What Do We Know About Instructional Time Use in Mali?

Assessing the Suitability of the *Classroom Observation Snapshot* Instrument for Use in Developing Countries

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Acronyms and Abbreviations

ALT	Academic Learning Time
BNPP	(World) Bank-Netherlands Partnership Program
COS	Classroom Observation Snapshot
EFA	Education for All
EGRA	Early Grade Reading Assessment
FTI	Fast-Track Initiative
HDNED	Human Development Network Education Department, World Bank
SOS	Stallings Classroom Observation System
TF	Trust Fund, World Bank
TNL	Time Needed for Learning
TOT	Time on Task
TSL	Time (actually) Spent on Learning

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Executive Summary

Information about how teachers and students use their time in the classroom is vital to the development of educational policies to improve the quality of education. Although the time a teacher allocates and uses for instructional activities is important, the amount of time that students actually spend on curriculum-related activities is critical for improving learning outcomes. To investigate these relationships, the tasks performed by teachers and students in the classroom must be measured.

Background

This paper summarizes what has been learned about instructional time and its measurement during the Bank-Netherlands Partnership Program (BNPP) grant.[1] It also provides an analysis of the capabilities and limitations of the Classroom Observation Snapshot instrument, which was used to conduct time-use surveys in Mali and Benin in the second phase of the BNPP grant. Finally, the study offers pragmatic suggestions for planning and implementing instructional time measurements for task team leaders and researchers who intend to implement a time-use study. The underlying question of the paper is: How can the amount of time spent on learning in the classroom be measured in ways that are simple, easy to administer, valid, reliable, comparable across countries, and that can be monitored across time?

The surveys conducted during the first phase of the BNPP-funded Economics of Education project in 2004 and 2005 revealed gaps between the time allocated for instruction and the time spent on instructional tasks. These instructional time surveys (conducted in Ghana, Morocco, the state of Pernambuco in Brazil, and Tunisia) revealed significant losses in instructional time, ranging from 27.9 percent in Pernambuco to 13.3 percent in Tunisia. Similar findings were reported in studies executed in Cameroon, Eritrea, and India (see chapter 3 of this report).

The second phase of the BNPP program recalibrated research activities to focus on the measurement of instructional time in the classroom. Instructional time surveys in Mali and Benin were then implemented in October–December 2007, together with an early-grade reading assessment.

[1] The first phase of the BNPP "Economics of Education" project collected classroom time-use data in Ghana, Morocco, Tunisia, and the Brazilian state of Pernambuco from 2004 to 2005. For a presentation of these data, see Abadzi (2007). The project is known by the identifier TF052584 at the World Bank.

Mali Survey Results

The Mali survey revealed teachers to be on task 70.9 percent of the time that they were in the classroom, of which 45 percent was devoted to reading aloud, lecturing, and conducting discussions (i.e., questions and answers). When teachers were off task, they were most likely performing classroom management not directly related to instruction or they were absent from the classroom (together, these two activities accounted for 67.4 percent of their off-task time).

Teachers used their time efficiently on instructional activities, but nearly 25 percent of classroom time was still used for classroom management. In Mali, teachers must use classroom time to prepare for the next lesson because instruction periods span two- to three-hour continuous time blocks. Although block timing may reduce the time needed for transition, it may also increase the time required for classroom management.

Students in Mali spent an average of 65.7 percent of their time on task. This figure is lower than that for teachers because students can be off task during teacher instruction. In fact, the allocation of student on-task time across various instructional activities closely followed that of teacher on-task time. However, **for the vast majority of their off-task time (67 percent), students were unengaged.**

The overwhelming majority of student time (87 percent) fell into only one-quarter of the 56 material-activity combinations possible in the Classroom Observation Snapshot (8 activities multiplied by 7 materials). In other words, three-quarters of the possible descriptions of classroom instruction specified by the instrument were utilized either rarely or not at all.

This finding suggests that the COS is being underutilized and, consequently, may not be very applicable to classrooms in Mali. It also suggests that the instrument should be further modified, either by disaggregating the material-activity categories or replacing the current categories with ones more relevant to the Mali context, in order to increase the number of material-activity descriptions utilized during classroom observation.

Limitations of the COS

Although COS surveys document time use in the classroom, they do not reveal how much time is actually dedicated to learning curriculum-related content. The surveys are, moreover, based on a number of assumptions about the existence of quality inputs for effective time use. For example, teachers are assumed to be aware of curriculum content and the objectives of a given learning unit, and classrooms are assumed to have an adequate number of textbooks for each student and other appropriate learning materials. Finally, actual learning time related to curriculum content or assignments given by a teacher (i.e., academic learning time) may be only a fraction of the time students are coded as being “on task” by the instrument.

Findings from the BNPP surveys indicate that the Classroom Observation Snapshot should be simplified and its behavioral categories modified to better reflect individual country conditions. Changing the behavioral categories so as to increase the number of utilized descriptions would result in less homogenization of classroom activity and reveal more variation by classroom and country. Such modifications would enable the instrument to transmit more useful information about classroom time use.

In addition to country-specific modifications to behavioral categories and activities, **the COS also needs to better reflect contemporary educational goals, which emphasize real problem solving, investigation, projects, and other forms of applying knowledge and skills to everyday life situations.** The results of COS surveys need to be analyzed in terms of these goals so that solutions for improving classroom time use do not rely on more of the same classroom practices (Sahlberg 2007).

If the goal of a study is to measure time loss in classrooms, less complex measures than the COS time use survey should be used. Multiple classroom observation measures are needed to capture the quality aspects of education, the links between instruction and curriculum content, and the actual tasks that comprise COS behavioral categories. For example, the Snapshot does not capture what tasks are associated with classroom management, a category that absorbs close to 25 percent of teacher time.

Findings and Recommendations

The COS tool requires significant modification in order to offer a more valid measure of instructional time use in developing countries. Data reliability also could be improved by using multiple instruments to examine classroom practices (see Jukes 2006). Adaptation and pilot testing of the COS may be needed in each country where it is used, but within limits that permit comparability of results across countries. Equally important, the results of COS surveys should always be interpreted within the context of the country in which the data is collected (Matthew 2007).

The factors affecting student disengagement need to be better understood by investigating the instructional characteristics that determine the rate of student engagement. Measuring teacher time use as a separate variable, moreover, does not produce significant gains unless it is linked to variables related to the quality of instruction, curriculum content, and quality of inputs (e.g., availability of instructional materials and textbooks).

The World Bank should focus on developing both a conceptual framework for assessing educational quality and appropriate tools for classroom observation in developing countries. If instructional time use is to be linked with learning outcomes, future research should focus on measuring time use by teachers *and* students. In addition, classroom observation should be used more effectively as a feedback mechanism to advise teachers on how they could improve classroom practices.

Specifically, the Bank is encouraged to develop methodologies and instruments that can:

(i) capture data on the amount of time students are engaged in curriculum-related learning tasks assigned by a teacher (i.e., academic learning time);

(ii) determine why teachers use as much as 25 percent of their allocated instructional time for classroom management;

(iii) determine why such a high proportion of students are uninvolved in classroom activities and how this time loss is related to classroom size, family background, the instructional methodologies chosen by teachers, as well as the availability of learning materials; and

(iv) identify effective instructional strategies and integrate them into the COS and other classroom observation instruments so that their use may be measured.

Finally, government policies are needed to ensure that instructional time is used effectively. In Mali, for instance, education officials and community members rarely knew how long the school year was supposed to be. Government ministries should inform education officials, stakeholders, and communities about the time the state has allocated to learning. They should also ensure that students are provided appropriate instruction by providing teacher in-service training and other activities in which teachers are obliged to participate. Time use should accordingly be on the agenda of any education review by a government ministry or donor.

Introduction

Background

The Government of the Netherlands provided grant funds to the World Bank in 2003 to enable it to assess the magnitude of time loss in the classroom and find methods to measure this loss. Instructional time studies were conducted in 2004–2005 in four countries: Ghana, Morocco, Tunisia, and the Brazilian state of Pernambuco. During this first phase of the Bank-Netherlands Partnership Program (BNPP), data was obtained through surprise school visits, classroom observations, and surveys in a sample of schools selected by Bank country teams. These findings were reported in a report by Helen Abadzi, "Absenteeism and Beyond" (2007).

The second round of BNPP surveys focused on the underlying research question for the project as a whole: How can the amount of time spent on learning be measured in ways that are simple, easy to administer, valid, reliable, comparable across countries, and that can be monitored across time? The Classroom Observation Snapshot instrument of Jane A. Stallings selected for the studies in Phase 1 of the program was revised to better meet the learning environments and conditions of developing countries. The training of enumerators and data collectors in Mali was then observed to see how applicable the instrument was for measuring time-loss in primary-school classrooms of that country, as well as what further changes would be required in the instrument, if any.

An instructional time survey was conducted in Mali in October 2007, and in Benin in November–December of that year. The survey in Mali incorporated an evaluation of a teacher training program on reading instruction that was implemented by Plan Mali and the Institut pour l'Education Populaire (Institute for Popular Education, or IEP). The Benin survey is expected to provide additional data for a BNPP-funded impact evaluation study. Data collection in both countries also included an early-grade reading assessment, but the results of this assessment are not discussed in this paper.

The present report is organized as follows: chapter 1 discusses the conceptual framework of instructional time, followed by a brief literature review in chapter 2. Chapter 3 discusses the Classroom Observation Snapshot, using the Mali survey as an illustration. Chapter 4 discusses the applicability of the COS for measuring time loss. The Conclusions and Recommendations then summarize the findings of the study and offer recommendations for future research.

1. Instructional Time: Concepts and Definitions

The vast amount of instructional time research conducted in the United States took place during the 1970s and 1980s. The majority of these surveys focused on how teachers used time in the classroom; few focused on time use by students. Since 1990, however, certain qualitative measures of student engagement have been developed.

Time as a Variable for School Learning

John B. Carroll's model of learning as a function of time (Carroll 1963) is the common starting point for studies of time and learning. His model is based on a determination of distinct learning tasks and the amount of time it takes to master them. **According to Carroll, the degree of learning may be conceptualized as a function of the time actually spent on learning (TSL) in relation to the time needed for learning (TNL).** His model posits that three factors determine total TNL:

(i) aptitude (defined by Carroll as the amount of time needed to learn the task under optimal instructional conditions);

(ii) the ability to understand instruction; and

(iii) the quality of instruction.

Two factors influence total TSL:

(i) time allowed or opportunity to learn, that is, the amount of time the school and the teacher allot to a particular learning task or subject area; and

(ii) learner perseverance, or the amount of time a learner is willing to engage actively in learning.

Bloom (1968, 1974) recognized the relevance of Carroll's model in his theoretical work on mastery learning. **Bloom's learning-for-mastery strategy focuses on those elements of the Carroll model that are most influenced by the teacher: the opportunity to learn (i.e., time allocated to learning) and the quality of instruction.** The principles of mastery learning are based on the interaction of quantity and quality of instruction in an environment that encourages learner perseverance with tasks that are both understood by the learner and consistent with his or her learning rate (Wyne and Stuck 1982).

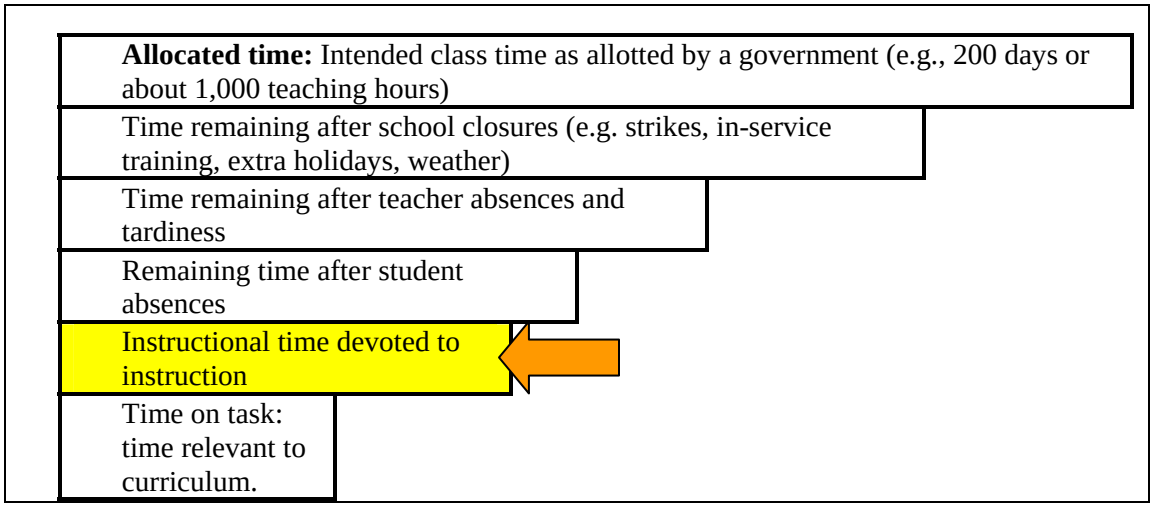
The concept of "academic learning time" (ALT) describes the amount of time students are exposed to a curriculum or learning. This concept is used in the Beginning Teacher Evaluation Study (BTES) model of classroom instruction. In this model, the amount of ALT is the strongest determinant of academic achievement. **The basic components of ALT are: (i) the time allocated for academic work; (ii) student engagement; and (iii) the student success rate (Gettinger 1984).** Because ALT is closely tied to the nature of the learning task, researchers and reviewers who investigated its effects found it to be very closely related to the achievement and attitudes of the

students involved (see Anderson 1984; Karweit 1985; Mazzarella 1984; Quartarola 1984; Fisher and Berliner 1985; and Walberg 1988).

Conceptual Framework and Key Definitions

The following figure developed by Millot and Lane (2002) and used by Abadzi (2007) presents the conceptual framework and time factors in education.

Figure 1. Time factors in education



Source: Abadzi 2007.

Allocated time is usually understood as the number of days or hours per school year that a government mandates for teaching. The World Bank estimates that 850 to 1,000 effective school hours (a total that does not necessarily match officially mandated hours) are optimal per year for publicly financed primary schools (see UNESCO 2005). The indicative framework used by the Bank's "Education for All" fast-track initiative sets the expectation of at least 850 hours of primary school instruction (about 200 days, given 5 school days per week).

Instructional time is the amount of in-class time that teachers spend on task, during which students are provided with instruction. It excludes time spent on classroom management activities, when a teacher is considered off-task.

Time on task refers to the amount of time during a class period in which a teacher is actively engaged in teaching or students are actually engaged in assigned learning tasks related to curriculum content. Most often, this term is used to mean the time students are actually engaged in learning tasks. It is also sometimes spoken of as the engaged rate.

2. Previous Studies on Time Use and Learning Outcomes

Allocated Time and Learning Outcomes

Most research that examines the link between allocated time and student achievement dates back to the 1970s and 1980s. This research, mainly conducted in the United States, indicated that increasing allocated time alone had little influence on student achievement. That being said, the evidence is very mixed, especially in developing countries, and no strong pattern emerges.

Since the 1980s, the debate over the relationship between time allocation and learning achievement has continued (see, for example Jacobson 1980; Baines 2007). Educational literature reveals a fairly consistent set of contentions concerning time and learning outcomes, as summarized by Cotton (1990):

(i) There is no relationship between allocated time and student achievement.

(ii) There is some relationship between engagement time and achievement.

(iii) There is a larger relationship between academic learning time and achievement.

As shown in table 1, Nelson has summarized some of the research findings associated with these contentions.

Table 1. Research on the influence of allocated time on student achievement

Study or article	*Conclusion*
Karweit (1983) Heyns (1986) Dempster (1987) Leinhardt and Bickel (1987)	Time devoted to school learning appears to be a moderate predictor of school achievement.
Mazzarella (1984) Quaratoria (1984) Karweit (1985) Pintrich (1986) Levin & Tsang (1987) Slavin (1987) Hossler, Stage and Gallagher (1988)	Increasing allocated time has a non-statistically significant but positive relationship to achievement. Considerable increases in the amount of schooling would be required to result in even modest increases in achievement, but the cost is not justified.
Jacobson (1980)	There is a strong positive relationship between quantity of schooling and learning achievement. Increasing allocated time increases student achievement.

Source: Nelson (1990).

There is no concrete evidence that proves student achievement in developing countries is correlated with the length of the school day or, for that matter, the length of the school year (Millot and Lane 2002). However, in Uruguay, and to a lesser extent, Chile, full-time schools appear to have improved student test scores, especially those of the most disadvantaged students. Vegas and Petrov (2007) report that Chile's Full School Day (FSD) program shows a small but positive impact on learning outcomes, with greater gains in language than in math. This program did not involve any specific interventions to improve teaching methods during the additional school hours. However, it was instituted concurrently with other reforms that focused on teacher professional development and the provision of support to poor schools, among other activities.

Students gain from more instruction when it is combined with quality inputs. As noted above, Uruguay's full-time school program appears to have improved learning achievement, particularly in the most disadvantaged schools.[2] Yet the program did not simply extend the school day from four to seven hours; it also implemented a pedagogic approach designed to compensate for differences in household income levels, encouraged community participation, and provided substantial teacher development in instructional practices tailored to the full-time school model.

Yair (2009) concluded that allocating more hours to education does not serve disadvantaged students because these students may gain very little from more instruction if the quality of the instruction remains the same.

Foundational Research on Instructional Time and Learning Outcomes

In the 1980s, education researchers discovered a strong, positive, and consistent relationship between the time students spent engaged in learning (time on task) and their subsequent achievement performance (see Stallings 1980; Rosenshine 1980; Kiesling 1984). The student engagement rate with instruction is, however, rather low. For instance, a study conducted by Yair (2000) found that students reported that they were engaged in their lessons only 53.8 percent of the time,[3] thus **net learning time from a student perspective is significantly lower than previously estimated rates of time on task** (e.g., Rosenshine 1980). Student engagement with instruction is significantly correlated with instructional methods, subject matter, gender, race, and grade level. Yair reported that student engagement was significantly lower during teacher lectures, for instance, than during laboratory work or scientific experiments. Group work and individualized instruction also seemed to hold student attention.

[2] The evaluation of the program found that at schools with disadvantaged populations, certain improvements were found in average math scores (0.30 points) and average language scores (0.20 points). See Vegas (2008, 123); this article reports on the evaluation findings, but is not the evaluation report itself.
[3] In this investigation, a sample of 865 students from grades 6 to 12 were provided with digital wrist-watches that were programmed to emit beeps eight times a day at random intervals for a week. When the watches beeped, they were requested to answer a short questionnaire about their activities at the time of the beep (Yair 2000).

A set of studies conducted in the late 1970s compared teachers' use of time with average and effective student use of time. Based on these results, Stallings established benchmarks for effective use of time in U.S. classrooms (Stallings 1985). In these studies, effective teachers in secondary schools were observed to spend 15 percent or less of their classroom time in organization or task management, 50 percent or more of their time in interactive instruction, and 35 percent or less of their time actively monitoring seatwork (Stallings 1986, 2007). Effective students, in turn, used 97 percent of their classroom time for active learning and less than 3 percent off-task.

The standards developed by Stallings were used as a reference for the instructional time surveys conducted during the first phase of the BNPP project (see Abadzi 2007). However, comparisons with Stallings' work should be made with caution since the selection of instructional methodologies that determine appropriate time usage depends on the subject, grade level, and developmental level of the student.

Furthermore, **the results of surveys conducted in developing countries using standards developed in the United States should be interpreted within the context of the country where data was collected.** For example, the U.S. benchmarks have underlying assumptions about the presence of quality inputs for effective time use. It is assumed, for example, that teachers are aware of curriculum content and the objectives of the learning unit, and that they know and are able to choose suitable teaching methodologies. It is further assumed that classrooms contain a sufficient number of textbooks and appropriate learning materials (see Walters 2007).

Although the materials on which students or teachers spent their time were largely unattended in U.S. surveys, some findings regarding usage have been reported by Stallings (1975). In one study (Stallings 1980), she found that time spent working with textbooks (as opposed to time spent with puzzles, games, and toys) related positively to achievement scores in reading and math. Conversely, she found that time spent with more explanatory materials and activities was positively related to scores on a nonverbal problem-solving tests and lower student absence rates. In addition, more time spent on discussion and review of materials, reading aloud, and supportive, corrective feedback from the teacher was positively associated with student achievement (Stallings 1980). By contrast, additional teacher time spent on classroom management and/or organization and social interaction was negatively associated with student achievement. Time spent in small groups (as opposed to one-to-one instruction) was also associated with student academic gains.

The instructional time surveys conducted in the United States in the 1980s were not without criticism. For example, Stallings (1980) indicated the need to move beyond "time on task," and Frymier (1981) suggested that "learning takes more than time on task." One of the major criticisms of time-on-task surveys is that "the generalization that time on task is directly related to achievement may be a function of the fact that, when the task itself requires the learners to make sense out of meaningless curriculum materials, more time results in more learning" (Frymier 1981, 260).

Classroom Research in Developing Countries

Time loss studies

Recent surveys by the World Bank have found discrepancies between intended and/or allocated time and the reality of school instructional time, particularly in less-developed countries (see, for example, Millot and Lane 2002, Abadzi 2007). In both qualitative and quantitative terms, the amount of time used for actual instruction is less than the amount anticipated by the national policies. For example, schools were found to be open 70 percent of the officially mandated time in Mali and 57 percent (114 out of 200 days) in Honduras. A study in the Dominican Republic similarly reported overall time use of 65 percent (Abadzi 2007).

Teacher absenteeism is another significant source of instructional time loss, particularly in less-developed countries. Surveys carried out by the World Bank between 2002 and 2003 in primary schools in Bangladesh, Ecuador, India, Indonesia, Peru, and Uganda found that, on average, 19 percent of primary school teachers were absent. The highest national average absentee rates were in Uganda (17 percent) and India (25 percent). The survey also found that, on average, teacher absentee rates were much higher in poorer areas.

Teacher absenteeism as a cause of instructional time loss was also observed during the field survey conducted for this report in October 2007 in Mali, where first-grade teachers in the Bamako area were attending a 20-day training on curriculum development. Although the schools tried to organize instruction during this period, it was obvious that first-grade students lost more than 10 percent of the total time allocated to learning during their scholastic year (155 days in all) because the system lacked appropriate teacher in-service policies.

Instructional Time Surveys in Developing Countries

Since 2002, the World Bank has conducted instructional time surveys in seven countries: Benin, Brazil (Pernambuco), Ghana, India (Madhya Pradesh, Uttar Pradesh, and Andhra Pradesh), Mali, Morocco, and Tunisia. Similar types of surveys have been implemented in Eritrea and Cameroon. In addition, a survey entitled "How Teachers Teach in Albania" analyzed interactions in secondary-school classrooms there. Finally, student engagement was among the variables of a classroom observation system developed for the READ project in Mongolia.

The preliminary findings from a research project being carried out in the Boyo Division of Cameroon suggest that 70.9 percent of classroom instructional time is efficient (Walter 2007). This study measured student engagement or disengagement with a given activity. The overall rate of engagement for all students for the entire period was 67 percent. On the other hand, teachers were engaged most frequently in lecturing or explaining (20.3 percent), giving instruction (17.6 percent), and questioning students (15.8 percent). Only

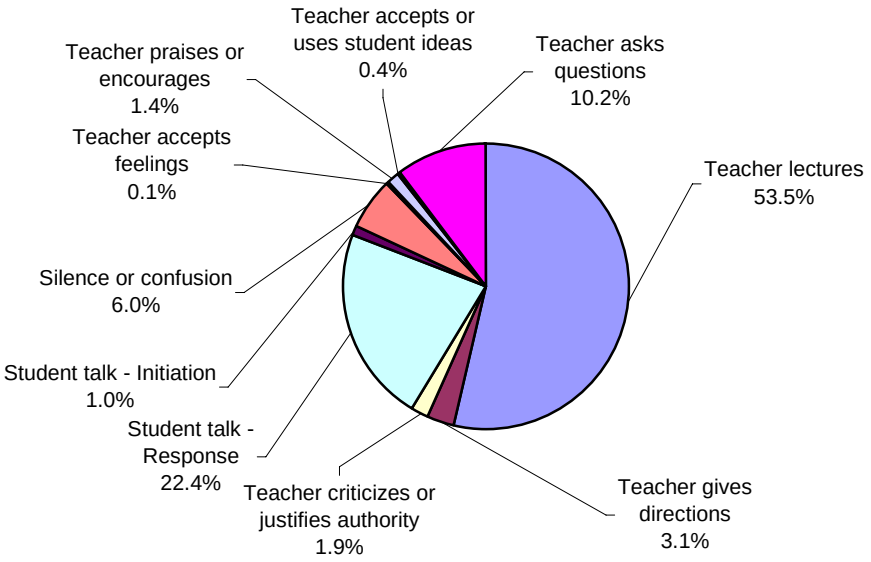
once in 48 hours (0.1 percent of total time) were teachers found to be answering a question from a student. The study also suggests that a large amount of teacher time (9.8 percent) was spent on assessment activity, but this may be due to the fact that observations took place during the part of the semester when teachers tend to focus on assessment.

A "time-on-task" survey administered in three Indian states in 2007 found that when primary school teachers were in school, various non-academic activities, especially administrative work, took a considerable amount of their time. While in classrooms, these teachers engaged students in learning tasks more than 80 percent of the time. However, classroom activities mainly involved routine, traditional teaching and rote learning methods, compared to active and innovative higher-order learning tasks. Even when teachers engaged in learning activities, the inclusion of all or the majority of students in these activities often did not happen. **When teachers were engaged in teaching activities, students in small groups were found to be "off-task" in more than 80 percent of the classrooms surveyed.** This was especially true in multi-grade classrooms when a teacher was addressing one specific grade and the remaining students were assigned to do tasks in small or large groups (Sankar 2007).

The findings of this time-on-task study suggest that student attendance and classroom participation, as well as the quality of instruction (described as student-centric learning activities), have significant effects on learning outcomes. These factors are related more to learning than simply time quantity. The survey also found that multi-grade teaching was negatively related to learning outcomes.

The "How Teachers Teach in Albania" survey (Boce and Sahlberg 2007) did not directly measure time use, but it did analyze interactions between teachers and students and among students themselves in typical secondary-school classrooms, using Flanders Interaction Analysis Categories (FIAC). The survey **found that classroom interaction was highly dominated by teacher's talk: teachers spoke for more than 70 percent of lesson time.** More precisely, teachers spent 53.5 percent of observed time lecturing, i.e., delivering information to students (see figure 2). These findings confirm "Flanders Law"—about two-thirds of teaching time is dominated by direct talk by a teacher and, of that, about two-thirds is direct lecturing.

Figure 2. Percentage of classroom FAIS interactions in first year of secondary school, Albania (N=303)

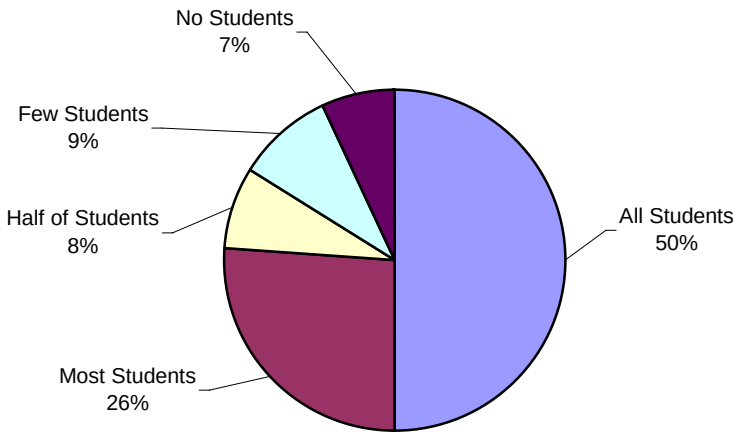


Source: Boce and Sahlberg (2007).

Students in the Albanian sample talked during 23.5 percent of lesson time, but less than 5 percent of this talk was initiated by students themselves. An interesting finding was that there was no statistically significant correlation between class size and the mode of instruction. This means that teachers in the survey taught in similar ways in both smaller and larger classes.

A classroom time allocation study in Eritrea analyzed how primary-school teachers structured classroom time and how actively students were engaged in learning activities on a minute-by-minute basis. Study findings indicated that students were on task only 50 percent of the time allocated for a task (see figure 3). It also found that a variety of instructional formats are being used in Eritrean classrooms.

Figure 3. Timed classroom observation of student engagement in primary school, Eritrea – all languages, all grades



Source: Walter (2007).

All of the abovementioned surveys on instructional time confirm the assumptions that time loss does occur in the classroom and that most classroom time is used for teacher-led activities.

Table 2. Percentage of teacher and student time spent on instructional tasks, various countries, 2002–2007 (%)

Instructional strategy % of time	U.S classroom criteria[a]	Pernambuco (Brazil)	Ghana	Morocco	Tunisia	India (AP+ MP+UP)	Cameroon
Teacher							
Interactive instruction	50% or more	**52.4**	**59.9**	**62.8**	**61.2**	**65.9**	**-**
Passive instruction	35% or less	**19.6**	**10.3**	**19.9**	**25.6**	**14.87**	**-**
Total instructional time		**72.1**	**70.2**	**82.6**	**86.7**	**80.77**	**70.9**
Organizing/management	15% or less	27.9	28.0	17.8	13.3	11.9	-
Student							
Student off-task Rate	6% or less	**19.3**	**21.1**	**9.2**	**9.9**	**7.35**	**33.0**

Source: World Bank instructional time-loss surveys: Abadzi (2007), Sankar (2007), Walter (2007).
Note: [a] Stallings (1980).

Although table 2 is useful in a broad sense, certain methodological differences make the comparison and generalization of data across countries questionable. First, the data shown was collected both from different grades and from multi-grade classes. Second, the data was collected through observation of different curriculum subjects, yet curriculum content, subject, and grade level determine the methodologies used in the classroom. The choice of methodology also depends on previous knowledge of the students, the experience of the teacher, and the availability of instructional materials. Since these factors are different across classes and countries, comparing time-use across classes and countries may be inappropriate.

There is no doubt that teachers use their time effectively for instruction, at least when observers are present. Comparing the percentages for instruction in each country with the benchmarks developed by Jane A. Stallings in the United States in the 1980s (Stallings 1980, 2007), teachers in the various countries shown in table 2 seem to be on track. According to the U.S. benchmarks, effective teachers generally use more than 50 percent of classroom time for active instruction and less than 35 percent for passive instruction. However, in certain countries, the proportion of time used for classroom management is much higher than that suggested for the United States. The student off-task rate is also significantly higher

Comparisons with standards developed for the United States should, however, be made with caution. First, as noted above, the data shown in table 2 was obtained from different grades and subjects. Second, as Walters (2007) points out, the interpretation of instructional time surveys must be done with an understanding that the COS tool was developed for a system that is functional and where quality inputs for effective time use are in place. That is, it assumes that teachers are aware of curriculum content and the objectives of a given learning unit, and are able to choose and use appropriate instructional methodologies. It also assumes that textbooks and appropriate instructional materials are available in classrooms.

3. The Classroom Observation Snapshot and its Application in Mali

The Stallings Observation System (SOS) was first developed in the 1970s to evaluate how elementary teachers and students used their time in classrooms.[4] During the 1980s and 1990s, the system was modified for use in middle and high schools. Since 2002, the "Snapshot" section of this system has been used as a survey instrument for World Bank projects in Tunisia, Morocco, Brazil, Ghana, and India.

The Classroom Observation Snapshot (COS) records the environment of and participants in a classroom as if they were being photographed at one specific instant. Each "snapshot" lasts for a duration of 10 to 15 seconds. Ten such snapshots are recorded during one class period at regular intervals, at which time the activities of every person in the classroom are recorded, together with the material being used and the people with whom they are engaged (see appendix 1 for a sample snapshot matrix).

Box 1. The Classroom Observation Snapshot Instrument

The Classroom Observation Snapshot (COS) is used to generate data on how teachers distribute their time across a range of pre-defined classroom activities and pre-defined instructional materials, as well as to monitor student grouping patterns during classes and quantify the proportion of students disengaged from classroom activities.

The snapshot methodology observes classroom activities at regular intervals, as though they were photographed at a particular instant in time. Ten "snapshots" are coded during a classroom or observation period (see the sample COS grid in appendix 1). Prior to observation, the observer records general information about a given class, including grade level, subject, number of students by gender, and class duration. During the observation period, he/she records information on a grid. This information typically includes information about the content of instruction or unusual circumstances that occur during a coding interval.

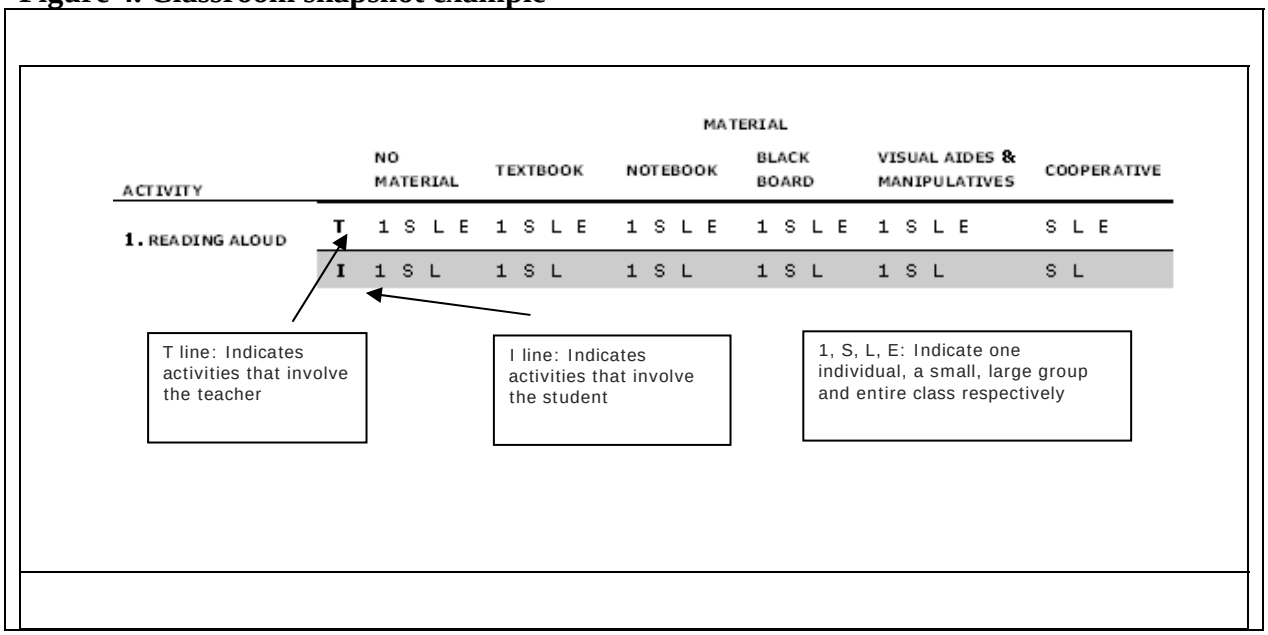
Using the COS, the engagement of teachers and students in the classroom is distributed among 13 pre-defined activities. The observer first places the teacher on a grid according to the activity in which she/he is engaged (shown as horizontal rows, or "lines") and the material being used (shown as vertical columns). Then, moving clockwise around the room, the observer places all of the students on the grid according to the same two parameters (activity "line" and materials being used). Teacher and student activities occur simultaneously, but may differ, and are noted in the "T" and "I" rows, respectively, of each activity line.

[4] Jane S. Stallings contributed to this section.

The Snapshot essentially provides data for assessing teacher and student activities, the materials being used in a classroom, and grouping patterns at specific moments in time. This data can be coded using paper and pencil forms and then read by a computer. The resulting database can be used for immediate statistical analysis. Software allows for analysis at the level of country, district, city, school, and grade. Comparisons can be made between boys and girls and between language groups. In addition, the database can generate a profile of the behavior of each teacher.

A manual with practical examples is available in English, French, Portuguese, and Spanish. An example of the grid is shown in figure 4.

Figure 4. Classroom snapshot example



COS Survey in Mali

This section demonstrates the different types of analysis that can be performed with the Classroom Observation Snapshot instrument, using data gathered in Mali.

Data Summary

In late October 2007, observers were trained in the COS instrument and then visited a number of schools across Mali to conduct an instructional time survey. Twenty-five primary schools participating in a national reading improvement program were chosen for the survey on the basis of community, school, and teacher characteristics. These schools were matched with 25 control schools that did not take part in the reading program.

The instructional time survey in Mali became the baseline for a teacher literacy training program **which had been** implemented by Plan Mali earlier in 2007. The survey

collected data from a total of 48 schools and 80 classrooms (grades 2–6), together with a test sample of first-grade students (see tables 3 and 4). As part of the same survey, a reading assessment was also conducted on the fundamental components of literacy acquisition: phonetic awareness, phonics, fluency, comprehension, and vocabulary, using adapted Early Grade Reading Assessment **(**EGRA**)** instruments. The results of the reading assessment survey are not discussed in this report, but can be accessed from Plan Mali.[5] (Sample specifications for the COS survey and a regional breakdown of classrooms and schools by commune (the administrative unit for the national school system) are summarized in appendix 4.)

Table 3. COS data overview

Item	Amount
Total classes observed	80
Total snapshots collected	800
Total teachers observed	79
Total schools visited	48

Source: World Bank time-use survey, Mali, 2007.

Table 4. Number of classes by grade

Grade	Number of classes
Grade 2	31
Grade 3	10
Grade 4	23
Grade 5	1
Grade 6	2
Mixed grades	5

Source: World Bank time-use survey, Mali, 2007.

Types of Data and Data Analysis

Classroom Observation Snapshot data collected in Mali consists of two types of information: general information about a class, such as the number of students and the start time, and 10 "snapshots" recorded throughout the duration of the class. Data from the individual snapshots is aggregated to form class-level data in order to derive, for example, the proportion of time spent by teachers or students on different activities throughout an entire class. As a result, analysis can occur at two levels: that of the class and that of a specific snapshot. This subsection presents methodologies for both levels of analysis, whereas a typical analysis of COS data generally focuses only on the class level.

Class-level and certain snapshot-level analyses of COS data rely on two commonly used metrics: *student time* and *teacher time*. Student-time multiplies the number of students by the number of minutes. For example, if 10 students read aloud for 10 minutes, 100 minutes of student time were spent reading aloud. Teacher time has an analogous definition.

[5] Plan Mali-BP, 1598 rue 122 Badalabougou-Est-Bamako, **City?, Mali?** (tel.: 222 40 40/ 223 05 83/ 222 69 79), email: maili.co@plan-international.org.

As explained in figure 4, the COS instrument *categorically* approximates how many students are engaged in different activities: either as an "individual student," a "small" group of students ("S," ranging from 2 to 10), a "large" group of students ("L," ranging from 11 to all students, but excluding the teacher), or the "entire" class ("E," all students *and* the teacher). **Consequently, estimating student time requires transforming a categorical approximation of group size into a numerical value** that represents a number of students.

The algorithm used for this transformation assumes that, for any given snapshot, the mean size of small groups is six students (an appropriate number if the size of each small group were random and symmetrically distributed from 2 to 10). The mean size of large groups was derived using a formula based on the size of the class and the number of small groups.[6]

Class-level Analysis

Activity in a class can be dissected into two components: *instructional* and *non-instructional* activities (see Jukes 2006). Instructional activities include reading aloud, demonstrations or lectures, discussions, practices or drills, projects, seatwork, copying, and verbal instructions about assignments. Non-instructional activities include classroom management, social interaction, and activities not defined as instructional.

Table 5 describes the average proportion of teacher time and student time allocated to instructional and non-instructional activities in the Mali sample. The figures differ because some students can be engaged in non-instructional activities while the teacher instructs.

Table 5. Instructional and non-instructional time use, Mali COS survey (%)

Activity	Teacher time	Student time
Instructional	70.9%	65.7%
Non-instructional	29.1%	34.3%

Source: World Bank time-use survey, Mali, 2007.
Note: Values shown represent the average proportion of student and teacher time dedicated to either instructional or non-instructional activities.

Table 6 disaggregates the same data by grade.

[6] For the Mali survey, each large group equaled the total number of students reduced by the number of individuals recorded on the sheet, then reduced further by six times the number of small groups on the sheet, and divided by the number of large groups recorded on the sheet. The Stallings Observation System software provided to the World Bank assumes that the mean size of small groups was 10, instead of 6, as used in this study. This assumption may complicate comparisons between the results of this report and other, previous Bank reports that used this software.

Table 6. Instructional and non-instructional time use by grade level, Mali COS survey (%)

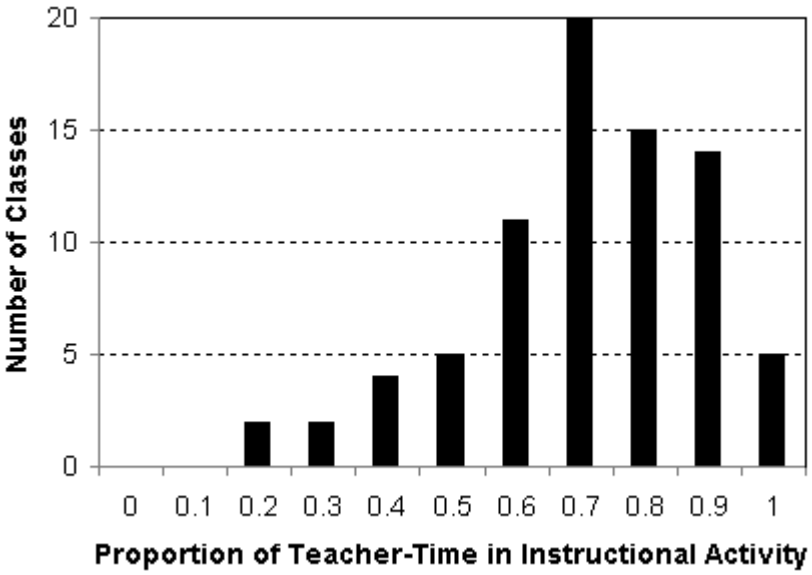
	Grade Level									
	2	3	4	5	6	2	3	4	5	6
Activity	Teacher time					Student time				
Instructional	72%	73%	68%	90%	70%	65%	64%	66%	86%	71%
Non-instructional	28%	27%	32%	10%	30%	35%	36%	34%	14%	29%

Source: World Bank time-use survey, Mali, 2007.
Note: Percentages are the average proportion of either teacher or student time spent on the indicated activity in each class in the indicated grade level.

The percentages for lower grades shown in table 6 more closely reflect sample-wide findings than do the percentages for higher grades, but it should be noted that the survey collected only a few observations for higher grades (see table 4).

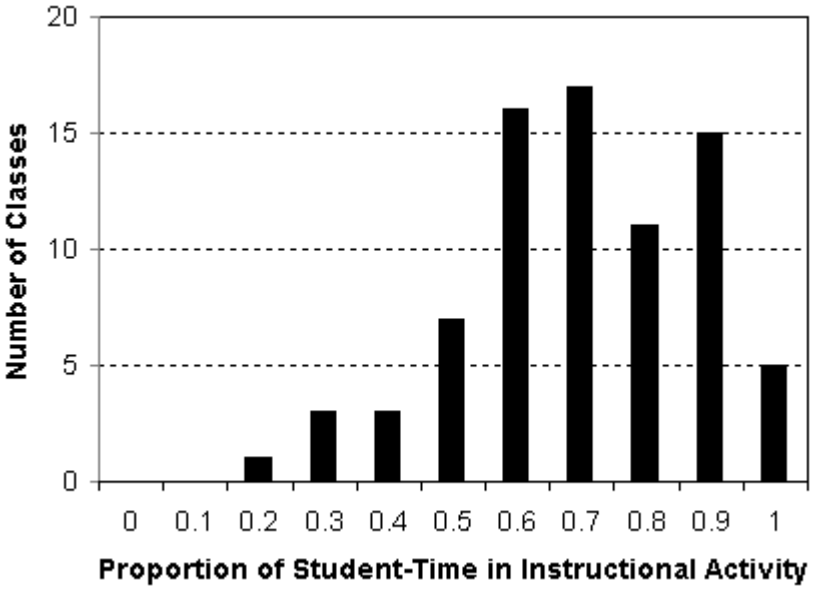
Figures 5 and 6 below plot the distribution of classes observed in Mali across different proportions of instructional time. The x axis in these figures represents the proportion of time spent on instructional activities ranging 0 to 100 percent, while the y axis indicates the number of classes.

Figure 5. Class distribution according to teacher time devoted to instructional activity, Mali COS survey



Source: World Bank time-use survey, Mali, 2007.

Figure 6. Class distribution according to student time devoted to instructional activity, Mali COS survey



Instructional Time-Use Analysis

***Instructional time* refers to the total amount of teacher time and student time, respectively, dedicated to instructional activities.** As presented in table 5 above, teachers in Mali dedicate an average of 70.9 percent of their time, and students, 65.7 percent, to instructional activity.

Table 7 shows the average proportions of instructional student time dedicated to specific instructional activities and material use, as defined for the Mali survey. This data helps explain what students were actually doing when engaged in instructional activity.

Table 7. Distribution of instructional student time across activities and materials, Mali COS survey (%)

				Material				
Activity	**None**	**Textbook**	**Notebook**	**Blackboard**	**Visual aid**	**Manip.**[a]	**Co-op.**[b]	**Total**
Reading aloud	0.0%[c]	6.5%	0.9%	7.2%	0.8%	0%	0%	15.7%
Demo /lecture	2.9%	0.2%	0%	7.3%	0.7%	1.1%	0.4%	12.6%
Discussion	6.8%	1.3%	0.4%	3.1%	0%	0%	0.2%	11.7%
Practice / drill	3.7%	0%	0.2%	2.9%	0%	0%	0%	6.8%
Projects	0.2%	0%	0%	0%	0.1%	0.9%	0.4%	1.6%
Seatwork	2.0%	0.4%	16.0%	11.7%	3.3%	0%	3.5%	33.9%
Copying	0.2%	0.2%	4.0%	2.5%	0%	0%	0%	6.9%
Verbal instruction	9.0%	0.2%	0.6%	0.6%	0.2%	0.4%	0%	11.0%
Total	25.1%	8.7%	22.0%	35.2%	2.1%	2.4%	4.4%	100%

Source: World Bank time-use survey, Mali, 2007.

Notes: [a] Manipulative (defined as "any physical object that the student or teacher uses as a learning tool").
[b] Cooperative.
[c] Percentages reflect average proportion of student time spent on a given activity-material combination across all classes and grades.

An average of 16 percent of instructional student time involved seatwork with a notebook. **Seatwork accounted, on average, for one-third (33.9 percent) of all instructional student time. The majority of student time (82.3 percent) was concentrated on three types of materials: notebooks, blackboards, or none.**

Previous analyses of Stallings Snapshot data have disaggregated instructional activities into *interactive* and *passive* categories. Table 8 distributes the Mali data for instructional student time between these two categories by grade level, and table 9 shows the same information for instructional teacher time.

Table 8. Distribution of instructional student time by activity and grade, Mali COS survey (%)

		Grade level				
Activity	**All**	**2**	**3**	**4**	**5**	**6**
Interactive instruction	48.3%	47.6%	45.6%	46.5%	45.0%	52.0%
Reading aloud	15.7%	10.3%	18.4%	14.5%	11.7%	38.0%
Demo /lecture	12.6%	14.7%	11.8%	10.1%	23.3%	7.0%
Discussion	11.7%	10.8%	9.7%	15.3%	10.0%	7.0%
Practice /drill	6.8%	10.7%	4.3%	3.4%	0%	0%
Projects	1.6%	1.0%	1.3%	3.2%	0%	0%
Passive instruction	40.8%	42.1%	48.0%	37.9%	45.0%	41.0%
Seatwork	33.9%	34.6%	33.8%	31.1%	33.3%	40.4%
Copying	6.9%	7.4%	14.3%	6.8%	11.7%	0.1%
Verbal instruction	11.0%	10.3%	6.3%	15.7%	10.0%	7.0%

Source: World Bank time-use survey, Mali, 2007.
Note: Percentages are averages.

On average, interactive instruction in Mali accounts for 48.3 percent of total instructional student time for all classes, while passive instruction accounts for 40.8 percent. Since 65.7 percent of total student time is instructional, these figures mean that 31.7 percent and 26.8 percent of student time are spent on interactive and passive instruction, respectively.

Table 9. Distribution of teacher time by activity and grade, Mali COS survey (%)

		Grade level				
Activity	**All**	**2**	**3**	**4**	**5**	**6**
Interactive instruction	52.6%	51.9%	45.2%	54.7%	44.4%	57.1%
Reading aloud	17.4%	11.1%	17.8%	18.7%	11.1%	42.9%
Demo /lecture	13.9%	17.1%	12.3%	11.3%	22.2%	7.1%
Discussion	13.4%	13.0%	9.6%	18.0%	11.1%	7.1%
Practice /drill	6.5%	9.7%	4.1%	3.3%	0%	0%
Projects	1.4%	0.9%	1.4%	3.3%	0%	0%
Passive instruction	35.8%	37.0%	47.9%	29.3%	44.4%	35.7%
Seatwork	30.2%	31.5%	34.2%	26.0%	33.3%	28.6%
Copying	5.6%	6.0%	13.7%	3.3%	11.1%	7.1%
Verbal instruction	11.6%	11.1%	6.8%	16.0%	11.1%	7.1%

Source: World Bank time-use survey, Mali, 2007.
Note: Percentages are averages.

On average, interactive instruction accounts for 52.6 percent of total instructional teacher time for all classes, while passive instruction accounted for 35.8 percent. Since 70.9 percent of total teacher time is instructional, these figures mean that 37.3 percent and 25.4 percent of total teacher time are spent on interactive and passive instruction, respectively.

Non-instructional time use

Non-instructional time refers to the total amount of teacher and student time respectively dedicated to non-instructional activities. As presented earlier in table 5, 34.3 percent of total student time and 29.1 percent of total teacher time in any given class in Mali is, on average, dedicated to non-instructional activity. Table 10 presents the average proportion of non-instructional teacher time dedicated to the non-instructional activities defined in the Mali survey, by grade level.

Table 10. Distribution of non-instructional teacher time across activities by grade, Mali COS survey (%)

		Grade level				
Teacher activity	**All grades**	**2**	**3**	**4**	**5**	**6**
Social interaction with students	6.6%	6.0%	0%	0.1%	0%	33%
Discipline	12.3%	11.9%	14.8%	11.4%	0%	0%
Classroom management with students	6.6%	7.1%	3.7%	10%	0%	0%
Classroom management alone	38.8%	46.4%	37.0%	32.9%	0%	50%
Social interaction with adults	7.0%	8.3%	11.1%	7.1%	0%	0%
Out of room	28.6%	20.2%	33.3%	28.6%	100%	16.7%

Source: World Bank time-use survey, Mali, 2007.
Note: Percentages are averages.

Classroom management alone accounted for the largest share of non-instructional teacher time—38.8 percent—for all grades, while absence from the classroom accounted for 28.6 percent. Together, these two activities explain 67.4 percent of all such time.

Table 11 presents the average proportion of non-instructional student time dedicated to the various non-instructional student activities defined in the Mali survey.

Table 11. Distribution of non-instructional student time across activities by grade, Mali COS survey (%)

		Grade Level				
Student activity		**2**	**3**	**4**	**5**	**6**
Socially interacting	25.4%	20.2%	17.7%	39.9%	80.3%	51.9%
Unengaged	67.2%	70.1%	75.2%	51.3%	19.7%	48.1%
Being disciplined	3.3%	4.7%	4.2%	3.1%	0%	0%
Involved in classroom management	4.0%	5.0%	2.8%	5.6%	0%	0%

Source: World Bank time-use survey, Mali, 2007.
Note: Percentages are averages.

As can be seen, on average, students in all grades were unengaged for the majority of non-instructional student time (67.2 percent), and socially interacting for another 25.4 percent of this time.

Class-level variable analysis

Correlations among class-level variables help describe classes in the sample. Table 12 presents partial correlations between the proportion of student and teacher time for specific time-use variables, as well as other class-level variables. The purpose of the table is not to test specific hypotheses about the correlation between variables, but rather, to prompt further thought about the data.

Table 12. Partial correlations between student and teacher time –use, Mali COS survey (N=79)

		Student time			Teacher time				Class	
		% interactive learning	% unengaged	% social interaction	% classroom management	% absent from room	% social interaction	% discipline	Number of students	Seq. time elapsed
Student	% interactive learning[a]									
	% unengaged	0.40*								
	% social interaction	-0.03	-0.48*							
Teacher	% classroom management	-0.29*	0.44*	0.44*						
	% absent from room	-0.17	0.48*	0.31*	-0.38*					
	% social interaction	-0.07	0.30*	0.35*	-0.32*	-0.12				
	% discipline	-0.26*	0.28*	0.01	0.00	-0.15	-0.06			
Class	Number of students	-0.03	0.00	0.22*	-0.18	-0.16	0.05	-0.02		
	Time class started	0.15	-0.08	0.10	-0.27*	-0.16	-0.19	0.08	-0.02	
	Seq. time elapsed[b]	-0.26*	-0.21*	0.19	-0.26*	-0.13	-0.02	-0.04	-0.05	0.01

Source: World Bank time-use survey, Mali, 2007.
Note: Each cell contains the *partial correlation* between the row and column variable using the other variables as *control variables.* Each variable measures either student or teacher time dedicated to the specified activity as a percentage of total student or teacher time for each class. Partial correlations reported at the significant level of 0.10 level are denoted with an asterisk (*).
[a] "% interactive learning" is the average percentage of student instructional time spent on "interactive" acitivities.
[b] *Sequence time elapsed* measures how far into the sequence of classes the measurement occurs (sequences begin at 8 am for the 8 am–12 pm time period and 3 pm for the 3 pm–6 pm time period).

The table reveals, for example, that classes with higher proportions of unengaged student time also have higher proportions of interactive learning, holding other variables constant. This result does not imply interactive learning *causes* students to be unengaged, it merely exposes a possible association, given the control variables. The table also shows a negative association between the proportion of students unengaged and the amount of time elapsed since the beginning of a given time sequence.

Snapshot-level data

Class-level data combines the information contained in individual "snapshots" collected throughout the class. Disaggregating this information in two ways (by conditional measures of time use and by classroom co-event occurrence) permits several informative analyses.

Conditional measures of time use

Class-level data examines the proportion of student time spent on various activities. However, it would be useful to know the proportion of student time spent on various activities that are conditioned on other, simultaneously occurring activities. For example, table 13 presents the distribution of student time across four activities while the teacher was engaged in different activities.

Table 13. Student time allocation by teacher activity, Mali COS survey (%)

	Student time allocation			
Teacher activity	**Instructional activity**	**Social interaction**	**Unengaged**	**Classroom management**
Instructional activity	86.4%	2.8%	10.8%	0%
Interactive instruction	84.6%	2.2%	13.2%	0%
Passive instruction	87.6%	3.8%	8.6%	0%
Verbal instructions/directions	90.7%	2.6%	6.7%	0%
Social interaction with students	10.8%	44.3%	44.9%	0%
Discipline[a]	29.0%	4.4%	34.6%	0%
Classroom management with students	0%	9.7%	33.7%	56.7%
Classroom management alone	12.5%	27.1%	60.4%	0%
Social interaction with adults	26.8%	33.5%	39.7%	0%
Out of room	15.0%	22.0%	61.0%	0%

Source: World Bank time-use survey, Mali, 2007.
Note: [a] Rows do not add up to 100 percent, since some students are being disciplined.

For example, when a teacher in Mali is involved in an instructional activity such as teaching, 86.4 percent of students are, on average, also engaged, 2.8 percent are socially interacting, and 10.8 percent are unengaged. A higher proportion of students are unengaged during interactive instruction, reflecting the positive correlation between interactive instruction and disengagement indicated earlier in table 12.

Whereas the previous table describes the distribution of student time across different student activities *during* each different teacher activity, the following table describes the distribution of student time spent socializing or unengaged across different teacher activities. Thus **the previous table helps explain what students are doing during different teaching activities, while the following table helps explain what teaching activities account for student disengagement or social interaction.**

Table 14. Distribution of social interaction and unengaged student time by teacher activity, Mali COS survey (%)

	Student Activity	
Teacher activity	**Social interaction**	**Unengaged**
Instructional activity total	23.0%	33.2%
Interactive instruction	9.6%	21.3%
Passive instruction	11.0%	9.5%
Verbal instructions/directions	2.5%	2.4%
Social interaction with students	9.8%	3.7%
Discipline	1.8%	5.4%
Classroom management with students	1.5%	2.6%
Classroom management alone	35.1%	29.6%
Social interaction with adults	7.9%	3.5%
Out of room	21.0%	22.0%

Source: World Bank time-use survey, Mali, 2007.

Note: Instructional activity time includes interactive instruction, passive instruction, and verbal instructions and/or directions.

For example, 23 percent of student social interaction time and 33.2 percent of student unengaged time occurred while the teacher was instructing. The majority of time students spent socially interacting or unengaged (51.6 percent and 56.1 percent respectively), however, took place while the teacher was either out of the classroom or performing classroom management.

Conditional measures of time use also allow analysis to focus on certain subsets of activities. For example, table 15 presents partial correlations between the proportion of student time spent socially interacting and unengaged and other class-level variables while the teacher was instructing.

Table 15. Class-level correlations for student time during teacher instruction, Mali COS survey (%)

	% Social Interaction	% Unengaged
% social interaction		-0.01
% unengaged	-0.01	
% passive instruction	0.25*	-0.24*
Time start	0.08	0.05
Time in sequence	0.17	0.20*
Number of students	0.19*	-0.11

Source: World Bank time-use survey, Mali, 2007.

Notes: Each proportion variable indicates the proportion of class time during which the teacher is instructing.

* Indicates significance at the 10-percent level.

For example, classes in which students spent a high percentage of their time on social interactions when a teacher was instructing also had higher percentages of passive instruction. Additionally, these classes also had higher numbers of students.

Categorical variable analysis

The analysis presented in previous sections required transforming a categorical measure of student group size (i.e., “1, S, L, E”) into numerical values to construct measures of student time. The present sub-section avoids this transformation by uncovering data patterns through the use of statistical methodologies compatible with categorical data. The analysis utilizes a set of binary variables to represent each snapshot and then examines how these variables affect the probability of observing other variables in the same snapshot. This process establishes how different activities in the classroom associate contemporaneously with one another.

Table 15 presented partial correlations between variables from the subset of snapshots during which a teacher was engaged in an instructional activity only. Table 16 augments the analysis of the preceding table by presenting results from two, random-effect probit models estimated with the same subset of snapshots.

Probit models estimate the impact that each independent variable has on the probability that the dependent event will occur. In this case, the first model’s dependent event is the occurrence of a group of students socializing, while the second is the occurrence of a group of students being unengaged. These estimates provide a sense of how different activities are associated with the two dependent events.

Table 16. Associations between teaching activities and/or other factors and students being unengaged or socializing, Mali COS survey (N=434)

		Dependent event: Occurrence of a group of students			
		Socializing		Being unengaged	
	Independent variable	*Coef.*	*Pval*	*Coef.*	*Pval*
	Number of students	0.02***	0.001	0.00	0.263
	Lowest grade level	-0.06	0.501	-0.20**	0.019
	Seq. number[a]	0.87**	0.006	0.19	0.516
	Seq. time wlapsed[b]	0.00	0.353	0.00	0.677
	Students socializing			-0.52**	0.012
	Students unengaged	-0.44**	0.015		
Teacher	Passive instruction	-0.23	0.302	-0.34*	0.053
	Passive instr. prev.[c]	0.37*	0.053	0.11	0.508
	Textbook	-0.74*	0.094	-0.12	0.676
	Notebook	0.28	0.370	-0.12	0.655
	Blackboard	-0.04	0.864	-0.01	0.953
	Visual Aid	-6.47	1.000	8.14	1.000
	Manipulative	0.42	0.392	-0.17	0.713
	Cooperative	0.48	0.326	-0.85*	0.076

Source: World Bank time-use survey, Mali, 2007.
Note: A group of students must include at least two students. Results derived from a random-effects probit model. Asterisks denote the following significance levels: * – sig 10 percent, ** – sig 5 percent, *** – sig 1 percent. Binary variables controlling for the relevant commune (i.e., the administrative school unit) were also included, but none were significant.
[a] *Seq. Num* is the binary variable true during the second class sequence.
[b] *Seq. Time Elapsed* indicates how much time has elapsed since the beginning of the sequence; sequences ran from 8:00 am to 12:00 pm and from 3:00 pm to 6:00 pm.
c *Passive Instr. Prev.* is true if passive instruction occurred in the previous snapshot.

This table exposes several patterns in the Mali dataset. For example, the occurrence of the teacher being engaged in passive instruction instead of interactive instruction has a statistically significant and negative association with the probability of a group of students being unengaged during the same snapshot. Additionally, there is a statistically significant and positive association between the number of students in the classroom and the probability of observing students socializing in any snapshot. Both these patterns reflect the findings of table 15, which used the same data.

The penultimate table, table 15, suggests a positive and statistically significant partial correlation between passive instruction and social interaction. However, this pattern did not emerge in that table: the occurrence of passive instruction has no detectable association with the probability of observing a group of students socializing. The reason for this discrepancy lies in the use of *class-level* data in table 15. Although classes with higher proportions of passive instruction also display higher proportions of social interaction among students, this does not mean that they occur simultaneously. As shown in the table 16, there is a statistically significant and positive association between the occurrence of passive instruction in a snapshot and the probability of observing students

socializing in the *next* snapshot.[7] This probably explains the correlation in the penultimate table.

Summary of Mail Survey Findings

The previous subsections presented different methodologies for analyzing data from the Mali time-use survey and revealed a number of different patterns in the data. The implications of these patterns for both time use in Mali and, subsequently, for use of the Stallings Classroom Observation Snapshot (SCOS) instrument, are discussed below.

Time Use in Mali

Instructional versus non-instructional time. Teachers in Mali instructed, on average, 70.9 percent of the time they were in the classroom and were engaged in non-instructional activities 29.1 percent of the time. Students were reported to be engaged in learning activities 65.7 percent of classroom time and non-learning activities, 34.3 percent (see table 5).

Instructional time. A majority of instructional student time was devoted to four activities: reading aloud, lectures, discussions, and seatwork. The majority of this time was devoted to using three types of materials: none, notebooks, and the blackboard (see table 7). Interactive instruction accounted for 52.6 percent of all instructional student time; passive instruction, 35.8 percent; and verbal instructions about class work, 11.6 percent (see table 9).

Non-instructional time. Classroom management and being absent from a class accounted for 74.0 percent of non-instructional teacher time (see table 11). Social interaction and being unengaged accounted for 92.6 percent of non-instructional student time (see table 12). A teacher being absent from the room and performing classroom management alone is positively correlated with students socially interacting or being unengaged (see table 13). While a teacher instructs, 23.0 percent of student time is dedicated to social interaction and 33.2 percent, to being unengaged (see table 15). **These figures suggest that reducing student time spent off-task depends on reducing teacher classroom management and teacher absences from the classroom, as well as increasing the number of students engaged during instruction.**

Understanding student off-task activity during instruction. The factors associated with students being unengaged during instruction differ from the factors associated with students socializing during instruction. In addition, the factors that have a statistically significant association with one activity do not have a statistically significant association with the other (see below). This finding might make these two activities seem unrelated; however, the occurrence of students socializing is significantly associated with a lower

[7] Inspection of actual snapshots suggests this relationship exists because students who complete seatwork or copying early tend to socialize while the other students finish up.

probability of students being unengaged and vice-versa (see table 16). This second finding suggests that the two activities are negatively related through unobserved factors.

Analyzing student social interaction during instruction. Classes with higher numbers of students tend to have higher proportions of students socially interacting (see tables 12 and 15). Additionally, a higher number of students in each snapshot is associated with a higher probability of students socially interacting (see tables 16). **In an unreported probit estimation, reading aloud is significantly associated with a higher probability of social interaction compared to most other teaching activities.**

The use of textbooks in a snapshot is associated with a lower probability of students socially interacting, as compared to other materials (see table 16). Snapshots occurring during an afternoon sequence of classes are significantly and positively associated with the probability of a group of students socializing (see table 16); in an unreported probit estimation, time of day had the same association. All these factors, except for reading aloud, were not significantly associated with students being unengaged.

Analyzing student disengagement during instruction. Classes with more passive instruction are associated with less students being unengaged (see tables 15 and 12). In any given snapshot, passive instruction is associated with a lower probability of students being unengaged (see tables 14 and 16). The lowest grade level in the class (for classes with only one grade, this would also be the highest grade) has a positive association with students being unengaged (see table 16), as do classes beginning later in the sequence of classes (see table 14), but the latter finding was not reflected in the probability of students being unengaged, when controlled for other contemporaneous factors (Table 16).

No association is apparent between these factors and social interaction among students. Also, the number of students seems to be unassociated with the propensity for students to be unengaged. However, as stated above, an unreported probit model displayed a significant, positive association between reading aloud and the probability of students being unengaged, compared to other activities.

The impact of class sequencing. The probability of students being unengaged or socially interacting seemed to be unrelated to how much time had elapsed since the beginning of a class sequence (see table 17), although the proportion of students being unengaged in a class had a positive relationship with the amount of time elapsed (see table 15). It should be noted, however, that table 15 has fewer controls than table 16, so the results of the latter may be more credible. Additionally, the probability of students socially interacting is positively associated with snapshots occurring later in a class sequence (see table 16).

Classroom Observation Snapshot Instrument

Two implications of the data patterns discussed in the previous sections are relevant to the use of the Classroom Observation Snapshot instrument.

Activity and material classifications. *Out of all student time in the classroom, 73.9 percent fell into four out of eight activity categories; 82.3 percent fell into three out of seven material categories. Of note, 87 percent of student time fell into only one-quarter of the 56 combinations of possible material-activity combinations defined by the COS (8 activities multiplied by 7 materials).* In other words, three-quarters of these possible descriptions of classroom instruction are utilized either rarely or not at all.

This finding suggests the COS instrument is being underutilized and, consequently, may not be very applicable to classrooms in Mali. It also suggests that the instrument should be further modified, either by disaggregating the material-activity categories or replacing the current categories with ones more relevant to the Mali context, in order to increase the number of material-activity descriptions utilized during classroom observation. By increasing the number of utilized descriptions, less variation in classroom activity ends up being homogenized and more variation is revealed. Such modifications would enable the instrument to transmit more information about classroom time use. However, the possibility of such modifications depends on what researchers are attempting to measure with the instrument.

Use of snapshot-level data. Previous World Bank analyses of Stallings Classroom Observation Snapshot data involved classroom-level data and examined correlations between various proportions of classroom time. However, certain caution must be used in drawing conclusions from this data. For example, table 15 showed a positive correlation between the proportion of students socializing and the proportion of instructional time dedicated to passive instruction. However, as revealed at the snapshot level in Table 16, there is no evidence that these two variables have a *simultaneous* association, but rather, a *lagged* relationship. In general, snapshot-level data contains a great deal of information that could affect the overall interpretation of class-level data.

Use of categorical variable methodology. Previous World Bank analyses have transformed the student group size variable (i.e., “1,S,L,E”) into a numerical value in order to calculate the actual number of students involved in a given activity. In smaller classes, the absence of information on the exact number of students can be problematic. A small group can range from 2 to 10 students; in a class of 30, this difference represents a large change in proportion. However, for several data applications, such as examining correlations and co-occurrences, this transformation can be avoided by using methodologies suitable for categorical data. This report, for example, utilized binary variables with probit models to generate measures of co-occurrence. Many other methods exist to achieve this same goal, such as multinomial and ordered probit and logit models.

4. Measuring Time Loss with the COS

One of the underlying questions for the Economics of Education project funded by the World Bank-Netherlands Partnership Program is: How can the amount of time spent on learning in the classroom be measured in ways that are simple, easy to administer, valid, reliable, comparable across countries, and that can be monitored across time? The following paragraphs summarize lessons learned from the use of the Classroom Observation Snapshot (COS).

a) The COS is a rather complex measure. Its use requires thorough training in order to understand the behavioral categories and coding systems that it employs.

b) A trainer who is very familiar with both the instrument and the data collection methodology should train the observers. The experience of the Mali survey suggests that a minimum of four days' training is required to achieve an appropriate reliability level.

c) The instrument should either be discussed with local education experts or tested by the trainer and such experts prior to the training. Jukes (2006) in particular has emphasized the importance of pilot testing the instrument in target countries so as to establish the reliability of the COS.

d) Country-specific modifications to categories and activities signal that there is a broader need to review and modify these parameters of the instrument. However, such modifications should be made within a common contextual framework for teaching and learning so that the goal of producing comparable data is not lost. Too many modifications may lead to a situation where COS data cannot be compared among countries.

e) To increase the instrument's reliability and shorten the required training time, the Snapshot could be simplified. A more user-friendly COS could, for example, be developed for the use of parents and community members. Existing models, such as the Classroom Checklist (CCL, see Stallings 1977) or the Emerging Academics Snapshot (see Ritchie et al. 2001), could be examined in order to see how the instrument could be made simpler.

f) If the instrument is intended to generate data comparable within a country or between two or more countries, it is imperative that classroom behavior be coded in the same way. This imperative requires that the same grade levels be observed and that standardized data collection and training procedures be instituted. It would also require standardization of observation intervals. Several enumerators in Benin, for example, suggested reducing the amount of time between individual snapshots in order to get a better idea of what is actually happening in a given class.

The critical question is whether the goal of a survey is to measure time loss or time use. For the first goal, simpler instruments are available. For the latter, the COS could be an option if its behavioral categories are modified to reflect the context of a given country. The timing of data collection should also be taken into account because different kinds of activities may take place at the beginning and middle of a school year, as well as at different times of the school day; various subjects may also involve different activities (Knight 2001).

Conclusions and Recommendations

This report has examined instructional time, time use in the classrooms, and use of the Classroom Observation Snapshot, using a specific survey conducted in Mali in 2007 as an illustration. A number of conclusions are offered below, followed by recommendations for future research on time use.

Increase awareness of time allocated to instruction among education stakeholders. In Mali, education officials and community members rarely knew how long the school year was supposed to be. As service delivery mechanisms, education ministries should therefore ensure that education officials and stakeholders are aware of the amount of time that the national government has allocated to instruction. Monitoring time use should also be on the agenda of any educational review conducted by an education ministry or donor.

Effective time use should be emphasized. During the instructional time survey in Mali, first-grade teachers in the Bamako area were invited to a 20-day training on a new curriculum. Although the schools had made arrangements for the absence of these teachers (e.g., putting two classes together, using older students as teachers, or notifying first-graders that there would be no school during these days), it was obvious that first-grade classes in this area lost a significant amount of instructional time. More information is needed about the policies and practices that could ensure that instruction is not disrupted during such in-service teacher training.

Teachers teach, at least when observers are present. With regard to the time allocated to instruction by teachers, the countries studied in the various BNPP projects (Ghana, Mali, Morocco, Pernambuco, Tunisia) performed reasonably well according to benchmarks recommended by Stallings and others (1980). For example, the recommended minimum proportion of classroom time dedicated to active instructional activities (e.g., reading aloud, demonstration, and lecturing) is 50 percent. Among the countries and areas where surveys were conducted in 2004–2005 (Ghana, Morocco, Pernambuco, Tunisia), Pernambuco allocated the least amount of time to these activities, but still exceeded the recommended minimum by 2.4 percent.

Quality inputs need to be in place. Meeting recommended benchmarks developed for the United States does not, however, necessarily translate into adequate learning achievement in developing countries. Specifically, these benchmarks make a number of assumptions about the presence of quality inputs for effective time use. Teachers are assumed to be aware of the curriculum content and the objectives of a given learning unit, as well as to know and be able to choose suitable teaching methodologies. Likewise, classrooms are assumed to have an adequate number of textbooks for each student and other appropriate learning materials.

Issues that require further investigation include why teachers use so much classroom time for classroom management and why students lose learning time in the classroom. The data on time use obtained from the eight countries examined in this

report follow a similar pattern: *teachers use their time efficiently on instructional activities, but nearly 25 percent of classroom time is still used for classroom management.* In Mali, for instance, teachers had to use classroom time to prepare for the next lesson because instruction periods span two- to three-hour continuous time blocks. Although block timing may reduce the time needed for transition, it may also increase the time required for classroom management. However, the Snapshot instrument does not capture what tasks are associated with this activity.

The COS instrument does not capture how much time is actually dedicated to learning curriculum-related contents. Since actual learning time related to curriculum content or assignments given by a teacher (i.e., academic learning time) may be only a fraction of the time students are coded as being "on task," little time may actually be spent learning and practicing curriculum content. One of the limitations of the Snapshot instrument is that it codes students who raise their hands as participating and engaged, but it does not document whether or not they are actually on task.

Multiple instruments are needed to assess classroom practices. Although not widely used in developing countries, several standardized measures can be used to assess the quality of instruction, interaction, and classroom processes and practices. Several instruments and rating scales for assessing classroom climate and effective classroom management are presented in the UNSECO report, *Increasing Teacher Effectiveness* (Anderson 2004). Some classroom observation measures are also introduced in Jukes (2006). **Another useful review of such measures is** "A Review of Early Childhood Observation Measures" by Elisabeth Grinder (*Educational Psychologist,* Special Issue: School and Classroom Organization). Reviews of the structure, content training requirements, and available psychometric properties of seven available direct observation codes are presented in a paper by Robert Volpe, James C. DiPerna, John M. HInze and Edward Shapiro (2005).

Instruments simpler than the Classroom Observation Snapshot could be used to measure time loss in the classroom. Findings from the BNPP surveys indicate that the Snapshot must be simplified and its behavioral categories modified to better reflect current concepts of learning and teaching. In addition, multiple measures are needed to capture the quality aspects of education and the links between instruction and curriculum content. Accordingly, adaptation and pilot testing of the tool may be needed in individual countries.

Further work is needed to develop a conceptual framework for the quality of classroom processes that would inform the design of appropriate policies. This framework should look more comprehensively at how classroom quality and learning relate to the teacher, students, the school, and other classroom factors.

This report concludes that the Classroom Observation Snapshot could be one of the instruments used to measure classroom practices in developing countries, but this tool requires significant modification. Data reliability could also be improved by using multiple instruments to examine classroom practices (Jukes 2006). Equally important, the

results of COS surveys should be interpreted within the context of the countries in which the data is collected (Matthew 2007). Results also need to be examined in light of modern concepts of learning and teaching in order to avoid the idea that more of the same type of classroom practices would be a sufficient solution (Sahlberg 2007).

Next Steps

This report has argued that better use of classroom time can be achieved only by improving awareness of time and time use in national educational systems and schools and by supporting schools and teachers to improve the quality of existing learning time. Given these goals, **this report suggests that World Bank should focus on developing and using instruments for classroom observation that address the core issues of client educational reforms, such as improved quality of instruction. Studies of time loss in the classroom should, moreover, be implemented within the same educational quality framework.**

Box 2. Next steps for classroom observation

- Explore what classroom observation measures are available.
- Develop and standardize observation instruments for different purposes.
- Make information available to the World Bank team task leaders and client countries on these existing classroom observation instruments.

If the goal of educational assessments is to link the use of instructional time with learning outcomes, the focus of such assessments should be how both teachers and students use their time in the classroom, not just how teachers do. The causal link between time use and learning also needs to be explored. Little is known, for instance, about the relationship between instructional time use by a teacher and learning achievement by students. Further work is needed to develop methodologies that can capture data on the amount of time students are engaged in curriculum-related learning tasks assigned by a teacher.

Box 3. Suggestions for TTLs planning to implement a COS survey

- Make sure the objectives of the COS are clear and that they are in line with government policies and priorities.
- Plan for dissemination and use of data.
- Ensure the government's ownership of and commitment to using the instrument.
- Adapt and pilot the instrument together with local education experts.
- Decide what grades and subjects will be covered.
- Have experienced trainers train the enumerators.
- Make unannounced visits to schools during the survey.
- Monitor and supervise data collection.

Additional studies are also needed to identify the conditions of student engagement and non-engagement. Such studies might explore why teachers use as much as 25 percent of their allocated instructional time for classroom management. More information is needed to understand why such a high proportion of students in the studies discussed in this report are uninvolved in learning activities, and how this time loss relates to classroom size, family background, the instructional methodologies chosen by a teacher, and the availability of learning materials. Finally, additional data is needed on effective instructional strategies, so that classroom observation instruments may monitor their use.

Appendix 1: Classroom Observation Snapshot

NO OF SNAPSHOT.: **EXACT TIME OF OBSERVATION:**

CLASSROOM OBSERVATION SNAPSHOT								
		MATERIAL						
ACTIVITY		NO MATERIAL	TEXTBOOK	NOTEBOOK/ WRITING MATERIALS	BLACK BOARD	VISUAL AIDS	MANIPULATIVES	COOPERATIVE
1. READING ALOUD	T	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	S L E
	I	1 S L	1 S L	1 S L	1 S L	1 S L	1 S L	S L
		CHECK IF CHORAL READING ☐						
2.DEMONSTRATION/ LECTURE	T	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	S L E
	I	1 S L	1 S L	1 S L	1 S L	1 S L	1 S L	S L
3. DISCUSSION	T	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	S L E
	I	1 S L	1 S L	1 S L	1 S L	1 S L	1 S L	S L
4. PRACTICE & DRILL	T	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	S L E
	I	1 S L	1 S L	1 S L	1 S L	1 S L	1 S L	S L
5. ASSIGNMENT	T	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	S L E
	I	1 S L	1 S L	1 S L	1 S L	1 S L	1 S L	S L
6. COPYING	T	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	S L E
	I	1 S L	1 S L	1 S L	1 S L	1 S L	1 S L	S L
7. VERBAL INSTRUCTION	T	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	1 S L E	S L E
	I	1 S L	1 S L	1 S L	1 S L	1 S L	1 S L	S L
8. SOCIAL INTERACTION	T	1 S L E						
	I	1 S L						
9. STUDENT(S) UNINVOLVED	I	1 S L						
10. DISCIPLINE	T	1 S L E						
11. CLASSROOM MANAGEMENT	T	1 S L E						
	I	1 S L						
12. CLASSROOM MANAGEMENT ALONE					T			
13. TEACHER SOCIAL INTERACTION OR TEACHER UNINVOLVED					T			
14. TEACHER OUT OF THE ROOM					T			

Comments (Positive Feedback & Support):

Appendix 2: Observations and Suggestions for Applying the Snapshot Instrument

This appendix summarizes the suggestions of enumerator teams in Benin and Mali for modifying the activities and categories of the existing COS instrument.[8]

[8] The issues and suggestions identified by the enumerators were recorded by Rebecca Paulson, Prathima Rodrigues, and Raisa Venäläinen and include their observations of the Mali instructional time survey. Jane A. Stallings provided feedback on the suggestions.

Appendix 2

Table 17. COS Instructional Time Activities: Issues and Suggestions from Enumerators in Benin and Mali

Activity 1 – Reading Aloud		
Definition	**Issues**	**Suggestions**
1. Reading aloud The teacher or one or more students reads aloud from a textbook, blackboard, their own writing, or reproduced material. Examples: - The teacher or student reads aloud while the rest of the class follows along in their own texts. - Students take turns reading sections from material. - Reading in unison. - Reading instructions aloud. This activity is usually a teacher-led activity, but it can be coded on the "I" line (for a student) if the teacher is not present and students are reading aloud to each other.	1.1. Coding and instructions in the manual and during enumerator training need to be changed. The original manual says, "Although one person reads at a time, all students are coded as engaged in the oral reading activity with the teacher." In a western setting this is an entirely reasonable coding assumption, but in developing countries it is a more questionable assumption. When a classroom is made up of 65 children sitting in a hot, noisy environment with a peer reading in a language that is poorly understood, most children will not, in fact, be listening to what is being read. Therefore, when "reading aloud" is taking place, this activity should not be automatically coded E (all children reading aloud). Rather, the enumerator should be instructed to observe how many children are actually "reading aloud" versus being "uninvolved" (see Walters 2007). 1.2. Is "reading aloud" an active instruction methodology? In the TOT survey in India (Sankar 2007), this activity was included in category 2, which consisted of "teacher activities in classrooms that do not require higher-order thinking. At the same time, they are not 'rote learning' methods, but involve ***traditional teaching*** activities that facilitate learning by students." 1.3. There is some uncertainty between the categories of "reading aloud" and "practice/drill" (activity 4).	Instruct the enumerator to observe how many children are "reading aloud" versus being uninvolved (Walters 2007). When reading aloud is taking place, do not automatically code the student line as E (entire class reading aloud). Survey pedagogical literature and consult education experts to define whether reading aloud belongs under active or passive instruction.

Appendix 2

Activity 2 – Demonstration & Lecture		
Definition	**Issues**	**Suggestions**
Activity 2 – Demonstration & Lecture The teacher, television, or some form of media informs or lectures a student(s); for instance, the teacher introduces new academic material to the students.	2.1. "Demonstration" and "lecture" communicate very different activities. The definition does not clearly express the meaning of these activities, nor does it convey the meaning of demonstration. Since demonstrations and lectures are two different types of activities, they should be identified as separate activities and each have their own definition as opposed to being combined. In the TOT survey conducted in India, this activity was replaced with "instruction/ demonstration." Lecturing was not included as a separate activity.	The definition needs to be clarified and expanded, reflecting that generally, this category is used when a teacher presents academic content to students (i.e., the activity is teacher-led). Although a student presenting to the class would also fall into this category, this activity is far more rare. Because question-and-answer activity often occurs within a lecture/demonstration activity; a "question and answer" box could be added and checked under the lecture/demonstration activity.

Appendix 2

Activity 3 – Discussion		
Definition	**Issues**	**Suggestions**
Activity 3 – Discussion The students and teacher interact in an academic discussion (i.e., a verbal exchange of ideas or opinions).	3.1. Discussion does not really occur in the primary-school classes observed**.** Instead, question-and-answer periods between a teacher and class are quite common. The difficulty with this category is that, given the brevity of an individual snapshot, it is hard to capture whether a discussion is taking place, which requires longer observation.	Add a new category: "Question & Answer." This category would be coded whenever a teacher asks a question of the class and one or more students raise their hands to answer it. (Usually the teacher looks for a very specific answer; if a student answers incorrectly, the teacher calls on someone else until he/she gets it right). It's quite possible that the "discussion" category could be removed altogether. If the category is retained, it needs to be more clearly defined with examples.
	3.2. If students are engaged in discussion while working on a group assignment, this activity is generally coded by observers as "assignment & seatwork," not "discussion," because the most obvious thing they see is students working on an assignment.	If the "discussion" category were removed, discussion during "assignment and seatwork" could be coded as "cooperative" to show that students are working together on a common task while exchanging ideas. This is an example where observers need to be reminded to record only the activity they see taking place at the instant of the snapshot; while they know that students are engaged in an assignment or a project, what they see when they take the snapshot is a discussion, which should be coded as "cooperative."

	3.3. The examples under the "discussion" category are not clear. In the example, groups of students are "helping" each other correct their homework and the teacher is "explaining" a problem to one student. It is not clear from the definition that helping correct homework should be coded as discussion. A teacher explaining a problem to a student seems, moreover, a better fit for "demonstration/ lecture" than "discussion."	Adding a clarifying word to this title would help broaden the category from adhering to a strict definition of discussion, which doesn't cover all the activities the category intends to cover. Perhaps something like "Discussion/Verbal Assignment" could be used.
Activity 4 – Practice & Drill		
Definition	**Issues**	**Suggestions**
Activity 4 – Practice & Drill Activities that are undertaken with the objective of memorizing material, such as multiplication tables, vocabulary, or spelling words.	4.1. There is some uncertainty between the "reading aloud" and "practice & drill" categories. Often a teacher will read a phrase from a text or from the board, then ask the students to read or repeat after her/him. More often than not, students simply repeat and do not actually read the words, so observers are unsure how to code this activity. In addition, there is a widespread practice in which teachers ask someone a question and if the answer is correct, all children are instructed to repeat what the first student said. To the casual observer, this looks like practice or drill. However, parroting is not equivalent to practice and does not produce much learning (Walter 2007).	Make a distinction between drill and parroting in the coding, for instance, by adding a **"**parroting/ repeating**"** box to check under this activity. Observers will have to judge whether students are following a text or not. This point should be added to the coding guide in the section on "reading aloud" and "practice/drill."
	4.2. Enumerators in Benin recommended removing this activity, as this sort of repetition does not happen in the classroom there. The only activity they observed in Beninese classrooms that might fit this category was singing.	Discuss the practice and drill activity in the training sessions with enumerators. Ask them to note in the log section when they observe this activity, along with an indication of how much time was given to it.

	4.3. Built-in value statements should be avoided. "Practice and drill" can be a useful methodology for learning a multiplication table or new language.	See recommendation associated with issue 1.3.
Activity 5 – Kinesthetics & Projects		
Definitions	**Issues**	**Suggestions**
Activity 5 – Kinesthetics & Projects Kinesthetics: Any activity that requires the use of the human body. Projects: Any activity that requires students to use information to create a project, such as hands-on activities that result in a product and can extend over one or more class sessions.	5.1. The definition of kinesthetics is not very clear and there are not enough examples to describe it.	The kinesthetics definition or coding guide should clarify that the body is being used for learning activities and more examples should be added.
	5.2. Projects seemed to be a very confusing concept. This category was almost never coded. It is very hard to differentiate (and the definition does not clearly differentiate between) what makes something a "project" versus "assignment & seatwork."	Remove this activity. If kinesthetics occur, they could simply be coded as class work under "manipulative" (since the definition of manipulative includes using the body). Also, a project can be indicated as a cooperative activity by marking class work in the "cooperative" column. If the category is retained, its definition must clearly differentiate what makes something a project versus an assignment.

Appendix 2

Activity 6 – Assignment & Seatwork		
Definition	**Issues**	**Suggestions**
Activity 6 – Assignment & Seatwork One or more students are writing papers or involved in any other written work at their seats. Reading silently is also coded as seatwork.	6.1. This activity is called "seatwork," yet it may include activities that take place at the blackboard or elsewhere in the room.	Activity 6 is a category that needs to be reviewed. Does it necessarily have to be done at the seat?
	6.2. Assignment and seatwork was a common activity in the primary classes observed. However, teacher monitoring and feedback are critical for positive learning outcomes from this activity. On several occasions it was observed that teachers accepted incorrect answers from students. 6.3. The wording that describes the actions of the teacher seem to indicate different activities (e.g., checking for comprehension, helping, actively monitoring, explaining).	The distinction between actively monitoring students in the "assignment & seatwork" category and checking for comprehension in the "discussion" category needs to be clarified. Feedback (individual/ group) should be included in the grid.

Appendix 2

Activity 7 – Copying		
	Issues	**Suggestions**
Activity 7 – Copying Students copy from the blackboard. The primary purpose of the activity is to transfer the text on the board verbatim to students' papers or copybooks.	7.1. This activity should be analyzed in context. Copying can be an effective method for learning languages or letters. Students may also copy textbook content or assignments from the blackboard due to a lack of textbooks.	Add a box to the matrix or use the log section to indicate whether copying is an activity used to replace or compensate for the absence of textbooks, or whether it is related to a learning activity.
	7.2. The main difficulty with this category is distinguishing between when to code "copying" and when to code "assignment & seatwork." For example, if a teacher writes a math problem on the board that the students must write down and solve, this would be coded as "assignment & seatwork," whereas if he/she wrote multiplication tables on the board that students were to write down, this activity would be coded as "copying."	An example should be added to the manual to clarify this distinction.
	7.3. Another difficulty in coding the "copying" category was how to code the associated material. Often copying was seen when a teacher was writing material on the blackboard and students were copying into their notebooks. This means that two materials were being used simultaneously. In this case, observers were unsure whether to code the "copying" with "blackboard" or "notebook."	Code the material the teacher uses as a teaching tool if enumerators face a choice between two materials.

Appendix 2

	Activity 8 – Verbal Instruction	
Definition	**Issues**	**Suggestions**
Activity 8 – Verbal Instruction The teacher verbally makes assignments for the work expected during the day or for homework. He/she explains the procedures to be followed, the amount of work to be finished, or the rewards for completing an assignment.	8.1. This activity is pretty clear. The only issue was differentiating between explaining how to do something and giving instructions to do something. For example, if a teacher explains to students how to build a water filter ("first you take a jug and fill it with water, then you…"), this was sometimes seen as "verbal instruction" instead of "demonstration" or "lecturing."	Add a couple of examples of verbal instruction in the coding guide that emphasize that this activity can be a directive or a command, stressing the point that verbal instructions do not clarify academic content.
Activity 9 – Social Interaction		
Definition	**Issues**	**Suggestions**
Activity 9 – Social Interaction Two or more students talk or laugh about non-academic activities. The teacher is socially interacting with the students.	9.1. There was much discussion among observers as to whether social interaction had to be verbal or whether it merely indicated an interaction between at least two students. This activity could also include passing notes, as well as physical interaction.	Include any interaction between at least two students, either verbal or non-verbal, under the category "social interaction." Any other off-task behavior would be categorized as "unengaged."

Appendix 2

Activity 10 – Student(s) Uninvolved		
Definition	**Issues**	**Suggestions**
One or more students are not involved in instructional activities, for example, if a student is staring out the window, resting his/her head on the desk, or sleeping.	10.1. The second point under the coding guide states that students who come in or out of class "for no apparent reason" should be coded as uninvolved. This indicates that if a student has a good reason, for example, going to the bathroom, going to get chalk for the teacher, etc., they should be coded as something else (perhaps classroom management), which is not stated.	The "no apparent reason" portion of this statement should be removed. Whether or not they have a good reason for coming or going, they are still uninvolved in the learning activity that is taking place in the classroom and should be coded as such.
Note: Depending on the purpose of the study, it is necessary to decide whether or not these two categories (social interaction/ not involved) need to be observed. There is general consensus that students who are interacting socially are uninvolved in a class, so why not simply mark them as such? Removing the "social interaction" category would, however, take away the possibility of showing a teacher engaging a student in social interaction. Should the "social interaction" category be removed, both teacher and students would be coded as "uninvolved" in such a case.		
Activity 11 – Discipline		
Definition	**Issues**	**Suggestions**
Activity 11 – Discipline One or more students are reprimanded for their behavior or sent out of the room for disciplinary reasons.	11.1. Oftentimes students were disciplined by being made to kneel at the front of the class. Because a snapshot codes activities related to the teacher, and a teacher might be in another activity at the time of a given snapshot (e.g., he/she is not actively disciplining the student), this activity cannot be coded even though students are being disciplined. Students involved in such a disciplinary activity are generally coded "uninvolved," which can be confusing, since observers want to mark them as being disciplined.	This point should be clarified on the coding guide instructions for "discipline." Include an "I" line for discipline; students coded on this line would be in the process of being disciplined. Record disciplinary activities in the log at the bottom of the coding matrix.

Appendix 2

Activity 12 – Classroom Management		
Definition	**Issues**	**Suggestions**
Teachers and/or students are involved in classroom management: passing out papers, changing activities, putting away materials, preparing to leave. If a teacher is alone and performing duties related to a class, such as grading or cleaning the blackboard, Activity 13 ("classroom management alone") is used.	12. 1. There was often confusion over why students preparing to leave and putting their things away were coded as doing "classroom management" instead of "uninvolved." Most observers want to code this activity under the latter category unless a clear task is taking place, such as cleaning the blackboard or passing out papers.	It seems that there should be a difference between students who put away their things after being asked to do so by the teacher, and those who do so before a classroom activity is over.
	12.2. The first point under the coding guide for this activity is to "code with no materials." Even though materials are being handled, they are not being used. This point is unnecessary. There is no choice to mark this fact on the grid for other materials, making it unnecessary.	Remove this point from the coding guide.

Appendix 2

Activity 13 – Classroom Management Alone		
Definition	**Issues**	**Suggestions**
Activity 13 – Classroom Management Alone A teacher alone is involved in classroom management: passing out papers, changing activities, putting away materials, preparing to leave.	13.1. How is this activity coded if a teacher is writing material on the blackboard and students are waiting for him/her to finish before they can either copy the material down or continue with the assignment? If he/she is writing lesson-related material, the activity is not necessarily "classroom management alone," but if the students aren't yet copying, it is unclear how they should be coded.	In such a case, code the teacher as "classroom management alone" and the students as "unengaged" or "social interaction." This might not be totally fair, as a teacher only has one blackboard and might not be able to write all the lesson material on it ahead of time. If such an activity is coded "assignment & seatwork," however, there is no way to code the teacher in this activity alone. Coding the whole class in this activity would, moreover, indicate that they are all engaged, when in fact they are not. If a teacher had given the students a task while he/she was writing material on the board, the coding could reflect that the teacher was in "teacher involved in classroom management alone," while the students were involved in "assignment & seatwork."
	13.2. The first point under the coding guide says: "Circle the T. Even though materials are being handled, they are not being used." This point is unnecessary. An enumerator does not have the choice to code this fact with other materials, making it unnecessary.	Remove this point from the coding guide.
	13.3. One common teacher management activity that was observed was the teacher writing the date, lesson title, classroom attendance. etc., on the board.	Add this as an example of "classroom management alone" in the coding guide, since the activity is so common.

Appendix 2

Activity 14 – Teacher Social Interaction or Teacher Uninvolved		
Definition	**Issues**	**Suggestions**
Activity 14 – Teacher Social Interaction or Teacher Uninvolved The teacher and another person (e.g., parents, a visitor, community members, another teacher) interact about subjects other than class-related topics. The teacher is in the classroom, but not involved in any academic activity.	14.1. This definition of teacher social interaction states that the teacher and another non-student interact about topics other than class-related material. The issue is how to code the activity if a teacher speaks with a visitor about a school-related topic? Would it still be marked as "teacher social interaction," or as "teacher classroom management alone" (even though the teacher is not really alone).	Since the snapshot method asks the observer to simply record what they see and not interpret the situation, this definition should be simplified to: "The teacher is interacting with a non-student." The observers should not have to deduce whether or not the material being discussed is academic.
Activity 15 – Teacher Out of the Room		
Definition	**Issues**	**Suggestions**
Activity 15 – Teacher Out of the Room	15.1. This was the clearest category of all.	Do not change.

Appendix 2

Suggestions for Improving COS Material Definitions

No material: No changes needed.

Textbook: No changes needed.

Notebook: The definition states that notebook also includes "chalk, pencils, pens, crayons, erasers, etc." This was confusing for observers, as writing utensils are separate from materials that are written on. Notebooks or slates can't really be used without these writing tools, so it doesn't seem necessary to add them to the notebook definition.

Blackboard: No changes needed.

Visual aids: No changes needed.

Manipulative: The definition of manipulative directs the observer to "code this category for any physical object that the student or teacher uses as a learning tool." This definition should be clarified, as visual aids could also be used as a learning tool. The definition should reflect that the object must be somehow maneuvered, manipulated, or controlled by the teacher or student in order for it to be coded as manipulative.

Cooperative: The following is the original definition in the manual: "This category is not a material, though it is under the material heading. Use this category when students work together on an assignment in small/large groups. Cooperative work necessitates an exchange of ideas between at least 2 people. NOTE: Just because students are working in groups does not make the activity cooperative. Remember that cooperative learning, also called collaborative learning, occurs whenever students (with or without the teacher) interact in pairs or groups to share knowledge and experiences about a common task."

Suggestions: A line should be added about when "cooperative" should be prioritized over other materials. For example, if students are cooperatively working on a project using light bulbs and wires ("manipulative"), the activity should be coded as cooperative and not manipulative. The definition itself also needs to be clarified to distinguish more clearly between what makes an activity cooperative as opposed to just group work. This is somewhat difficult for observers to determine because it requires some interpretation on their part. An observer may be able to see that students are working in a group and talking together, but it may be difficult to say whether they are actually working cooperatively. The term needs to be clearly defined to be measured.

Appendix 2

Other Suggestions for Improving the Manual

1. The manual should be shortened as much as possible by removing unnecessary pages, such as section titles. These titles could be combined onto the following pages, which would reduce the length by six pages.

2. The coding circles on example grids for each of the activities should be filled in or at least shaded, so that trainees understand that they are to completely fill in and darken their coding circles. Since trainees saw the open circles in the manual and the trainers often coded with open circles on the coding grid poster, trainees completed their own sheets with open circles instead of filling them in. Filling in the circles should thus be reinforced in the manual and during training.

3. The manual should further emphasize the brief nature of a snapshot. It needs to make explicitly clear that the observer is to record exactly what he/she sees at the precise moment of the snapshot and should not attempt to interpret the situation.

4. The manual should emphasize the difference between the first eight activities (i.e., active instruction) and the last seven activities (i.e., passive instruction and classroom management). The first eight activities are learning activities related to the academic content of a lesson, whereas the last seven are non-academic activities. Clarifying this concept will help observers automatically find the correct section of the coding grid. Before this point was clarified during training, observers often mixed up activities that are considered off-task with the first eight activities. For example, if students were sweeping the classroom, observers might code this as kinesthetic because it involves the use of the body. The observers did not understand this distinction until the trainers clarified that in order to code an activity in the top part of the coding grid (activities 1–8), the activity must be related to the academic content of a class. Any activity that is not directly related to the academic content of a lesson is automatically coded in the bottom part of the coding grid (activities 9–15).

5. Positive and negative feedback from teachers should also be included in the snapshot grid. Feedback was observed quite often; having a record of the amount of feedback given during class and whether it is positive or negative would be a useful data set. Feedback could potentially be added as another activity category or another line (possibly under the “assignment/seatwork” category), as it was during this activity that most feedback was recorded. Aligning feedback with a specific activity would be limiting, however, since teachers might provide feedback during “reading aloud” or “projects,” as well as “assignments.” It might be useful to have a separate box in the comments section that would allow observers to mark down any positive or negative feedback that occurred, either during or between snapshots. This would create a record of how many times positive and/or negative feedback was given during a 60-minute period.

Appendix 3: Country Implementation Plan for Training and Data Collection

Preparation

The instructional time survey requires the training of enumerators on classroom observation methods, data collection, data analysis, and reporting.

Preparation for training includes:

- identification of enumerators, training venues, and selection of the schools where testing will take place;
- consultation with local education experts to assess the appropriateness of activities, finalize the cover sheet, and suggest modifications to the instrument, wherever necessary; and
- obtaining permission from the relevant Ministry of Education, wherever necessary.

Training

After the preparation phase, training takes place in a country for a total of 4–5 days. A specialized trainer familiar with the methodology and instrument is required. Training is conducted on:

- the concept of classroom instructional time;
- use of the Classroom Observation System (adapted from the Stallings Observation System) for classroom observation;
- actual classroom observations (to enable enumerators to practice coding classroom activities and improve the reliability of their readings);
- basic calculations of time allocated to various activities; and
- use of classroom observations to provide immediate feedback to teachers.

Observer reliability is checked during training and again at the end of the training.

Data Collection

- If a high reliability rating is reached during training, one observer is assigned to observe one teacher. Otherwise, two observers are assigned per teacher. Data booklets from the observation are then brought back for analysis.
- Local and/or regional education offices need to be contacted ahead of time to let them know that a research team is coming. Make sure that a letter to

the school directors is prepared with a stamp of approval. The letter should briefly explain the purpose and procedures of the study. Ask regional officials NOT to inform the selected schools, as data should be collected during surprise visits.

- Make sure observers administer the director questionnaire without leading the director or making recommendations or judgments.
- When groups are established to go to different schools, consider selecting a coordinator for each group. This person would be in charge of delegating roles (e.g., who will administer the questionnaire to the director, who will evaluate reading, who will be observers).

Data Analysis

A software and data entry manual is available.

Budgeting

Table 18. Example budget for in-country costs [9]

International consultant (trainer)	
Fee	
Travel	
Hotel and **per diem**	
Total consultant cost	
Training	
Cost of materials (printing of manuals, grids, flip charts, etc.) x number of participants	
Transportation for participants + transportation to schools where the instrument will be tested during training	
Refreshments	
Rentals (facilities, equipment , etc.**)**	
Equipment	
Miscellaneous	
Data Collection	
Fees + Transport (depends on the sample size)	
Travel + Lodging	
Total	**US$30,000 – US$45, 000**

Note: The budget for data collection is subject to change depending on the number of schools in the sample and the geographic location of schools.

[9] Based on Instructional Time surveys during Phase 1 of the BNPP project and the COS survey in Mali.

Appendix 4: Regional Breakdown of Classes and Schools in Mali COS

Table 19. Number of classes and schools in Mali, by commune

Commune	Total classes observed	Total schools observed
Baguineda	11	5
Baroueli	16	10
Benkadi	3	2
Boidje	4	2
Dialakorba	4	2
Kalake	4	2
Kaniogo	10	5
Moutougoula	7	3
Narena	6	3
Sanando	4	2
Sanankoroba	5	3
Somo	2	2
Tamani	4	3

Source: World Bank time-use survey, Mali, 2007.

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