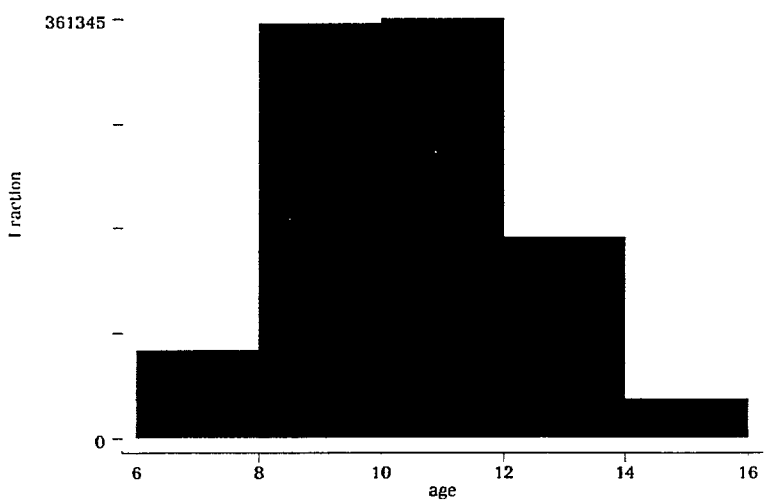
- Looking across ages, these data suggest that the VBS are more effective in teaching children of all ages, however, analysis of learning over time using larger sample sizes would provide more conclusive evidence

II QUANTITATIVE RESULTS

A DESCRIPTIVE STATISTICS AND SCORES FOR THE FULL SAMPLE

A total of 120 girls (50 4%) and 118 boys (49 6%) comprise the pretest sample, averaging 9 9 years of age While the ages of pupils in Standard 2 range from 6 to 16, Figure 1 shows that the bulk of pupils are between 8 and 12 years of age

Figure 1 Distribution of Ages in Pretest Sample



The smaller posttest sample remained similar, with 50 9% girls, 49 1% boys, and an average age of 9 9 years Table 1 offers a view of the full sample averages for pretest, posttest and gain score Recall that there are 26 points possible in Mathematics, 22 in English and 22 in Chichewa, for a total of 70

Table 1 Average Score by Subject in Number of Points on Pretest and Posttest, as Well as the Gain Between Tests (Standard Deviation in Parentheses)

	Pretest (n=238)	posttest (n=176)
Math	14 75 (5 97)	18 88 (6 09)
English	6 45 (5 75)	10 94 (7 87)
Chichewa	7 23 (7 42)	12 17 (8 93)
Total	28 44 (17 45)	41 90 (21 18)

In all subjects, there was a positive difference between pretest measures and posttest measures of pupil learning The fact that there were 238 pupils who took the pretest and 176 who took the posttest required that an analysis of absence at posttest precede discussion of posttests as well as gain in score between the two measurement points Of particular interest was identification of systematic patterns of absence by school type which would endanger accurate gain score estimation as intended by USAID and SC This analysis concluded that there is no difference in the probability of posttest absence across school types once individual pupil characteristics are taken into account (for full analysis, see Appendix 2) Gain scores are not in danger of bias due to attrition so long as the gains are computed taking into consideration these characteristics sex, age, and initial achievement Therefore, this report controls for individual pupil characteristics and analyzes estimated, or fitted gains in Standard 2 mathematics, English, and Chichewa scores

B COMPARISONS BY SCHOOL TYPE

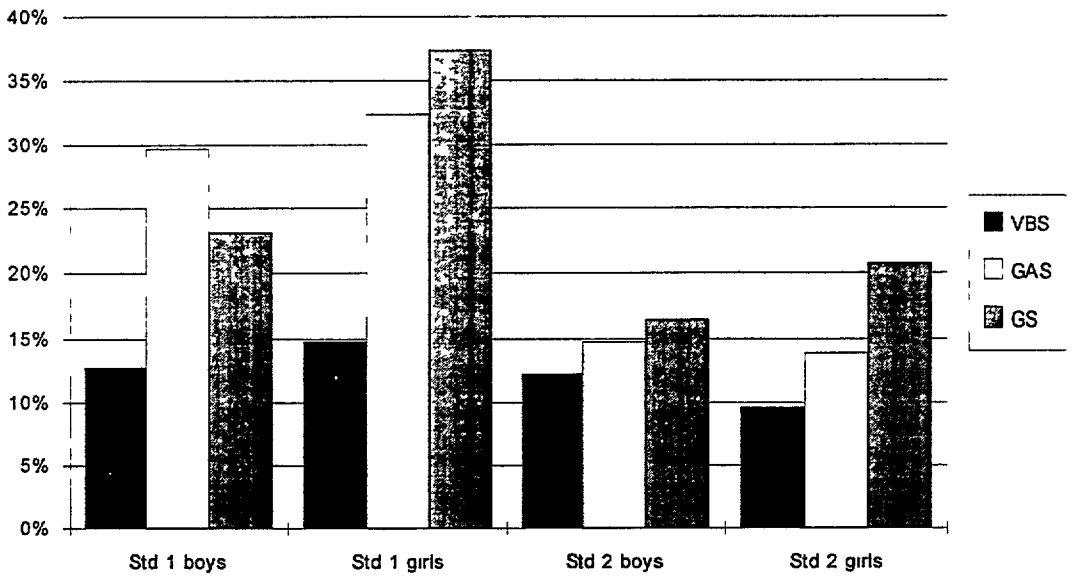
Building from this conclusion, I can proceed with a comparison of average pretest, posttest, and gain score[14] across school types This is of particular importance in considering the potential contributions of the pilot experience to primary education in Malawi It offers a look at the impact of both the innovations introduced into the VBS by SC and the less intensive SC support to the GAS The differences in inputs noted in the introduction also reveal themselves in indicators related to achievement such as repetition, attendance, and transition Comparing these rates briefly foreshadows the results of the achievement analysis

1 Repetition, Attendance, and Transition

According to outcomes such as repetition, attendance, and transition, important differences in impact emerge from the approach to primary education provision in these three types of schools For example, Figure 2 displays the large school type discrepancy in repetition in 1997 Relatively fewer pupils at VBS and especially those in Standard 1 were repeating standards

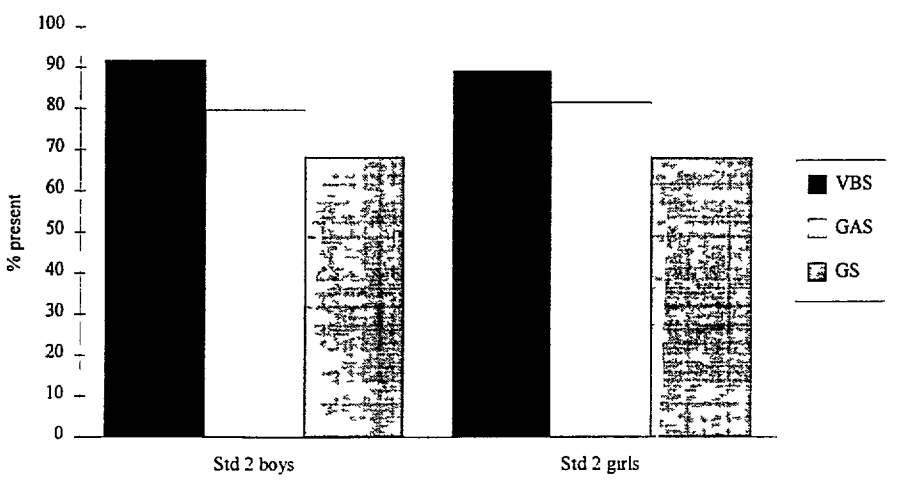
[14] Regression analys s of gain score showed no significant influence of sex or age upon gain, controlling for school or school type Thi report therefore focuses upon the raw mean scores

Figure 2 1997 Standard 1 and 2 Repeaters by School Type and Sex (as a Percentage of Total Enrolled)



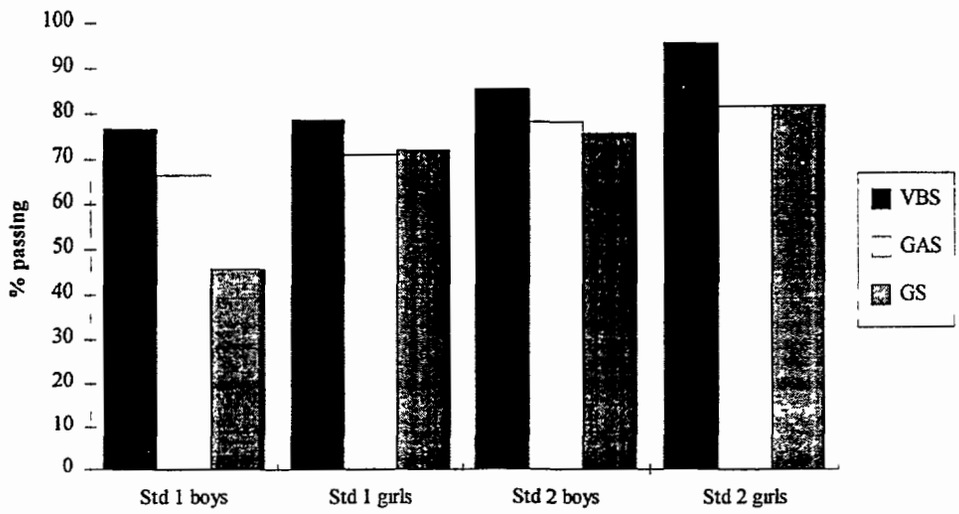
In Standard 2, however, the three types of schools had much more similar repetition rates in 1997, although the Standard 2 girls at GS remained a group repeating notably more often than their GAS and VBS counterparts As noted above, the analytic sample for the analysis of scores is comprised of non-repeaters But these rates may influence the overall quality of teaching and learning and therefore be related to patterns of relatively higher or lower scores In addition to repeating standards less often, VBS Standard 2 pupils were present at school in 1997 in larger percentages than GAS and GS Standard 2 pupils Figure 3 reveals this phenomena by school and sex

Figure 3 1997 Standard 2 Attendance Rates by School and Sex (as a Percentage of Total Enrolled)



Approximately 90 percent of VBS pupils are present at school, while GS pupils are nearer to 70 percent of the total enrolled Again, these percentages represent attendance for all Standard 2 pupils in these 12 schools, not just the 238 pupils in the achievement test sample But this approximation of the amount of time these Standard 2 pupils spend in school builds the expectation of differences in achievement Finally, the VBS pupils of both sexes made the transition to the next standard in 1998 in larger percentages than their counterparts as seen in Figure 4

Figure 4 1997 Estimated Transition Rates by Type of School and Sex (as a Percentage of Total Enrolled)



Note that in both standards in 1997 and in all types of schools, a larger percentage of girls passed onto the next standard than boys did This differential is especially apparent at GS in Standard 1 These three indicators, repetition, attendance and transition reflect overall school quality and therefore presage the test score differentials that we turn to now

2 Test Scores

Among the three school types, boys and girls are equally represented in the tested sample of pupils In the VBS, pupils are a bit younger (9 6 years on average), while in the GAS, half of all the standard two pupils in the sample, or 40, are 11 years of age or older Looking at pupil pretest scores across school subjects in Table 2, in every school, pupils generally have higher average scores in mathematics and more comparable scores in English and Chichewa

Table 2 Average Pupil Pretest Score in Three Types of Schools by Subject and Total (Standard Deviation in Parentheses)

	n	Math Mean (sd)	English Mean (sd)	Chichewa Mean (sd)	Total Mean (sd)
VBS	78	17 46 (5 94)	10 44 (6 50)	10 32 (8 11)	38 22 (19 11)
GAS	80	14 71 (5 60)	4 99 (4 34)	6 95 (7 39)	26 65 (15 30)
GS	80	12 14 (5 19)	4 04 (3 95)	4 53 (5 45)	20 70 (12 84)

In all three subjects and in total pretest score, VBS pupils scored significantly higher than did their GAS and GS colleagues and GAS pupils perform significantly better than pupils in GS ($p <$ 05) The pupils in these types of schools have very different starting scores on average at the beginning of Standard 2 Note also that the 70-question test was designed based on the second year primary school curriculum Two months into the year, VBS pupils answer almost 55% of the questions correctly on average, while GAS pupils do so on 38% of the questions and GS pupils get just below 30% of the total correct

Turning to posttest scores in Table 3, it appears that the overall scores in each subject have become more similar for VBS pupils, while the differential between mathematics and language remains for GAS and GS pupils

Table 3 Average Pupil Posttest Score in 3 Types of Schools by Subject and Total (Standard Deviation in Parentheses)

	n	Math Mean (sd)	English Mean (sd)	Chichewa Mean (sd)	Total Mean (sd)
VBS	68	22 53 (3 33)	18 21 (4 73)	19 13 (5 71)	59 81 (12 31)
GAS	55	18 45 (5 51)	7 36 (6 14)	9 53 (8 33)	35 35 (17 74)
GS	53	14 62 (6 54)	5 34 (5 07)	6 09 (6 77)	26 06 (16 35)

VBS pupils again score significantly higher on average on the posttest in mathematics, English and Chichewa than do their counterparts in GAS and GS And, GAS pupils score significantly higher on each subject of the posttest than GS pupils do on average At the end of the year, VBS posttest scores averaged 85% correct, GAS pupils averaged 51% correct and GS pupils averaged 37% of questions correct

This end of the year picture mirrors that from the beginning, the two scores at particular points in time reaching the same conclusion VBS pupils do significantly better across subjects than their GAS and GS counterparts and GAS pupils do significantly better than the GS pupils

A gain score -- the posttest score minus the pretest score -- offers a view of improvement over time rather than a score at one point in time In this case it provides a view of each pupil s progress over the course of a Standard 2 school year By controlling for individual pupil characteristics I ensure more accurate information from which to learn about the relative

increase in average test scores seen between Tables 2 and 3 Table 4 shows a fitted average gain for each curriculum subject by school type

Table 4 Fitted Pupil Gain Scores in Three Types of Schools by Subject (Standard Error in Parentheses)

	n	Math	English	Chichewa
VBS	68	8 39 (2 21)	9 44 (1 97)	12 52 (2 25)
GAS	55	4 59 (2 39)	3 10 (2 13)	3 10 (2 45)
GS	53	3 86 (2 17)	1 67 (1 93)	2 07 (2 20)

The pattern of significant differences in scores between school types is similar to that reported for pretest and posttest scores On average, VBS pupils have significantly higher gains in mathematics, English, and Chichewa than GAS and GS pupils over the year Gain scores in all subjects are not significantly different between GS and GAS

The pupils in the VBS learn more over the course of a Standard 2 school year than do their GAS and GS counterparts While issues such as class size, access to teaching and learning materials, teacher training and preparation, intensity and content of supervision, follow up training, etc may underlie these differences in pupil learning by school type, these data do not allow an analysis of such phenomena Further research is indicated to identify and understand potential sources of such achievement differentials

C COMPARING SCORES BY AGE

As the declaration of Free Primary Education brought children of all ages into the primary schools, this data offers an opportunity to consider the progress of pupils of different ages in mathematics during the Standard 2 school year [15] Table 5 shows scores by age at pretest, posttest and across the span of a year

Table 5 Numbers in Sample and Average Math Scores by Age

Age	N at Pretest	n at Posttest	Pretest	Posttest
6	1	0	6 00	
7	17	14	9 24	10 14
8	34	26	11 59	17 04
9	51	37	15 00	20 92
10	59	42	15 36	18 62
11	27	23	17 37	21 26
12	32	20	16 31	21 15
13	9	8	17 00	18 13
14	3	2	15 33	15 00
15	1	1	20 00	26 00
16	4	3	18 00	22 67

[1] Numerous studies suggest that math scores are a measure of effectiveness more sensitive to school and/or teacher effectiveness than reading or language scores (Mullens Murnane & Willett 1996 Rock 1995 Behrman & Lavy 1994 Lockheed & Longford 1991 Reimers 1991 Lockheed & Komenan 1988 Murnane 1975)

Eight year olds as a group are significantly lower on pretest score from their 9 to 13 year old counterparts At posttest, they remain significantly different from their 9 and 11 year old counterparts The small number of seven year old pupils as well as the small differential in their pretest and posttest scores is problematic, since the official entry into school is 6 and therefore Standard 2 pupils would normally be expected to be 7 years of age Given that the focus of this report is the comparison of achievement data from three types of primary schools in Mangochi, Table 6 shows the fitted mathematics gain scores for girls and boys of eight and nine years of age with average English and Chichewa achievement in each school type

Table 6 Math Gains by Sex and School Type, Controlling for Individual Characteristics

Age	VBS		GAS		GS	
	Girls	Boys	Girls	Boys	Girls	Boys
8	5 63	6 95	1 83	3 15	1 10	2 42
9	5 67	7 00	1 88	3 20	1 14	2 46

While these data suggest that the VBS are more effective in teaching children of these ages, analysis of learning over time using larger sample sizes would provide more conclusive evidence

D COMPARING SCORES BY SCHOOL

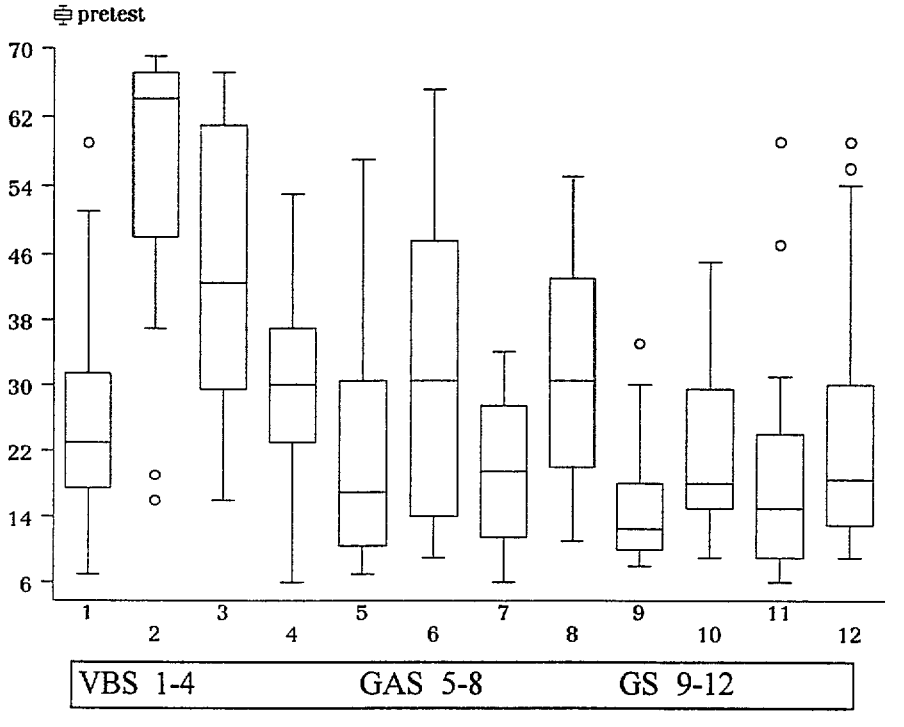
One important step to contribute to further understanding of differentials between these three types of school in Mangochi is the analysis of the "types" themselves as coherent or homogeneous categories If they were homogeneous, we would expect pretest and posttest scores to be similar within school type VBS, GAS and GS Table 7 offers a look at individual characteristics as well as average pretest, posttest and fitted mathematics gain score for each school in the sample

Table 7 Descriptive Statistics and Scores by School (Standard Deviation in Parentheses)

	Average Age	Pre-test n	Post-test n	Pretest Average (sd)	Posttest Average (sd)	Fitted MathGain
Village-Based Schools						
1	9 05	20	20	24 80 (13 13)	58 00 (10 80)	6 57
2	9 89	19	17	55 84 (16 39	66 94 (3 58)	2 98
3	10 10	20	18	42 85 (17 68)	55 78 (15 02)	4 49
4	9 47	19	13	29 74 (12 53)	58 69 (14 77)	5 54
Grant-Aided Schools						
5	10 20	20	10	21 85 (15 10)	28 40 (20 22)	3 20
6	9 75	20	14	32 85 (17 97)	40 71 (18 36)	2 11
7	11 60	20	14	19 15 (8 93)	25 86 (12 81)	3 57
8	10 65	20	17	32 75 (13 42)	42 82 (15 23)	2 00
Government Schools						
9	9 70	20	11	15 75 (7 99)	15 82 (9 52)	2 87
10	9 50	20	12	23 05 (10 69)	32 58 16 45)	2 09
11	10 20	20	13	19 25 (13 97)	27 38 16 76)	2 41
12	9 10	20	17	24 75 (16 17)	27 06 (17 59)	1 93

At School 7, pupils are 1 7 years older than the sample average, while School 1 pupils are 8 years younger In addition, particular schools have a larger number of pupils absent Further study at these sites may indicate problems or issues to be addressed vis-a-vis absenteeism and drop out Pretest scores in Table 7 vary quite a bit across all schools, but also within school types Figure 5 offers insight into the within school type variation in pretest score that exists in the sample

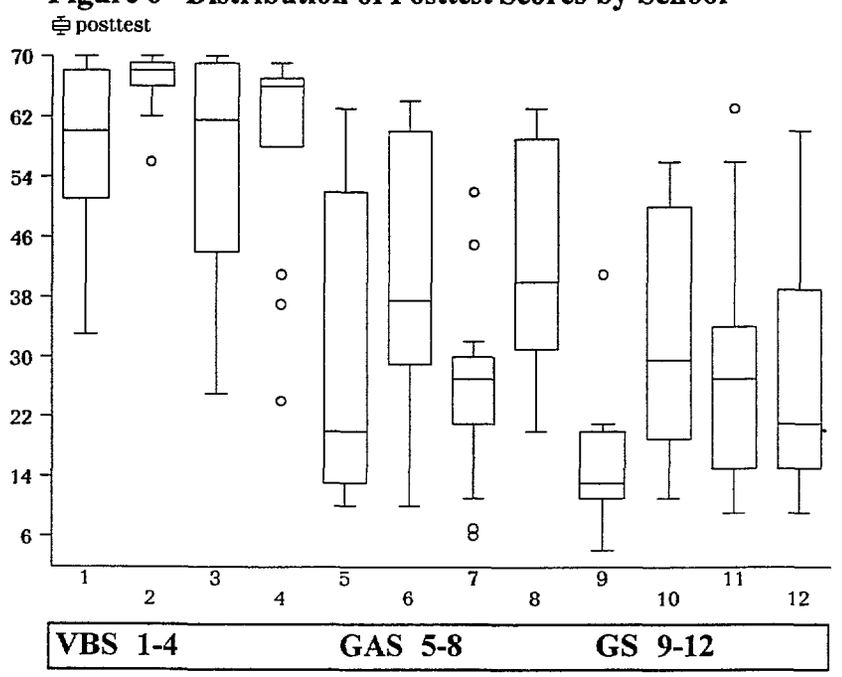
Figure 5 Distribution of Pretest Scores by School



According to Figure 5, pupils in School 1 perform much worse on average than their VBS colleagues in Schools 2, 3, and 4 In addition, those in School 2 are driving up the VBS average score This supports Strickland and Williams' conclusion that the school type category of *village based school* may not be homogeneous It may also relate to another finding that Strickland and Williams report They note from conversations with Standard 1 and 2 pupils in School 1 that "there are some ideas which can be expressed in Yao, which are not very clear to them in Chichewa" (p 56) Such a linguistic barrier, if absent in the other 3 VBS in the sample, would cause School 1 to stand out with a lower average pretest score Thus, further study of achievement in Mangochi should consider linguistic factors influencing pupil learning and achievement scores Among GAS and GS in Figure 5, (5-8 and 9-12, respectively), there is less variation in the distributions of scores across the schools GAS display no outside values while GS show extreme values at all but one school Thus, the GS and GAS seem more homogeneous across their types than those in the original 1996 sample At the individual pupil level for all schools the examining the characteristics of pupils whose scores are outside values (represented by an o above or below the box plot) may offer insight into health economic or other aspects of pupils lives that influence achievement

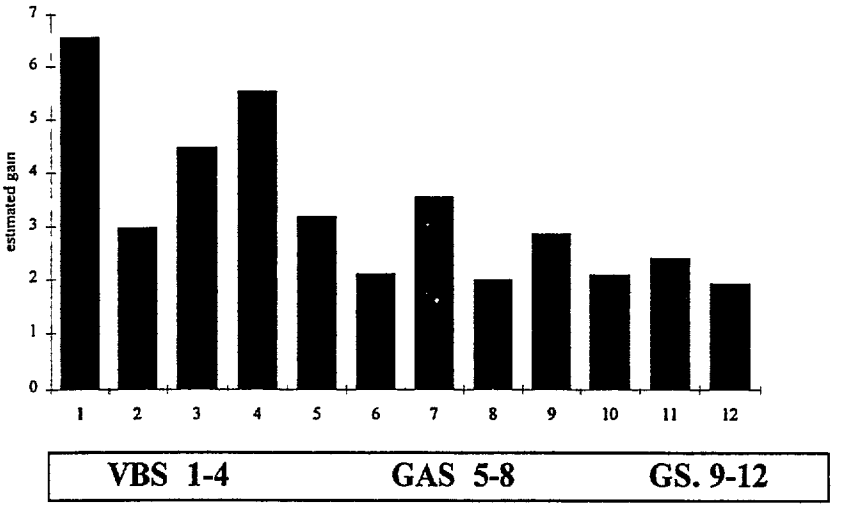
Looking at posttest scores in Table 7 above, School 1 scored an average of 58 points (or 82 9% correct) on the second round of testing This score, however, is still well below the average posttest score of pupils at School 2 (66 94 or 95 6% correct), another VBS School 2 began with a very high average pretest score of 55 84 and gained almost 10 points on average (66 94) to near the total possible on the test 70 points While the average pretests at the four VBS in Figure 5 paint a picture of distinct differences among the schools (covering a range of over 31 points), the posttest average scores are much more similar (covering a range of just over 11 points) and at the lowest average scoring school, pupils get 79 7% of the questions correct Figure 6 shows the distributions of these posttest scores by school

Figure 6 Distribution of Posttest Scores by School



At the GAS and GS, posttest averages range across almost 17 points for both types of school, revealing broad variation in posttest scores among Standard 2 pupils at these eight schools This is particularly troublesome at the bottom end of the scale, where at School 9, Standard 2 pupils tested at the end of the year answered less than 23% of the curriculum-based questions correctly Importantly, differences between schools within types (School 1 differs from School 2, School 9 from School 10, etc) suggest that while we detect significant differentials between the types of schools -- VBS, GAS or GS -- there may also be informative differences to note between the four different VBS, the four GAS and the four GS Fitted gain scores for each school also reveal a pattern by school type Figure 7 reinforces the conclusion that overall the VBS pupils gain more in mathematics scores than the GAS and then the GS

Figure 7 Estimated Math Gain Scores by School

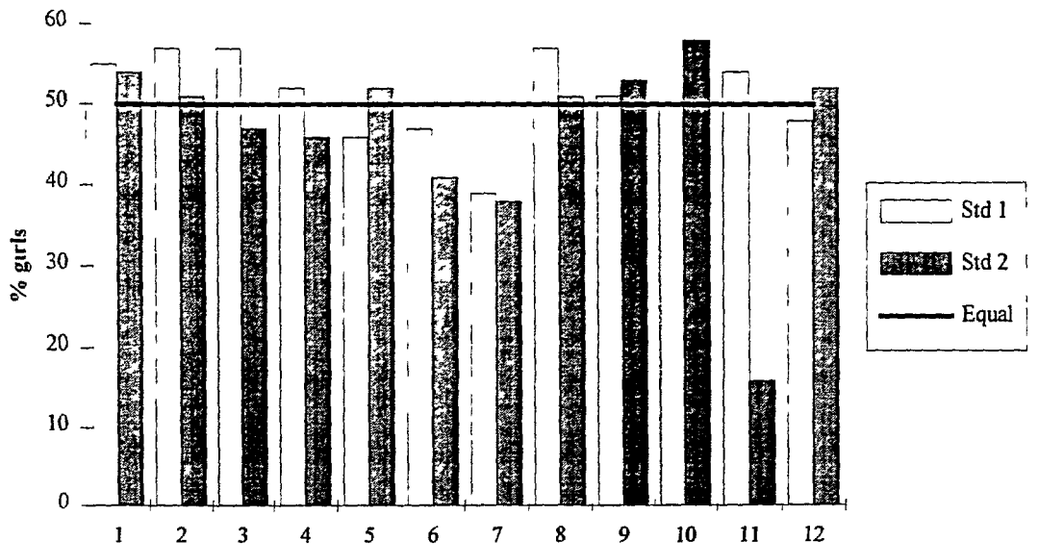


Within type, however, consider the large difference between schools 1 and 2 and schools 7 and 8 Each of these pairs of schools receive the same kinds of support from SC and/or the MOE, but show mathematics gains that differ by several points on average A closer look at processes (teacher instructional behaviors, teacher qualification and support, etc), as well as individual characteristics of pupils and teachers in these schools (such as health, socio-economic status, distance from house to school, etc) may help explain the variation in scores between schools of one type

E COMPARING SCORES BY SEX

A final perspective on these achievement data comes through the lens of comparing female and male achievement in the schools The Standard 2 girls in the sample are a few months younger on average than the boys, and both sexes range between 6 or 7 and 16 years of age While in this analytic sample the boys are girls are equally represented within each type and school, girls as a percentage of total enrollment varies quite a bit by school and school type Figure 8 shows this variation

Figure 8 1997 Girls Enrollment by School and Standard (as a Percentage of Total Enrollment)



Standard 1 girls outnumber boys in all four VBS This is the case in Standard 1 for only three of the eight comparison GAS and GS in Figure 8 In Standard 2, however, the VBS girls no longer consistently outnumber the boys They do so in two schools, which is the case in two GAS and three GS as well Note that while a they represent a smaller percentage of pupils enrolled than the boys in all of these cases, in the VBS, the differentials are 3 and 4 percent, while in the GAS they are 9 and 12 percentage points In the one GS where girls represent a smaller proportion of the school population, they comprise only 16% of the total Thus, girls' and boys' enrollment differs between schools and school types Do they differ in scores?

On the pretests in Table 8, we see that boys significantly outperform girls in English and to a lesser extent in Chichewa This duplicates the finding of Hyde et al (1996) in a correlational study of test scores

Table 8 Average Pupil Pretest, Posttest and Gain in each Subject by Sex (Standard Deviation in Parentheses)

	N	Math Mean (sd)	English Mean (sd)	Chichewa Mean (sd)
Pretest				
Female	120	14 33 (6 19)	5 57 (5 37)	6 53 (6 97)
Male	118	15 18 (5 74)	7 36* (6 01)	7 96~ (7 83)
Posttest				
Female	89	18 19 (6 15)	10 09 (7 62)	11 35 (8 98)
Male	87	19 57* (5 98)	11 82* (8 06)	12 99~ (21 19)
Fitted Gain Score				
Female	89	2 90 (1 90)	3 61 (3 19)	4 05 (4 06)
Male	87	3 72* (2 05)	3 53 (3 0[illegible])	3 83 (4 12)

* boys' and girls' average scores are significantly different at p< 05
~ boys' and girls average scores are significantly different at p< 10

Considering the scores of these pupils at posttest, the differentials found by Hyde et al reemerge for mathematics, continue in English and are slightly less significant, but present for Chichewa At these two points in time, boys significantly outperform girls in the majority of subjects But are they also gaining more than girls over the course of the school year?

Again, while the pretest and posttest provide information at one point in time, the fitted gain score offers a picture of pupil progress during the Standard 2 year controlling for individual characteristics The fitted gain scores in the final section of Table 8 above reveal that in fact girls' scores increase more on average than boys in English and Chichewa and that boys gain more on average than girls in mathematics None of these differences in language learning are statistically significant, however, and we conclude that boys and girls are learning these subjects equally in Mangochi In mathematics, however, boys learned more than girls in the 1997 school year across these school types

Again to focus this discussion on the comparison of school types, Table 9 offers a view of test scores similar in form to Table 8, but differentiated by school type

Table 9 Average Pupil Scores in Three Types of School by Sex for each Subject

	n		Math		English		Chichewa	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Pretest								
Village Based Schools	39	39	18 07	16 85	11 36	9 51	11 31	9 33
Grant-Aided Schools	40	40	15 00	14 43	5 78*	4 20*	7 33	6 58
Government Schools	39	41	12 46	11 83	4 97*	3 15*	5 26*	3 83*
Posttest								
Village Based Schools	33	34	23 21~	21 8~	19 03	17 43	19 85	18 44
Grant-Aided Schools	27	28	19 30	17 64	8 96*	5 82*	11 00	8 11
Government Schools	27	26	15 41	13 81	5 85	4 81	6 59	5 57
Fitted Gain Score								
Village Based Schools	33	34	5 29*	4 53*	7 47	7 66	8 15	8 48
Grant-Aided Schools	27	28	3 17*	2 27*	2 11	2 16	2 02	2 15
Government Schools	27	26	2 73*	1 95*	1 04	1 16	1 35	1 70

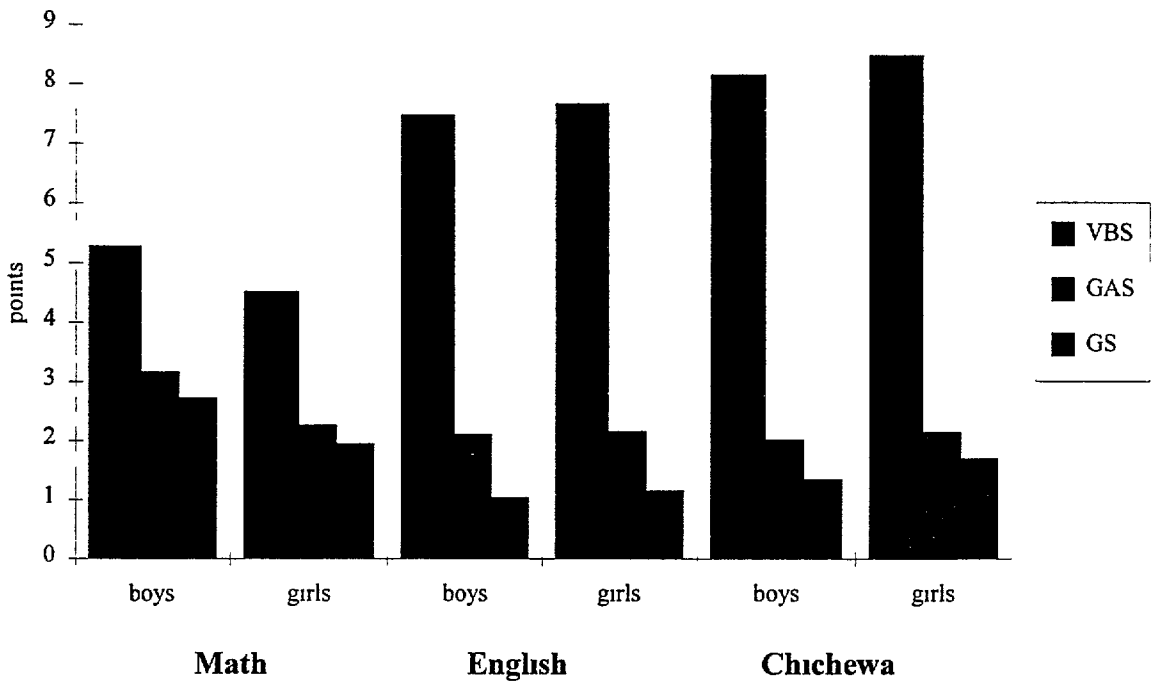
* boys' and girls' average scores are significantly different within school type at p< 05
~ boys' and girls' average scores are significantly different at p< 10

At the time of the pretest in Table 9, boys significantly outperformed girls in GAS in English and in they did so at GS in both English and Chichewa Later in the school year, however, at the time of the posttest, only the significant difference between girls and boys it GAS in English remains A somewhat significant difference (p < 10) between the sexes in mathematics, however, is visible at VBS At no school is there a significant difference between the sexes in Chichewa at posttest At these two points in time, several differences between girls and boys are visible across school types

For a perspective of learning between these two achievement tests, consider the fitted gain scores by subject, sex, and school type in the final section of Table 9 In mathematics, boys gain significantly more in score than girls in all school types In English and Chichewa, however, boys and girls gain equally over the period of a Standard 2 year at all three types of schools

Now focus in upon the columns to compare girls learning gains across school types and boys learning Controlling for individual characteristics, the girls in the VBS are learning significantly more than their GAS and GS counterparts in every subject A similar pattern of significantly higher gain by boys in the VBS is clear Figure 9 offers a graphic display of these gains

Figure 9 Average Gain Scores in each Subject by Sex and School Type



Thus, while two snapshots of girls' and boys' scores offered by the pretest, then the posttest, display several differences between girls and boys in Standard 2 in Mangochi, measuring their learning across the school year shows that girls and boys are progressing equally in language and that boys gain more than girls in mathematics Examination of learning gains in a larger sample of girls and boys at these schools would reveal which schools are most effective at promoting learning in each of these subjects

F SUMMARY OF QUANTITATIVE FINDINGS

The five main findings of this gain score analysis report the following

Comparing school types on average, VBS pupils have significantly higher gains in mathematics English and Chichewa than GAS and GS pupils over the year The pupils in the VBS learn more

over the course of a Standard 2 school year than do their GAS and GS counterparts However, gain scores in all subjects are not significantly different between GS and GAS

Looking across ages, these data suggest that the VBS are more effective in teaching children of all ages, however, analysis of learning over time using larger samples would provide more conclusive evidence

Comparing differences between schools within types reveals the potential of informative differences between the four different VBS, the four GAS, and the four GS

Comparing scores by sex shows that girls' scores increase more on average than boys in English and Chichewa and that boys gain more on average than girls in mathematics None of these differences in language learning are statistically significant, however, and we conclude that boys and girls are learning these subjects equally in Mangochi In mathematics, however, boys learned more than girls in the 1997 school year across these school types This pattern holds across all school types

Finally, comparing girls' scores across school types and boys' scores across school types, this analysis finds that controlling for individual characteristics, the girls in the VBS learn significantly more than their GAS and GS counterparts in every subject A similar pattern of significantly higher gain by boys in the VBS is clear

III QUALITATIVE RESULTS

The qualitative study was designed to examine teaching and learning in schools and classrooms in order to understand better the differences and similarities between and within the three types of schools In each section patterns are presented that obtain across types of schools, then variation between the VBS, GAS, and GS is discussed

A SCHOOL CONDITIONS

While this study focuses on teaching and learning processes, the conditions under which these processes are carried out have a strong impact on pupil learning A discussion of class sizes, the presence of teachers in classrooms, and school facilities set the stage for the discussion of teaching and learning observed in Standard 2 and 3 classrooms

1 Class Sizes

The size of Standard 1-3 classes varied widely across school types, ranging from a low of 29 pupils in a GS Standard 2 to a high of 280 pupils in a GAS Standard 2 Several classes in the 12 schools have decreased in size since 1997 due to new primary schools in the area but class sizes for Standards 1-3 usually exceeded the government ideal ratio of 60 1 Of the four GAS in the study no Standard 1, 2 or 3 class had fewer than 72 pupils and 75% of the classes had more than 100 Fifty percent of GS classes also had more than 100 pupils per teacher VBS teacher/pupil

ratios spanned a lower range than GAS and GS, however, three out of 12 VBS classes also had more than 100 pupils

Where records were available for comparison, class sizes were sometimes below or well above official reports For example, a GS officially recorded enrollment at 151 for a Standard 2 class, but the teacher register showed 129 pupils In a GAS Standard 2 the official count was 273, the actual enrollment, 103 In another GAS, the official count was lower than the number of pupils actually enrolled, 128 pupils were reportedly enrolled in Standard 3, but the teacher's record showed 140

The national ratio of one teacher for every 60 pupils is an unrealized goal, not an actual fact for the large majority of classes observed From these data it appears that this goal, putatively already attained, is achieved by averaging small class sizes in the upper standards into the total, and does not obtain for lower standards [16] Large class sizes are detrimental to pupil learning and help to perpetuate low rates of literacy On-going efforts to reduce class sizes in lower grades are laudable and necessary

2 Presence of Teachers

Presenting a pupil-teacher ratio for a class assumes that each class has a teacher In three GS/GAS schools observed, teachers had been moved suddenly at the beginning of the school year, and nine classes were left without teachers One hundred sixty Standard 1 GAS pupils sat in a classroom with no teacher Standard 3 pupils at that same school received instruction only when the headmaster or another teacher dropped in and, without planned lessons, "taught" the pupils Parents told researchers they knew that their children were learning very little in those classes They commented "The [pupils] are getting one subject per day " Two teachers in School 5 were sent to teacher training college for three months, and two others were transferred Three teachers in GAS School 8 requested transfers due to inadequate housing, and these transfers were immediately approved at the district level, without advance notice to headmaster or the community The transfers disrupted the education program of the school and potentially distanced the community from a sense of involvement in the school In the remaining five government schools and in all VBS, each class had at least one teacher [17]

This 1998 information on teacher shortages does not explain the difference in learning gains between Standard 2 pupils across school types for 1997, but it raises the possibility that some government school Standard 2 pupils in 1997 may not have had a teacher for the complete Standard 1 or 2 year This obviously could have contributed to lower scores and smaller learning gains

[16] Rural-urban class size differences must also be factored in to the national average

[17] In several schools where teachers were awaiting a permanent assignment, a class had two teachers

3 School Facilities

How pupils' basic needs are met affects their learning Shelter, water, sanitary facilities--all are necessary for pupils to learn effectively and efficiently

a Shelter

All 12 schools had at least one school block with classrooms, but the number of classrooms could never accommodate the number of pupils registered in school This deficiency was dealt with differently according to school type VBS scheduled two shifts, and all Standard 1-4 pupils studied indoors under shelter beginning either early morning or late morning, and thus were protected from the sun and separated by walls from other classes In GAS and GS, overflow classes met out-of-doors under trees or, less commonly, under a thatched roof shelter While the outside arrangement allowed all teachers and pupils to attend school at the same time, there were many distractions, such as younger pupils running around the school grounds during lessons The general preference of Malawian educators seems to favor a common morning meeting time over separate shifts, due to perceived levels of pupils' energy, attentiveness, and eating patterns Nevertheless, studying indoors promoted focused learning and potentially reduced pupil absences If the results of this study are to provide insight into why VBS pupils have greater learning gains and to enhance pupil success across the district, the idea of extending shifts to other schools cannot be ignored

Lower standard and most upper standard pupils across school types did not study at desks, so this cannot be factored in to Standard 2 pupil learning gain differentials While successful learning obviously did not depend on the presence or absence of desks, sitting on the floor was plainly more awkward for girls than for boys Since girls wore dresses to school, both sitting on the floor and standing up to answer a question were more difficult for them

b Sanitation

Sanitation facilities were substandard across school types In no school was there a sufficient number of well-constructed, clean latrines or toilets in structures with appropriate doors for girls and for boys Interviews revealed that parents in some communities thought boys should build the new latrines, while head teachers expected parents to take charge of this Girls at one government school were told to dig new latrines as a punishment, but school parents quickly intervened in what they considered to be an unsuitable task for girls In a VBS community, researchers observed the school and community come together to correct the problem of substandard toilets overnight, as will be described in the community section below

c Water

More functioning bore holes and clean drinking water were needed—only one or two functioning bore holes were to be found in the 12 schools Pupils often had to walk significant distances for a drink of water, and teachers reported that pupils did not always return to class following the trek to the water source

The GOM and the MOE together with their partners continue to grapple with the stress on the educational system of introducing free primary education and providing for the thousands of additional pupils who entered the system after 1994 The conditions for teaching and learning in the 12 rural Mangochi schools as described above were not optimum and too many children do not complete primary education This disparity, along with the desire to understand these differences and improve schooling for all Malawian children lead to the heart of the study, namely, examining dynamics of teaching and learning in the 24 Standard 2 and 3 classrooms

B TEACHING STRATEGIES

Several key areas emerged to highlight variations in teaching and learning across and within school types These included 1) the development and use of lesson plans, 2) teacher-pupil interactions, including group vs individual response patterns, small group work, and the ways in which teachers dealt with pupils' mistakes, and 3) curriculum, that is, teacher familiarity with teaching new curriculum, and the use of textbooks and teaching aids

1 Lesson Plans

Preparing lesson schema and daily lesson plans are an important component of a professional teacher's work in Malawi Teacher training covers lesson planning in detail, and a teacher's plans are one of the first items a Primary Education Advisor (PEA) asks to see on her or his supervisory visit to a school Teachers are expected to show their daily lesson plans for each subject to the school head at the beginning of the school day The daily ritual of teachers filing into the head teacher's office with their plan books was an indication of a well-organized school and well-prepared teachers

Across school types, most of the 24 teachers observed had prepared their lesson plans and were following them Most lessons were based on subject matter taken from textbooks and teachers' guides and usually followed a logical progression In several cases, GAS and GS teachers did not follow their lesson plans and the spontaneously developed objectives failed miserably Where teachers had not prepared a lesson plan due to reported illness, lesson activities were disconnected and a clear lesson objective was difficult to ascertain Seven of eight VBS teachers had prepared thoroughly for their lessons and regularly used teaching strategies that involved all or most pupils in learning tasks Teachers had written extensive lesson plans, with one particularly detailed English lesson covering five pages in the teacher's notebook

2 Teacher/Pupil Interactions[18]

a Individual vs Choral Response and Repetition

Individual repetition and choral response and repetition were methods used frequently across all types of schools and for all subjects Whole group response is useful for pupils learning to

[18] As described in Hyde et al classroom instruction was teacher-directed Therefore pupil-pupil classroom interactions (beyond pupil language use) were not a focus of this two-week study

pronounce a new word or words Whole group response and repetition becomes problematic when it is the primary means of teacher-pupil interaction If pupils routinely answer only as part of a group, they need not pay close attention to instruction, nor are they accountable for their learning Choral response gives teachers little indication of pupils' comprehension

Individual or whole group repetition is commonly used for teaching new vocabulary and word pronunciation It can be successfully combined with other teaching strategies or overused to the exclusion of checking for pupil understanding, as the two cases below illustrate

> In VBS School 1, Standard 2 teacher Mrs Mlambala greets her 30 pupils in English and says, "It's time for English " She begins by reviewing the previous lesson She picks up one leaf, then several leaves, one stone, then several stones, one book, then several books Each time she asks a different pupil, "What is this?" or "What are these?" and the pupil stands and replies When one girl incorrectly gives the singular rather than the plural, another pupil is called on He answers correctly, the girl repeats the correct answer, and both sit down This activity is repeated with the same items to review color words in English
>
> Mrs Mlambala then introduces new vocabulary and a new activity She writes commands on the chalkboard "look up," "look down," "walk to the door " She reads the phrases to the class, demonstrates the commands, and uses choral repetition, asking the class to read after her She next asks individual pupils to read out loud and then calls on pupils to read in groups of four or five After this, she again asks individual pupils to follow her instructions "Go to the window," "open your mouth," she instructs Individual pupils are called on, and by the end of the lesson she has interacted with each child at least three times The lesson closes with the entire class learning a new song through choral repetition and singing the song together

In contrast, a GS teacher--one of two teachers assigned to this Standard 3 class--used repetition throughout her English class to teach pupils a new dialogue

> Mrs Roda begins the lesson with choral repetition, instructing pupils to read each line of the dialogue written on the board after her, line by line, repeating each line several times Most pupils focus on the chalkboard Following this, she calls on several individual "star" pupils to come to the board and read the dialogue or discrete words from the dialogue out loud No pupil can do this without assistance, although several "stars" can speak the first three or four lines The pupils ended up repeating the last several lines after the teacher These same star pupils again return to the board and read every other line of the dialogue each child taking one role Few pupils focus on the chalkboard Those who do pay attention stumble through the second half of the sentences again, indicating that they understand only some of the words and phrases Nevertheless, after the star pupils sit down, Mrs Roda instructs all pupils to open their books and "read" the

same dialogue silently Their final activity is to read, (again, choral repetition) each line after her, line by line, as they had at the beginning of the lesson

Mrs Roda had prepared a lesson plan, but she seemed unsure of how to use the communicative approach to language teaching, or how to proceed when pupils failed to answer questions about word meanings She resorted to choral and individual repetition as her primary teaching strategies

Mrs Mlambala and other VBS teachers used choral response minimally for English, Chichewa, and mathematics She followed the choral method by calling on individual pupils, assigning them to work in groups or in pairs as described above Asking individuals to respond allows teachers to check for pupil learning and to incorporate pupil responses into the teaching (This strategy is intentionally taught to VBS teachers and is listed on the VBS teacher evaluation form) This emphasis on varied teaching strategies that enable pupils to practice new material and allowed teachers to check on pupil learning may be a key to understanding the significant differences in learning gains across school types in the quantitative study

b Small Group Work

Individual teachers in each school type used small groups in teaching English and mathematics A more detailed analysis of the data would be required to detect if there were differences between the ways in which small groups were used in the schools VBS teachers organized pupils into small groups for mathematics and English classes A GAS Standard 3 teacher taught pupils the words "borrow" and "lend," then organized pupils into small groups to practice the concepts with the group leader Two government school teachers taught the concept of tens and ones in mathematics, then organized the pupils into small groups to practice the concept by drawing on the floor with chalk or bundling strips of paper

Although this study did not allow for a systematic study of pupil learning in mathematics, paying close attention to small group work in mathematics, to other teaching methods and materials used (such as the bamboo counter), and to the length and frequency of teacher/pupil interactions might begin to provide some answers to boys' higher learning gains in mathematics across school types In several GAS classrooms, teachers called on boys 30-50% more than girls--in mathematics class only Examining the preparation, skill, sex, and gender awareness of the mathematics teacher could also provide important insights One particular incident highlights the critical importance of conducting such a study

> An untrained GAS Standard 2 teacher insisted that she treated girls and boys the same However, during a mathematics lesson she spent seven minutes and 20 seconds explaining and discussing mathematics problems with at least 10 boys in the class She spent only 20 seconds with girls--and all 20 seconds with just one girl

This lack of awareness of gender bias among women and men teachers is not unique to this teacher International studies of classrooms have shown repeatedly that even teachers committed

to gender equity demonstrate such bias and must learn to see this bias in their own teaching (O'Gara, 1996)

c Dealing with Pupils' Mistakes

When a VBS pupil made a mistake, s/he routinely remained standing until someone else answered the question correctly Then the pupil repeated the correct answer and sat down In this way, mistakes became tools for learning, not emblems of failure This strategy was used occasionally but less consistently in several government school classes GS pupils who answered a question incorrectly were not regularly given the opportunity to verbally correct their mistake after the right answer had been given Researchers were surprised that pupils in VBS classrooms appeared not to be embarrassed by mistakes Instead, they volunteered to make additional mistakes--still raising their hands even when they had already given several wrong answers Developing this self-confidence in making mistakes and daring to try new things is important, especially to the process of girls' developing into educated women (Wolf & Odonkor, 1998)

3 Curriculum

Malawi's primary education curriculum was recently revised in all areas Perhaps the most dramatic change was the switch to a communication-oriented approach from the traditional grammar-based method for English language instruction VBS teachers were "well aware" of the new curriculum and they appeared comfortable actively involving pupils in learning English This was due in no small part to the monthly or twice monthly supervisory visits from an SC staff member

Government school teachers cited the lack of orientation to the new curriculum as problematic, six reported uncertainty in teaching the new curriculum They noted that a workshop had been given once to all Standard 1 teachers, but all other new Standard 1 teachers were required to learn the new curriculum on their own, without training or assistance This uncertainty was clearly connected with pupil behavior in English class, where, as described above, GS pupils demonstrated that they did not understand the English lessons

Three-day visits to schools precluded collecting sufficient data to make a conclusive statement about the VBS reduced curriculum, however, researchers' observations suggested that the reduced curriculum contributes to pupil achievement Pupils in VBS Standards 2 and 3 have up to 75 more minutes per week of learning time in the four main subjects Since a given subject is often taught twice daily, teachers were able to revise and follow through on difficult material the same day For example, a Standard 3 VBS teacher introduced pupils to the days of the week in English Pupils hesitated in pronouncing the words during that session, so the teacher wrote the words on the board and called on individual pupils to "fill in the blanks" and read the words, teaching the same lesson in a different way during the second session of the day Another teacher reinforced the Chichewa lesson by focusing on recognizing and reading Chichewa words in the first session, then reviewing and writing the same words later in the morning

a Textbooks

One of the early criticisms leveled at VBS stated that government schools could enjoy the success of VBS if government schools had similar class sizes and access to the same materials With regard to textbooks, this study found that more pupils in Standard 2 and 3 government school classes (GAS and GS) had the required textbook than did VBS pupils (A large shipment of new textbooks had been distributed to schools throughout the country several months earlier) Frequently the government pupil/textbook ratio was 1 1, while the VBS ratio was 2 1, although the ratio was not consistent for any school type and data were scant for two GS In GAS School 6, Standard 3 textbooks were scarce in all subjects, especially mathematics, where 14 pupils shared one textbook In Standards 2 and 3 of one VBS, three pupils were required to share one mathematics textbook Due to the limitations of this study the distribution of textbooks according to sex is not known

The extent to which primary school textbooks promoted gender equity and a reduction in gender stereotypes was not a focus of this study, but it is the focus of another component of the GABLE Policy, Planning, and Curriculum Project (PPC) The Gender and Curriculum (GAC) unit at the Malawi Institute of Education has participated in curriculum development, thereby promoting gender sensitivity in specific subject matter Moreover, concurrent with data collection for this study, the GAC unit designed a more comprehensive instrument to evaluate gender sensitivity in curriculum materials and teaching The results of the GAC unit's evaluation using this instrument will provide important information about gender equity in the school curriculum

Future research on textbooks should explore differences in textbook distribution and usage according to sex, age and the like, since the ways in which textbooks are used are critical to their role in pupil learning (Harris, Okyere, Mensah, & Kugbey, 1997) While some pupils across school types appeared very interested in the content of a given textbook, others unknowingly held their books upside down Some teachers encouraged pupils to take textbooks home, others forbade this

b Teaching Aids

Supplementary learning materials or teaching aids can enhance and direct pupil learning Teachers across school types--although not all teachers--used teaching aids, many of which were constructed of local materials Flash cards and sentence strips made out of "banana bark" were most commonly seen in language classes and bamboo counters were used for mathematics

While across schools teachers used some teaching aids in the lesson, VBS teachers had more teaching aids available in the classroom and consistently used them in ways that reinforced the lesson Charts were displayed on the walls of all VBS classrooms except one, a room in an unfinished classroom block In one VBS the teacher took a chart off the wall to use it in a lesson and then replaced the chart on the wall Only one commercially prepared visual aid was used, a GS teacher showed pupils a large picture as part of her English instruction but set it aside when it would not stick to the chalkboard

Flash cards, sentence strips, and counters from local materials (banana bark, cardboard, bamboo) were used routinely and correctly in VBS One VBS Standard 2 teacher used sentence strips made from dried banana bark for English class In mathematics class, a Standard 3 teacher instructed pupils to count out ones and groups of tens on a bamboo counter Teaching aids were not used solely by the VBS teacher One VBS Standard 2 teacher used flash cards for English and Chichewa, calling on individual pupils to come forward, read what was on the flash card, then select a card from the pile and ask the class to read it

Nature tables made of sticks and covered with stones, sticks, leaves, vegetables, and other items were observed in each finished VBS classroom Nature table items were used in mathematics and language classes VBS classrooms also had "shopping areas" with empty cartons and wrappers, areas where pupils were encouraged to practice buying and selling

c Homework

There was a marked absence of homework assigned in Standards 2 and 3 across school types Researchers did not hear classroom teachers assign or check homework, nor did they see pupils bring written homework to school Yet parents who were interviewed spoke of helping daughters with homework or of siblings assisting each other with homework Therefore, to say homework was not assigned may not be true, but there was no material evidence of it Appropriately assigned homework gives pupils an opportunity to practice new lessons, synthesize new material, and use their creativity to expand on what they have learned While lack of writing materials, time constraints for teachers of large classes, and other factors may rule out assigning certain kinds of homework, the role of homework should be explored in future studies

C LANGUAGE USE AND LANGUAGE LEARNING

Given the inextricable linkages between language and learning, the study explored language use and instruction in the 12 communities where the schools are located Predominantly Yao and Chichewa are the languages spoken in these communities Tonga and Tumbuka, languages of the northern region are also spoken in villages near GS School 12, with Chichewa reported to be the common language of communication there Two communities--School 3 (VBS) and School 5 (GAS)--also included Chichewa-speaking Ngoni people To begin to capture the linguistic complexity of the 12 schools of the study, Yao language interpreters listened to pupil-teacher and pupil-pupil interactions in classes, listened to pupils converse and play during their break period, occasionally spoke with pupils, and systematically interviewed teachers

1 Pupils

The majority of pupils in almost all classes observed speak Yao at home Yao is the predominant language of the region which extends from Mangochi District to Machinga Zomba and parts of Chiradzulu The languages taught in schools and the languages through which pupils are expected to learn are Chichewa and English despite the official language policy

of 1996 acknowledging the extensive research that pupils learn new concepts best in their home language A number of Muslim pupils also studied Arabic in after-school madras classes

Pupils in two VBS in the Ngoni area were never heard to speak Yao in the classroom, and "not much" Yao was heard in the other two VBS, according to Yao language interpreters Pupils in GAS and GS spoke Yao more frequently in the classroom, primarily among themselves Pupils used Yao in the following ways (1) to assist another pupil with a task related to the lesson (e g , to borrow a pencil, to tell another pupil how to write correctly in the exercise book), and (2) to chat about personal things (e g , to talk about what one did the previous evening or before coming to school)

The fact that the majority of pupils are learning and studying in a second (Chichewa) and third (English) language has strong implications for comparing the achievement of those who speak Chichewa as a first language with those who must learn Chichewa as a second language *and* simultaneously study other subjects in Chichewa As noted in the discussion of pretest scores above, Standard 1 and 2 pupils in VBS School 1 indicated to Strickland and Williams (1997) that some ideas in Yao were not very clear to them when taught in Chichewa Dowd hypothesized above that linguistic barriers might be a contributing factor to lower average pretest scores in VBS School 1 Preliminary inquiries in the qualitative study suggest that the linguistic challenge of learning subject matter in Chichewa while simultaneously learning how to speak Chichewa is a barrier for the majority of pupils across schools and school types (since the home language of the majority of pupils is Yao) and not just for School 1 pupils A study of attitudes toward and use of Yao and Chichewa at home and in the community for girls and boys, and a gender-sensitive examination of second language instruction and learning in school would provide more of the information required to answer this question

2 Teachers

Approximately half of all teachers observed across school types spoke Yao Just over 50% of Standard 2 and 3 teachers in the eight GS and GAS schools observed were from the region and also spoke Yao (One spoke Tumbuka) All the Yao-speaking teachers switched between Yao and Chichewa (and English) in the classroom They commonly used Yao for translation and clarification of Chichewa words

> In Chichewa class a pupil gave the Yao meaning for the Chichewa word "litala" (path), which sounds like the Yao word for a small device used to kill termites The teacher said 'Yes, that s correct in Yao, now can you give me the meaning of the Chichewa word?'
>
> A GS teacher told the class in Chichewa, "Stop writing " The class stood up Pupils had confused the two meanings of the word (stopping and standing) and stood up instead of laying their pencils down The teacher explained in Yao that pupils should simply stop writing and reminded pupils of the two meanings of the word

Teachers also occasionally used Yao to reprimand a pupil, "Do not bother others!" or to urge pupils on, "Raise up your voice!"

One GS teacher who had not prepared a lesson plan used Yao almost exclusively in teaching his Standard 2 Chichewa class

> Mr Bongwe approached the chalkboard and said in Yao, "My notebook is the chalkboard" Pupils replied in Yao, "Ours is a notebook" Mr Bongwe wrote two Chichewa syllables on the board and asked a girl in Yao, "Have you seen what and how I have written?" She replied in a quiet voice Mr Bongwe commanded her in Yao, "Raise up your voice" She spoke more loudly He continued in Yao to the class, "The words just fit in exactly--can you see them?" and wrote more Chichewa words on the chalkboard Again, in Yao, he told pupils, "Write on a blank page" Finally, in Yao he warned pupils not paying attention, "Do not bother others" Instead of writing, a group of boys continued to chat with each other in Yao

At another GS, the head teacher forbade the use of Yao on the school grounds and said that he punished pupils who did not comply

Five out of eight VBS teachers were Yao speakers but never used Yao in class They used English in English class and spoke Chichewa in mathematics, general studies, and Chichewa class Interpreters did not hear VBS teachers speak Yao inside or outside the classroom One VBS head teacher in a multilingual community insisted that pupils and teachers use Chichewa as the common language and not speak Yao, since Yao was just one language among several spoken in the area One non-Yao-speaking VBS teacher made a disparaging remark over a child's mispronunciation of a Chichewa syllable When the pupil said, "nda/nda" and missed "ntha," the teacher said, "You never get it right!"

Given the complexity of language learning and the lack of data, no particular conclusions can be drawn from this very preliminary information However, it does point to the kinds of questions that could be included in a more detailed study, examining, for example, teacher attitudes toward Yao and teacher expectations of Yao-speaking pupils

3 Language Teaching

As mentioned above, not all teachers felt adequately prepared to use the new, communication-oriented approach to English language teaching, six GAS and GS teachers complained about lack of training to researchers Not all teachers felt comfortable speaking English either Researchers heard grammatical and pronunciation errors across school types in English classes An SC staff member noted that spoken English continued to challenge VBS teachers, however, their lesson plans indicated that they prepared thoroughly for class, and they used communicative methods with ease In one VBS a Standard 3 teacher with over 70 pupils in his class called on each of his pupils to read sentences or individual words from an English paragraph and pupils were able to do this successfully

All teachers taught Chichewa with confidence Many focused on matters of pronunciation When they did, teachers asked pupils to practice those sounds not in the Yao language and therefore most easily mispronounced in Chichewa For example, (Chichewa/Yao) nkwha/ngwa, nsonga/nzonga, nkha/nga Most teachers corrected pupils each time a word was mispronounced

> A Standard 2 GAS teacher asked an older teenage boy to repeat "ntha/nda" over and over The boy never pronounced it correctly and the teacher called on another pupil The boy sat down and said to his friends, "I've failed "

Research indicates that by the time a child approaches puberty, pronunciation and accent have been well established. Beginning with Standard 1 classes, older pupils who cannot pronounce a word like a native Chichewa speaker should not be made to feel as though they have "failed "

In all language teaching, a pedagogically sound balance should be struck between focusing on meaning and understanding and on pronunciation Since the meaning of words and sentences can be understood in the context of speech despite consistent pronunciation errors (i e , "s/he speaks Chichewa with a Yao accent"), meaning and understanding are more critical in language instruction and learning and should not be sacrificed at the expense of seeking perfect pronunciation

D INSTITUTIONAL SUPPORT FOR CLASSROOM TEACHING AND LEARNING

The quality of classroom teaching and learning is directly influenced by the kinds and quality of institutional support provided to the classroom teacher and the pupils The study's original question in this area targeted instructional supervision of teachers--support from districts, head teachers, and SC--and strategies for reducing pupil absences that SC had helped to develop in communities However, as data collection progressed, other kinds of support also became apparent The questions were expanded to query, "What other kinds of institutional support helps to foster a good environment for teaching and learning?" The list is illustrative rather than comprehensive

1 Supervision

Teachers across school types reported that they had received supervisory visits by PEAs or SC staff members and that these visits helped them to think about and improve their teaching GAS and GS teachers reported approximately one to three visits year, the PEA visited one GS nine times VBS teachers received one or two supervisory visits per month or, for new teachers and those experiencing difficulties, weekly visits

PEA reports indicated that during teacher evaluations PEAs paid attention to lesson plans, effective use of teaching aids, and gendered seating patterns in the classroom, among other things Their reports are kept on file with official records in the district office VBS teachers received frequent supervision as often as twice per month or four times per month with new VBS teachers VBS staff attend to categories similar to the PEA s but the longer VBS supervision form also inquires into teacher planning the teacher s relationship with the

community, and participation in community activities These forms are not kept as official records

In the VBS supervision process, the education trainer observes a class for one or more periods and meets with the individual teacher as soon after the lesson as possible The post-observation discussion begins by the education trainer asking the teacher to identify strengths and weaknesses in the lesson, thus modeling and promoting the process of teacher reflection on her/his teaching The content and frequency of instructional supervision for Mangochi teachers was a high priority from the beginning of VBS since teachers had been recruited from the community, and most had neither the credential required to teach primary school nor been trained to teach The frequent supervision gave these new teachers regular feedback about practical ways to work with children and improve their teaching Knowing that they would be supervised regularly probably also prompted teachers to prepare carefully and thoroughly for teaching

In one VBS a "peer teaching" schedule was posted in the head teacher's office During 1997, the teachers at this VBS observed each other on a regular basis One teacher taught a lesson while other teachers observed, then all teachers critiqued the lesson One teacher remarked that the process had been very beneficial for her, but she was uncertain whether the program would continue under the leadership of the new headmaster

The VBS school-based supervision strategies fit well with the program and plans of the Malawi School Service System Project (MSSSP) The possibility of incorporating the VBS interactive approach into the MSSSP with its focus on school-based teacher learning and in-service could be fruitfully explored

Across school types the supervision of classroom instruction was primarily conducted by an outside authority, that is, the PEA and/or the SC staff member Head teachers spoke of their intention to observe and evaluate teachers, but many also taught their own classes--large classes, frequently--and found it difficult to schedule teacher evaluations There was precedent for head teachers evaluating teachers, a GS teacher spoke of helpful feedback given him by the previous year's head teacher who had even invited teachers to observe him teach The qualitative study design intended to observe this headmaster and his methods of teacher supervision at close range over a three-day period, but his transfer made this impossible

The findings from both the quantitative and qualitative studies demonstrate that VBS teachers have been successful, presumably due largely to the supervision process Standard 2 pupils at VBS achieved significantly higher learning gain scores than their government school counterparts, and VBS teachers planned effective lessons and used a variety of teaching strategies to facilitate pupil learning The viability of continuing to select and train community teachers depends on many socio-political factors, however, and the current cl mate has not favored continuing this method of recruitment and training Nevertheless, these combined studies indicate that the method itself is efficacious and, with regard to pupil learning and achievement is viable

2 Leadership by Head Teachers

Well-organized schools had head teachers respected by the community At these schools the head teachers saw to it that pupils lined up promptly for before-school exercises and that the school grounds had been swept by pupils Teachers' filed in and out of the head's office to show him or her their lesson plans at the beginning of the day Head teachers' actions made schools safe learning environments For example, one GAS head teacher removed (that is, transferred) a teacher with a drinking problem, as well as a second teacher who was absent too frequently Community members of this school noted, "Teachers at this school can't misbehave " Another head teacher orchestrated a transfer for a teacher who had impregnated a schoolgirl Cooperative head teachers had access to or found other resources for the school (e g , materials from SC or from the Roman Catholic church)

3 Community Support and Mobilization

Community members across school types were aware of conditions for pupil learning, the content of what pupils were learning, and the importance of pupils being in school VBS parents talked about what and how pupils were learning VBS parents spoke about what was going on in the classroom and knew that their children were achieving Parents at one VBS school told researchers that pupils read in groups, could read at home, and that with lower teacher/pupil ratios teachers had more opportunity to concentrate on pupils Parents at another VBS noted that pupils were learning more at the VBS than GS—indicated by comparing the ability of transfer children to VBS children One father noted a difference in achievement between his own children, one at the VBS who had learned to read, another at the GS who could not

At the GAS lacking four out of nine teachers, parents noted that children were instructed in only one subject per day They observed that teachers appeared more interested in farming than in teaching and added that since the school had been established in 1969 only one pupil had been selected for secondary school (in 1996) At a GS the school committee complained that the headmaster was not dedicated to his job and had a side business vending bicycle parts The head also taught Standard 1--and failed 127 out of 140 pupils in 1997 The school committee engineered the head's removal and he was transferred to another school--a VBS where he is now headmaster and, once again, a teacher of Standard 1 pupils

The analysis of attendance patterns in the quantitative study revealed that Standard 2 VBS students were present at school in 1997 in larger percentages than GAS and GS Standard 2 students--90% compared with 70% (see Figure 2 above) [19] The amount of time pupils spend with the teacher and the curriculum is important for pupil learning and success In VBS communities, SC staff had met and worked with head teachers, teachers, parents, and village leaders to ensure that pupils--and girls in particular--would attend school VBS mothers reported

[19] This qualitative study, conducted at the beginning of the 1998 school year, also attempted to examine attendance patterns for the first three weeks of school, but attendance data were not readily available Not all pupils had begun attending school the first week of classes and not all teachers or head teachers had kept careful records during the first several weeks of the school year

that teachers visited (or were expected to visit) their children at home if their daughter or son were absent from school In one school the head teacher also kept track of girls' and boys' absences as did the village head man At another VBS parents had learned that they could expect teachers to call on their children at home if the children were absent from school--and were disappointed because their child's teacher had not followed through This expectation of school-home communication for the sake of a child's welfare created a safety net to ensure good attendance, especially important for the girls, whose literacy rate continues to lag behind boys

While Standard 2 parents reported that absences were most often due to illness, hunger, and lack clothing were also mentioned Girls were also absent to help with chores at home, or to care for siblings, ailing parents or grandparents At GS 12, boys worked in fishing, girls were sent to the market or to pick tea leaves at tea estates--where their labor was desired because it was cheap and the girls were submissive While options are few for those living in poverty and with hunger, district and national officials can play an active role in discouraging child labor, thus opening up jobs for adults and helping children to stay in school

VBS parents were aware of the opportunity to be involved in the school curriculum. In one VBS the school committee head had been invited to talk to the general studies class about his duties and role as school committee head. The school committee chair at another VBS said he was aware of the arrangement that parents could go and teach lessons (such as folk tales) at school, but he did not know when this would start

School-community relations were uneven, but several Mangochi communities demonstrated that they were able to work together to support their schools School committee members and parents of one GAS had made enough bricks to build another school block and were awaiting donor funds to proceed with construction All VBS communities had built the classroom blocks where their pupils studied The ability of a VBS community to mobilize quickly for the sake of its children s education was vividly illustrated during the first three days of data collection

> On the first day the headmaster pointed out to researchers the need for a decent latrine in the school The second day the school committee and village heads gathered with head teacher and school committee to discuss the problem Two village heads queried why they should help solve the problem since a third head--the one after whom the school was named--annoyingly and persistently insisted that the school be considered *his* school The school committee chair reminded the men that the school children s need for a latrine was at issue, the headmaster told the men that the government could close the school if it did not have a proper toilet At the end of the meeting the villagers agreed to work together On the third day a tractor and several women arrived at the school site to begin digging the new latrine

Rivalries and between village heads are not uncommon Setting aside disagreements for the sake of children s learning is a powerful testimony to a community s ability to mobilize for education These same kinds of behaviors can be encouraged and taught in communities across school types throughout the district for the enhancement of teaching and learning in Mangochi schools

E. GIRL-FRIENDLY SCHOOLS

A "girl-friendly" learning environment supports and encourages girls' participation in school It includes teacher-pupil interactions, attitudes toward girls, girls' aspirations, all that is related to curriculum, gender-sensitive administrators and parents, and more There were signs in each school type that girls' needs require and, in select cases, were receiving heightened attention. Indicators from the VBS pointed to a learning environment that was more encouraging of girls

Several GS and GAS mothers reported that the GABLE (Girls Attaining Basic Literacy in Education) program had raised the awareness of the community about educating girls and that more girls were enrolled in school as a result of GABLE efforts Yet the GABLE SMC Theatre for Development troupe that worked with Mangochi communities to encourage girls' education found this district the most difficult one in which to spark changes for increased enrollment of girls GS fathers at School 7 agreed that girls' education was important and blamed the mothers for girls' early marriage and dropout. Fathers and mothers in other communities blamed the girls themselves, not acknowledging the barriers girls face and the many factors discouraging girls from finishing school

Efforts on many fronts enable VBS girls to expect to succeed in school. The VBS attendance "network" described above, where teachers, head teachers, and village leaders check into pupil absences may be especially important for this In addition, VBS parents, teachers, and girls can expect that girls will advance from one standard to the next in a timely fashion, since VBS have a high pass rate for pupils from one standard to the next. In the quantitative study, relatively fewer pupils in VBS than in government schools, especially in Standard 1, repeated standards A high rate of advancement creates expectations of success for girls, their families, and others in the community Advancement figures varied for government schools According to the 1998 GAS enrollment data only 50% of the pupils enrolled in Standard 1 could expect to pass to Standard 2 The quantitative study (1997 data) concluded that as a group Standard 2 GS girls repeated notably more often than their GAS and VBS counterparts

VBS have women head teachers, teachers, and school committee members to serve as role models With the transition of VBS from SC to the district, new head teachers were assigned to the VBS One of the four VBS was headed by a woman, the deputy head at another VBS is a woman She was replaced by a male teacher but she remains deputy head of the school About half of VBS teachers are women, there are fewer in government schools Two GS have one woman teacher each, one has three out of 15, and in the fourth 8 out of 22 teachers are women VBS school committees also have women members Although researchers kept no official count across school types, they met more women school committee members in VBS interviews than at GS and GAS, not surprising since SC has strongly encouraged women to serve on school committees

VBS teachers spoke positively to and about girls One new VBS head teacher reported that boys had been more active that is alert and involved in lessons at his previous school However a VBS teacher and his own observations had convinced him that girls were more active at the VBS VBS teachers called on girls as frequently or more often than they called on boys this

varied in GAS and GS Neither girls nor boys were subjected to abusive language in a VBS, whereas a male GS teacher used offensive and abusive language in front of all pupils three days in a row

Gender-mixed seating patterns characterized the VBS classroom, girls and boys sat in every row and in every area of the room Gender segregated patterns were observed more frequently in GAS and GS, with girls in front of the classroom and boys in back or girls on one side and boys on the other

Standard 3 girls across school types had high aspirations for the level of schooling they would attain and the kind of work they would do, although this varied by school type VBS girls in equal numbers wanted to complete Standard 8 and secondary school, half of VBS boys wanted to finish secondary or university More GAS girls than GS or VBS girls hoped to complete secondary school One or two girls from each school type aspired to attend university, a total of four girls out of 60 Three-fourths of the boys across school types wanted to finish secondary and twice as many boys as girls hoped to finish university The largest majority of Standard 3 girls and boys wanted to work as professionals--teachers, nurses, clerks, airplane pilots--and nearly one-third of all boys wanted to work in a trade, primarily as a driver

VBS promote a safe environment that encourages girls to dare to do new things Girls in VBS did not have to worry about being sexually "proposed" or harassed by male teachers (or, as far as we were informed, male pupils) Some might conclude that this is not a problem because VBS currently span only Standards 1-4, however, there are overage, post-pubescent girls in some VBS classes The fact that 50% of VBS teachers are women and that all teachers are from and live in the community is arguably a key factor in maintaining this safe environment

By contrast, parents at GS and GAS are very aware of male teachers harrassing and "proposing" girls in their schools Parents at one GS spoke of a male teacher's designs on girl pupils, going to sporting events and returning late (' a calculated gimmick to fool around with targeted girls," noted one former teacher) A girl at the school was impregnated by the teacher The community said they pressed for the removal of the teacher but the father flatly refused to bring a case against the teacher--quite likely because he had been paid off by the teacher, a common practice The headmaster, while aware of the teacher's conduct, failed to take action because he did not want the teacher dismissed Parents at another GS told of a male teacher who had become involved with another teacher's daughter, a problem resolved by the headmaster A GAS mother stated that a male teacher in another village had impregnated her daughter so, to continue with the daughter s schooling, mother and daughter moved to this GAS

Other evidence from the study points to the indispensability of increased attention to girls' education and to gender issues in school Teachers must come to recognize and correct for gender bias in their own teaching For example, two male GS teachers reinforced gender stereotypes with their comments, "girls are better at skipping [rope] than boys" and "nurses are women ' Three out of eight GS teachers called on boys twice as often as girls in mathematics class A Standard 2 GAS teacher insisted that she treated girls and boys the same but spent 220% more time with boys than with girls in a mathematics lesson, a reminder that assigning

women teachers to a school does not guarantee that these teachers will be good role models, have high expectations for girls, or maintain classrooms characterized by gender equity (Prouty & Miske, 1997)

In many ways VBS offered girls a hospitable, more gender equitable environment for learning Individual teachers and schools across school types also displayed some characteristics of a girl-friendly learning environment It is urgent that the lessons learned here be extended to schools throughout the district to close the current gender gap that exists in primary education

F SUMMARY OF QUALITATIVE FINDINGS

These are the five main findings of the classroom observation study

- *Observing teachers and pupils in classrooms revealed important information about pupil success and effective teaching in different types of schools* Qualitative data answers important questions, such as, why? how? in what ways? It also offers critical insights into major questions of improving education

- *Village based schools are organized for and around pupil and teacher learning* Teachers were present in classrooms, engaged pupils in learning, and received institutional support and instructional supervision from SC staff and, in some cases, peers Community members interviewed were aware of what was going on in classrooms, of what they could expect of teachers and teaching, and of their responsibilities toward the school Pupils actively participated in lessons

- *VBS teachers use teaching strategies that facilitate pupil learning* Teachers a) followed *lesson plans*, using *teaching aids* effectively and appropriately, b) were familiar with the new *curriculum*, c) use a range of *teaching strategies* that informed them in the course of a lesson about pupil understanding and achievement, d) saw that pupils had frequent opportunities to *practice* a new lesson, and e) received frequent *supervision* and reflected on improving their own teaching practice in post-observation sessions or through peer teaching

- *Girls experience greater success in VBS, the school environment is "girl-friendly "* It is safe, teachers teach in ways that enhance girls' learning, and communities develop strategies to support girls (and all pupils') presence in school Attention must continue to be paid to developing a gender-equitable learning environment in *all* schools and classrooms since girls especially continue to face significant barriers to completing school

- *Connections between pupil learning gains, teaching and learning in the classroom, and organizational support for teaching and learning are interrelated and inseparable* While select innovations from the VBS pilot study can lead to improved education in

Mangochi schools, the relationships between the innovations and how one innovation builds on another must also be considered in the context of the "whole package "

In addition to the major findings, the study learned that across school types, the majority of pupils and half of Standard 2 and 3 teachers speak Yao The use of Yao varies across and within school type and needs to be studied further to understand the relationships between language learning, usage, and teaching that enhance pupil learning

IV CONCLUSIONS

Each of the above studies, the quantitative and the qualitative, provides important information about learning in Mangochi's Village Based, grant-aided and government schools Taken together, one study informs the other, moving beyond inquiry into supply and demand factors in education to the central questions of teaching, learning, and learning gains for primary school pupils in Malawi Schools with greater learning gains had better rates of attendance and lower rates of repetition In these same schools--albeit not in the same classes, since the studies were conducted in consecutive school years--teachers gave pupils more opportunities to practice new material using more teaching aids Teachers gave themselves more chances to check pupil learning Supervisors regularly evaluated teachers, contributing to improved teaching practice Teachers worked together with parents to follow up on pupil absences The schools had targeted improved schooling for girls, and "girl-friendly" schools resulted from the pilot project

Yet the quantitative data highlighted that not all pupils within a school type experienced the same success or failure The qualitative data examined what was going on within schools which the quantitative data hinted at and, in so doing, exposed the complexity of school classrooms, revealing some surprising similarities and puzzling--occasionally glaring--differences, such as male teachers' sexual harassment of girls in government schools

As the VBS pilot comes to a close, its lessons for enhancing the quality and quantity of primary education in Malawi emerge from particular innovations introduced in the pilot These included monthly or twice monthly teacher supervision by a locally resident supervisor, pupil-centered teaching, a class size cap, community mobilization, participatory methods, and hiring teachers from the locality It is likely that a combination of these innovations enhances student achievement Nevertheless, whether the innovations are considered one or two at a time, or taken together as a web of connected relationships and activities as was the perspective of this study, they have great capacity for changing the education system on a local, district, and national level VBS innovations have sparked much discussion, additional questions can contribute to the debate and to future research

- *Which teacher instructional behavio's most effectively enhance student learning?*
- *Are smaller class sizes in and of themselves a sufficient condition to raise student learning?*

- *What are the various ways in which teacher supervision contributes to enhanced learning?*
- *Does the location of the supervisor or PEA close by enhance his/her support to teachers and schools and therefore student learning?*
- *What amounts and types of community activities in support of education are associated with high learning in a school?*
- *How does a participatory approach to pre-service and in-service training for (paraprofessional) teachers support classroom behaviors that enhance student learning?*
- *How does the employment of teachers from the local community influence the local network of support for primary education?*

V RECOMMENDATIONS

Malawi has realized vast gains realized in access to primary education in Malawi since 1994 Building upon them now requires an intensive focus upon the quality of education This shifts concentration away from how many places or classrooms there are in schools to the processes of teaching and learning in classrooms Given both the quantitative finding that the VBS are more effective in promoting student learning and the qualitative evidence suggesting several ways in which teachers realize such effectiveness, we make the following recommendations

1 Strengthen supervision of teachers in the classroom The VBS pilot and other high achievement schools suggest three ways that this might be achieved in Mangochi's primary schools and beyond

- the local placement of PEAs near the school for which they are responsible,
- the extension of head teacher supervision skills and responsibilities, and
- the foundation of peer teaching groups in schools

2 Support, encourage, and give time and aid to teachers to reflect upon their teaching practice Emphasis should be given to checking student learning and providing constructive feedback

3 Inform and involve parents and communities in their children's education Communities should know what is happening in the school and be involved beyond constructing school blocks in such efforts as checking pupils' daily work, encouraging pupil attendance, supporting teacher performance, checking teacher punctuality, etc

4 Undertake additional research as well as implementation to explore questions and concerns raised in this report, especially girls' lower achievement and gain in mathematics Second language teaching and learning and textbook usage should also be explored The increased learning benefits of VBS pupils studying inside classrooms in two shifts should be examined and extended taking into account teacher concerns for pupil diet, alertness and so forth

5 Creating "girl-friendly" learning environments must continue to receive high priority and close attention, they are constructed through intentional and intensive work Resistance to girls' education is still very evident in Mangochi and GABLE efforts should be continued and expanded New opportunities for girls' leadership in classrooms and schools, and increasing the number of girl leaders, women teachers, and head teachers in schools, and school committee members should receive high priority Laws punishing male teachers and male pupils for sexual harassment of girls should be strictly enforced

6 The pivotal role of the district in facilitating a strong teaching and learning environment must receive increased attention This is especially important in the policy and practice of teacher assignments and transfers and of teacher supervision

VI BIBLIOGRAPHY

Behrman, J R & Lavy, V (1994) *Children's health and achievement in school* World Bank Living Standards Measurement Study (Working Paper No 104) Washington, DC World Bank

Bogdan, R & Knopp Biklen, S (1982) *Qualitative research for education An introduction to theory and methods* Boston Allyn and Bacon, Inc

Davison, J & Kanyuka, M (1992) Girls' participation in basic education in southern Malawi *Comparative Education Review*, 36(4), 446-466

Dowd, A J (forthcoming) *Training and support for paraprofessional teachers and school committees to enhance quality in primary education Save the Children innovations in the Village Based Schools of Mangochi, Malawi* Westport, CT Save the Children

Government of Malawi, Ministry of Education (1997) *Basic education statistics Malawi 1996* Lilongwe Government of Malawi

Harris, A M , Okyere, B A , Mensah, A , & Kugbey, H G K (1997, March) *What happens to the textbooks?* Paper presented at the meeting of the Comparative and International Education Society, Mexico City, Mexico

Hyde, K L , Kadzamira, E C , Sichinga, J N , & Chibwana, M P (1996) *Village based schools in Mangochi Evaluation report* Washington, DC United States Agency for International Development

Hyde, K L , Kadzamira, E C , Sichinga, J N , Chibwana, M P & Ridker, R G (1997) *Determinants of educational achievement and attainment in Africa Village-based schools in Mangochi Malawi, an evaluation report* Institute for Policy Reform Working Paper Series Washington DC Institute for Policy Reform

Ilon L (1991) *Girls' schooling access, persistence and success in Malawi A descriptive report* Lilongwe United States Agency for International Development

Kalton Graham (1983) *Introduction to survey sampling* Thousand Oaks Sage Publications

Kane E (1995) *Seeing for yourself Research handbook for girls' education in Africa* Washington DC World Bank

Lockheed M E Fuller B & Nyirongo R (1989) Family effects on students achievement in Thailand and Malawi *Sociology of Education* 62 (3) 239-256

Lockheed M E & Komenan A (1989) Teaching quality and student achievement in Africa the case of Nigeria and Swaziland *Teaching and Teacher Education* 5(2) 93-113

Lockheed, M E , & Longford, N T (1989) *A multilevel model of school effectiveness in a developing country* (World Bank Discussion Paper No 69) Washington, DC World Bank

Miske, S & Prouty, D (1996) *Schools are places for girls, too* (SD Publication Series Technical Paper No 41) Washington, DC United States Agency for International Development

Mullens, J E , Murnane, R J & Willett, J B (1996) Do training and subject matter knowledge contribute to teaching effectiveness? A multi-level analysis of longitudinal evidence from Belize *Comparative Education Review* 40(2), 139-157

Murnane, R J (1975) *The impact of school resources on the learning of inner city children* Cambridge, MA Ballinger

Nunnally, J C (1978) *Psychometric theory* 2nd Edition New York McGraw-Hill

O'Gara, C & Kendall, N (1996) *Beyond enrollment A handbook for improving girls' experiences in primary classrooms* Washington, DC Creative Associates International, Inc

Prouty, D & Miske S (1997) *Developing a gender-based approach to planning* In J Lynch, C Modgil and S Modgil (Eds) Education and development Tradition and Innovation Vol 2 Equity and excellence in education for development

Reimers, F M (1991) *Time and opportunity to learn in Pakistan's schools* (Development Discussion Paper No 407 ES) Cambridge, MA Harvard Institute for International Development

Ridker, R G (1997) *Determinants of educational achievement and attainment in Africa findings from nine case studies* Institute for Policy Reform Working Paper Series Washington DC Institute for Policy Reform

Rock, J L (1995) *Tipping the scales Access to an academic curriculum as a factor explaining the wage differential between black and white men in the 1980 s* Unpublished dissertation, Harvard University Graduate School of Education, Cambridge, MA

Strickland, B H , & Williams J H (1997) *Communities and school A research report on Save the Children s Village-Based Schools in Mangochi Malawi* Washington DC United States Agency for International Development

Stromquist N & Murphy P (1996) *Leveling the playing field Giving girls an equal chance for basic education -- three countries efforts* Washington DC The World Bank

Williams E (1996) 'Reading in two languages at year five in African primary schools' *Applied Linguistics* 17(2) 182-209

Williams, E (1993) "First and second language reading proficiency of year 3, 4 and 6 children in Malawi and Zambia" *Reading in a Foreign Language 10(1),* 916-927

Wolf, J M (1995) *An analysis of USAID programs to improve equity in Malawi and Ghana's education systems* (SD Publication Series Technical Paper No 10) Washington, DC United States Agency for International Development

Wolf, J M & Odonkor, M (1997) *How educating a girl change the woman she becomes An intergenerational study in northern Ghana* (ABEL Technical Paper No 8) Washington, DC United States Agency for International Development

World Bank (1995) *Third education sector credit project preparation mission aide memoire* Washington, DC Author

VII APPENDICES

APPENDIX A. ITEM ANALYSES

Table A Item Analysis of skills within tests are they consistent measures?

	Variables in scale	PRETEST Cronbach's α	POSTTEST Cronbach's α
Math			
1	Count count2 count3 count4	**2651**	7232
2	Numrec numrec2 numrec3 numrec4	**4589**	**5966**
3	add add2 add3	7296	7486
4	sub sub2 sub3 sub4	7223	7541
5	div div2	**2600**	**4346**
6	Mult mult2	7308	7580
7	pay change buy	**6487**	7226
	all math questions	8583	8682
English			
8	rec_k rec_e rec_b rec_m rec_o	7754	8474
9	Rdhouse rdbed rdfthr rdmango rdcat	8638	9428
10	Wrleaf wrbook wrfish wrbanana	7913	8699
11	Picsnt picsnt2 picsnt3 picsnt4 picsnt5	8057	9089
12	Rdpsg rdpsg2	**6655**	7833
	all English questions	9216	9625
Chichewa			
13	Rdvwls rdvwls2 rdvwlsb rdvwlsf	8499	7345
14	Rdsefa rdamayi rddengu	8386	9331
15	Sentc sentc2 sentc3 sentc4	9475	9814
16	Wrsosa wrgaga wrkalulu wrmango	8703	9035
17	Comps comps2 comps3 comps4 comps5	8775	9344
18	Answq answq2	**6361**	**6954**
	all Chichewa questions	9586	9753

Tested removal of those in bold for influence on pretest averages across school types and therefore upon the conclusion of logistic analysis No change

APPENDIX B ANALYSIS OF ATTRITION BIAS

Research Question

There are two questions that form this analysis First, were students in one school type more likely to miss the posttest than students in the other school types? If they were not and the probability of being absent for each type of school is equal, then a gain score analysis is not endangered by attrition bias If the probability of absence is different by school type, then exploration of individual characteristics to assess their power in predicting posttest absence is relevant. Observed factors as sex, age and initial achievement can explain variation in absence directly and as a group aid in the attribution of variation between individual sources and school sources Thus, the second relevant research question is controlling for observed individual characteristics, were students in one school type more likely to miss the posttest than students in the other school types?

Analytic Method

Maximum likelihood logit analysis predicts the probability of posttest absence and the following model will answer my first research question

$$\text{Prob(absent)} = 1/[1+e^{-(\beta_1 \text{VBS}+\beta_2 \text{G_AIDED}+\beta_3 \text{GOVT})}]$$

Where prob(absent) is the probability of absence, β1 is the estimated parameter for VBS, β2 is the estimated parameter for GAS and β3 is the estimated parameter for GS This logistic equation estimates all three school type parameters when the intercept is constrained to be zero With this no-intercept model, I test the null hypothesis that the school-type coefficients are equal to each other (H_o $\beta_1=\beta_2=\beta_3$) and that therefore students at each type of school have an equal predicted probability of absence at posttest

Then, I condition on individual characteristics -- sex, age and English and Chichewa pretest scores -- to ascertain whether predicted probabilities by type remain the same as the uncontrolled estimates in a model that addresses my second research question

$$\text{Prob(absent)} = 1/[1+e^{-(\beta_1 \text{VBS}+\beta_2 \text{G_AIDED}+\beta_3 \text{GOVT}+\beta_4 \text{FEMALE}+\beta_5 \text{AGE}+\beta_6 \text{ENG1}+\beta_7 \text{CHIC1})}]$$

Prob(absent) is the probability of posttest absence as above and I again test the null hypothesis that the school-type coefficients are equal while controlling for these observed individual characteristics

Logistic Regression Results

Model 1 in Table 4 predicts the probability of absence at the time of the posttest on the basis of school type alone The results show that a VBS student has an estimated probability of 14 of being absent while her GAS and GS counterparts have estimated probabilities of 31 and 34

respectively[20] The coefficients that underlie the estimated parameters in Model 1 are significantly different from each other in the population (p < 01) This leads me to conclude that a gain score analysis comparing these school types is likely biased due to attrition unless observed student characteristics better explain this pattern of absence

Table 4 Logistic Regression Coefficients, Standard Errors, p-Values, and Null Hypotheses Tested for Predicting Absence on Day of Posttest (p<0 05 = ~, p<0 01 = *)

VARIABLE/ MODEL	1	2	3	4
VBS	-1 807*	-1 650~	-1 314	-1 190
	(338)	(900)	(90)	(887)
G_AIDED	- 788*	- 805	- 481	- 422
	(241)	(926)	(941)	(933)
GOVT	- 674*	- 762	- 512	- 438
	(236)	(- 853)	(865)	(854)
FEMALE		- 113	- 103	- 122
		(313)	(310)	(314)
AGE		045	085	084
		(086)	(089)	(089)
ENG1		- 027		- 027
		(062)		(045)
CHIC1		- 044	- 025	
		(043)	(032)	
MATH1			- 070	- 074~
			(038)	(038)
H_0 $\beta_1=\beta_2=\beta_3$	reject p< 01	fail to reject	fail to reject	fail to reject

Adding the individual characteristics of sex, age and language pretest scores in Model 2, I find that neither these individual characteristics nor school type have highly significant predictive power While VBS still significantly predicts absence, it is the difference of this coefficient from the other school type coefficients that is of paramount interest, not its difference from zero I test this proposition in Model 2 (H_0 $\beta_1=\beta_2=\beta$), and fail to reject the null hypothesis that these estimated coefficients are equal to each other in the population of Mangochi primary schools In addition, interactions between FEMALE and AGE, FEMALE and both VBS and G_AIDED, and FEMALE and ENG1 and CHIC1 had no influence on altering the equality of the school type coefficients in Model 2

Models 3 and 4 in Table 4 above use the same strategy of conditioning on pretest scores to show that the school type coefficients predicting posttest absence are not unequal in the population of Mangochi schools Model 3 conditions on mathematics and Chichewa initial achievement to show that an English gain score analysis is not endangered by attrition bias, while Model 4 conditions on mathematics and English to conclude that a gain score analysis of Chichewa is also

[0] These probabilities are calculated using the first equation above For example, the probability of posttest absence for a VBS student is Prob(absent) = $1/[1+e^{-(1\ 807)}]$

not subject to this bias From these three models, I conclude that gain score analysis in all three subjects using this data is not jeopardized by attrition

Controlling for individual characteristics in this model, I conclude that there is a *common slope* for predicting probability of posttest absence at all schools While the predicted probabilities of absence by school type are different in the current sample, they are not so in the population Given these results, if Alifa, a 10 year old girl in Standard 2 with average Chichewa pretest score has an English pretest score higher than her classmate Patuma's, then Alifa has a lower probability of posttest absence The direction of this relationship holds no matter what type of Mangochi primary school they attend And, given the non-significance of the differences between the school type coefficients, these results show that the magnitude of the difference in predicted probability for Patuma and Alifa is arguably the same no matter which type they attend or if the attend different types of Mangochi primary schools

Discussion

The analysis of absence by school type shows no differences among school types in the probability of missing the posttest after conditioning upon pretest language scores This supports the mathematics gain score evaluation strategy comparing the three types of schools *so long as these analyses condition on initial language achievement* In other words, the gain score analysis strategy would not be endangered by absences so long as language pretest scores are used as covariates in the estimation of mean mathematics gain score Similarly, an English gain score analysis would be rendered more accurate by conditioning upon mathematics and Chichewa pretest scores in the estimation of mean gains Finally, the most accurate picture of mean gains in Chichewa available from these data would require controlling for mathematics and English pretest scores