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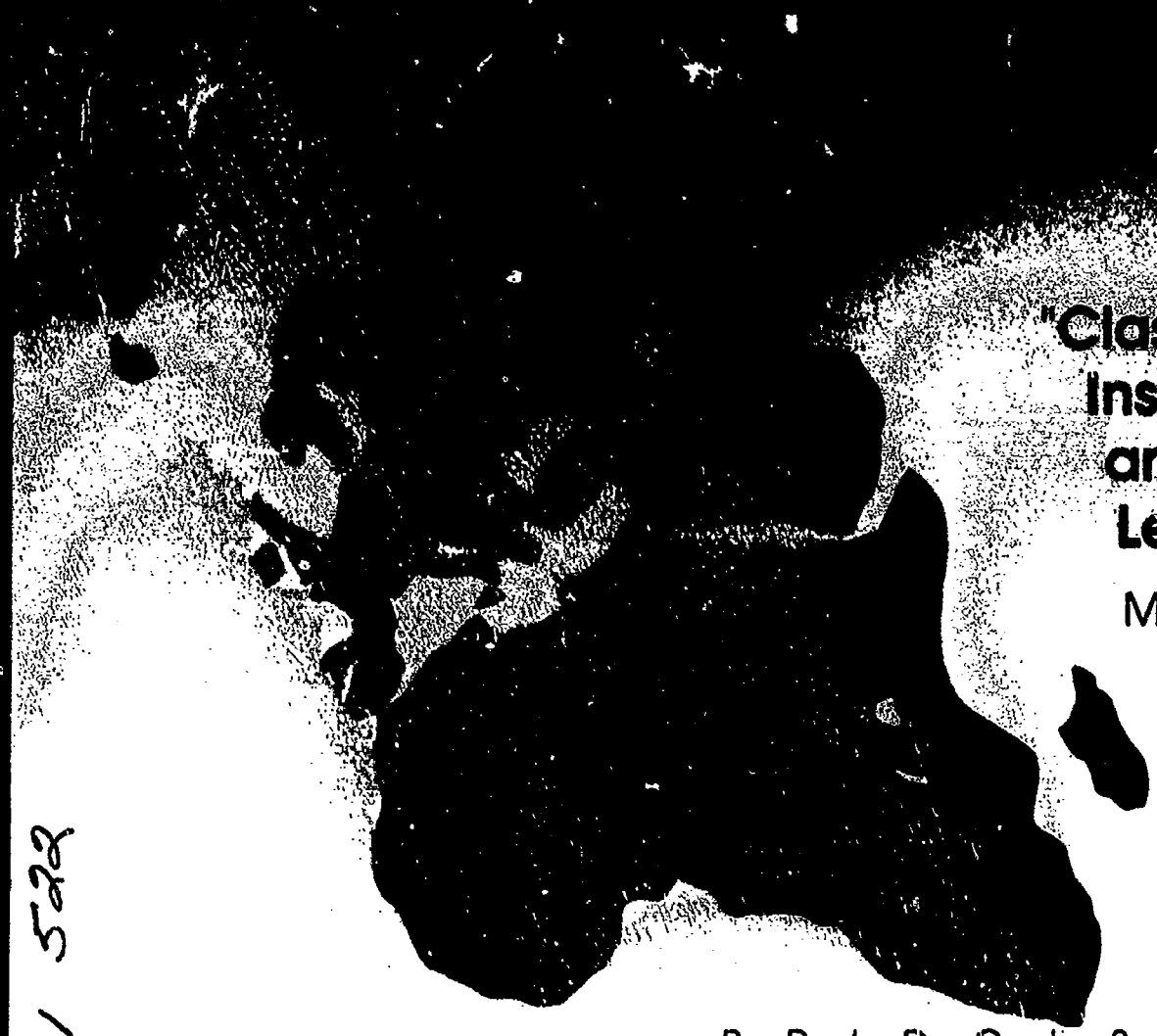
ABSTRACT

Due to limited resources in developing countries, finding the most effective means to achieve educational goals demands finding alternatives with the lowest possible costs. Classroom management attempts to use the human and material resources already present to improve both the quality and the quantity of learning through time-on-task. The relevance of classroom management, which emphasizes teaching in relation to management and uses instructional materials and teacher-managed time to promote learning, in developing nations is examined within this document. Specifically, the literature reviewed indicates that: (1) for learning to occur, stable teacher and student attendance patterns--established through incentives, recognition, and goal achievement--must exist; (2) it is the teacher as a classroom manager who has the greatest influence on learning; and (3) the use of classroom time and instructional materials depends on the teacher's ability to organize, pace, monitor, and provide feedback to students. Instructional strategies and the allocation of learning resources present challenging tasks for the educational attainment of developing countries. Classroom management strengthens the teacher's knowledge of his or her role; by becoming more aware of this role and of the interactive aspects of the teaching-learning process, teachers can enhance students' ability to learn. (191 references) (KM)



"Classroom Management: Instructional Strategies and the Allocation of Learning Resources"

Martha Montero-Sieburth

B • R • I • D • G • E • S
Basic Research and Implementation in DevelopinG Education Systems

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The Basic Research and Implementation in DevelopinG Education Systems Project (BRIDGES) is directed by the Harvard Institute for International Development and the Harvard Graduate School of Education, under Cooperative Agreement No. DDP-5824-A-5076 with the Office of Education, Bureau for Science and Technology, United States Agency for International Development. Also participating in the Project are the Institute for International Research, Michigan State University, the Research Triangle Institute, and Texas Southern University.

The BRIDGES Group includes educators, researchers, planners and policymakers committed to improving opportunity and quality in Third World schools. The goal of their collaborative effort is to identify policy options that will increase children's access to schooling, reduce the frequency of early school leaving and repetition, improve the amount and quality of what is learned, and optimize the use of fiscal and educational resources.

The *BRIDGES Research Report Series* is edited by the Harvard Institute for International Development. The *Series* is a collection of reviews of the state-of-the-art in research, and original research reports on basic education in developing countries. Each review summarizes research about a particular policy issue and suggests policy options. Original reports on BRIDGES-sponsored research present new information about the impact and costs of specific alternatives that the reviews have identified as most promising.

"Classroom Management: Instructional Strategies and the Allocation of Learning Resources"

Martha Montero-Sieburth

With assistance from Nona Lyons, Victoria Kelly-Suzuki, David Perkins, and Gerry Ewert.

Special thanks to Armando Loera-Varela for his work on instructional time.

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Foreword

This paper provides a framework for the design and evaluation of policies intended to improve learning outcomes of schools. Montero-Sieburth argues that three major factors contribute to the amount of learning in schools:

1) the effective use of instructional materials,
2) the quality of academic activities and tasks, and
3) the amount of academic time spent on engaging students in learning.

Her paper focuses on policies that affect the first and third factors, use of instructional materials and the allocation and maintenance of "time on academic task."

The simplicity of this framework may mislead those who are accustomed to thinking of the educational process as tremendously complex, so much so that they resist attempts to make teaching "scientific" and instead proclaim it an "art form." It may challenge those who believe that reduction of education to a mere process of instruction takes the soul out of the educational endeavor, leaving only an empty shell of technique.

Montero-Sieburth's contribution, while simple, is not simplistic. It expands the creative role of teachers rather than minimizing it. Not only must teachers be innovative in implementation of the curriculum in response to variations in students, they must also be innovative in the development of instructional aids out of whatever materials the environment provides. Montero-Sieburth shifts the definition of teachers from "implementors of a centrally designed curriculum" to "classroom managers of a variety of resources," only some of which are provided by the administration. The teacher remains the major source of students' learning of values, skills, and knowledge. The question is, what can central ministries do to help teachers be more effective, given the resources that are already present in the system?

Improvement in the quality of instruction will come principally through curricular reforms (of the kind described in Thiagarajan and Pasigna, BRIDGES Research Report Series No. 2, 1988), and through improved pre-service and in-service training programs—but ministries can do much to increase effectiveness through policies that affect the academic time spent on the teaching-learning process.

In many education systems both curriculum and pedagogy are largely unimplemented, because neither teachers nor students spend enough time on teaching and learning. Nor are they aware of how time is used or wasted. Assumptions by the ministry about what will take place in classrooms are invalidated, as too little time is employed in the realization of pedagogic goals, and knowledge about classroom interactions is unknown. Systems fail to reach objectives not so much because the curriculum is bad, but because it is not fully used or relevant, and not so much because teaching is poor, but because there is not enough of it. This paper provides evidence to support the conclusion that policymakers seeking fairly prompt improvements in levels of teaching-learning should attend to increasing the already available time spent on academic tasks for teaching and learning.

The teacher remains the major source of students' learning of values, skills, and knowledge.

The key elements in the framework for consideration of policy options are the teacher, students, and the resources available to the teacher. For each, time is the underlying dimension. Teacher time-on-task can be increased by reduction of absenteeism, reduction of time on non-academic activities at school, and a corresponding increase of time spent teaching the formal curriculum. Student time-on-academic tasks can be increased by relevant instructional materials, more frequent examinations, assignment of home-

work, and parent involvement in the instructional endeavor. Time-on-task can also be increased through use of materials (textbooks, workbooks) that permit students to focus on the curriculum even when they are not being taught by the teacher.

Montero-Sieburth reviews available research, but it is evident that an even broader range of options exists both for policymakers and creative teachers. The contribution of this paper to a dialogue on policy options for the improvement of learning outcomes is its identification of the importance of the teacher in carrying out academic tasks while maintaining order through stable classroom organization.

Noel McGinn
April 11, 1989

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Executive Summary

Because of present limited resources in developing countries, finding the most effective means to achieve educational goals demands finding alternatives with the lowest possible costs. This requires knowing how to best use the already available resources within the education system.

Classroom management attempts to use the human and material resources already present to improve the quality, as well as the quantity, of learning through time-on-task. This review deals with the relevance of classroom management to developing countries by emphasizing teaching in relation to management, and by the use of instructional materials and time as teacher-managed activites and strategies that lead to learning.

Generalizations from the review include the following:

- In order for learning to take place, stable teacher and student attendance patterns in developing country schools must exist. Teachers need participation incentives (where they are lacking) such as recognized status, professionalization, and merit considerations. Students need recognition, knowledge and skill development, and goal achievement.
- A different perception of teachers and teaching, one directed at training teachers in more effective and efficient use of existing resources, needs to be adopted.

...the idea that teachers can be managers requires a basic change in the concept of teachers as passive agents of the educational system.

- Policymakers, local school administrators, and/or teachers can initiate changes, but it is the teacher as a classroom manager who has the greatest influence on learning. Acceptance of the idea that teachers can be managers and active decision makers, requires a basic change in the concept of teachers as passive agents of the educational system.
- Teachers deal with a series of complex situations in everyday teaching — instruction, management, socialization, and discipline. With classroom management, teachers can control their students' behavior and learning through appropriate use of procedural strategies.
- The available resources to teachers in classrooms are time and instructional materials. However, the utilization of such resources depends on the teacher's ability to organize, pace, sequence, monitor, and provide feedback to students.
- Time spent on academic tasks yields learning outcomes, so time as a resource needs to be considered in light of time that is wasted. However, the quality of the task and student engagement are even more significant.
- The textbook is the most significant instructional material in developing nations. Its cost and production, however, make other learning options appealing.
- Instructional materials in themselves do not guarantee learning. Instead it is the way in which these materials are used that contributes to learning. Instructional materials are relevant in proportion to the students' and teachers' ability to use and interact with them.

The final section of this paper suggests recommendations to policymakers.

Section I: Introduction

Purpose of Review

Those concerned with improving educational outcomes, but confronted by an under-financed education system, have three options:

- to use existing resources more effectively,
- to seek additional resources, or
- to reduce the number of children served.

The purpose of this paper is to suggest policy options for the more effective use of existing resources through improved management. The struggle for increased funding, especially for basic education, must continue but available resources can be employed in more effective ways.

The recommendations of the paper are for policy changes, but because the work of education takes place in classrooms, it is changes in classroom management practices that will have the greatest effect. The paper will (1) define classroom management; (2) clarify the application of classroom management to developing country contexts; (3) identify those variables that, while directly controlled by teachers, can be influenced by government policies, namely, utilization of instructional materials, including the use of textbooks, and the use of classroom time; and (4) address the potential of classroom management for developing policies directed at teacher education, textbook production, opportunities to learn within classrooms, and reduction of teacher and student absenteeism.

Significant Variables

Although this review discusses the effects of classroom management on school policies, it does not address issues of school organization, such as leadership of the principal, school administration, and community-school interface. (These issues will be addressed in another BRIDGES Research Report, "Recognizing, Fostering, and Modeling the Effectiveness of Schools as Organizations in Third World Countries" by John Schwille et al.) This review analyzes the classroom within the formal school setting.

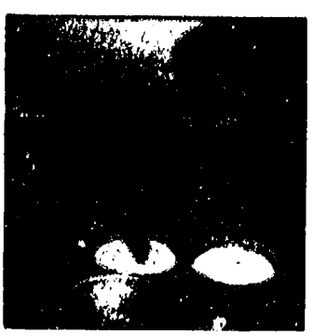
In the following sections, the paper defines classroom management in terms of instructional and management strategies, and provides as an illustration a Latin American composite case study of rural and urban classrooms. The paper then reviews research on how the policy variables of instructional time and materials affect learning outcomes. Policy implications and recommendations for future policy initiatives are discussed in the concluding section.

The recommendations of the paper are for policy changes, but because the work of education takes place in classrooms, it is changes in classroom management practices that will have the greatest effect.

Section II: Definition of Classroom Management

Classroom management as understood in the industrialized countries refers to "the provisions and procedures necessary to establish and maintain an environment in which instruction and learning can occur" (Duke, 1979: xii). According to Doyle (1986: 395), "...classroom teaching has two major task structures organized around the problems of learning and order. Learning is served by the instructional function (directed at individual cognitive engagement with academic content)...and order is served by the managerial function" directed at group participation. Brophy (1988:3) goes on to state that classroom management and instructional activities are simultaneous and inseparable: some minimal level of orderliness is essential for instruction to take place; at the same time, lessons must be designed to engage students' attention. Thus, classroom management entails not only teacher regulation of students' behavior through the establishment of rules and procedures and disciplinary interventions, but also the use of instructional strategies such as lecturing, questioning, recitation, seatwork, grouping, and the use of instructional materials to engage students in academic tasks. In short, classroom management is closely affiliated with teaching and classroom discourse (Brophy, 1988; Doyle, 1986).

Classroom management encompasses instruction ("actions assisting student in mastering formal curriculum"), student socialization ("actions intended to influence students' beliefs, attitudes, personal and social behaviors, expectations"), and disciplinary interventions ("actions intended to change disruptive behavior of students") (Brophy, 1988).



Teaching and management are the intervening factors between policy initiatives and educational outcomes.

Thus a good teacher is described as:

> a thoughtful practitioner who operates with considerable autonomy, yet purposefully works toward a set of goals that are simultaneously differentiated and integrated (Porter & Brophy, 1988:81).

Any attempt at utilizing classroom management strategies in developing countries needs to take into account the following caveats:

1) The nature of classroom management—which is linked to effective teaching, teacher thinking, and classroom discourse (Doyle, 1986)—in industrialized countries should not be translated as a set of techniques or a new technology separate from the control of the teacher in developing countries. It is most likely that approximations of classroom management are already in place in some developing countries through instructional delivery, uses of instruction, and direct and active teaching. Thus understanding that classroom management principles may not have a one-to-one correspondence in their application, but may be found in "approximations" to its practice, is important.

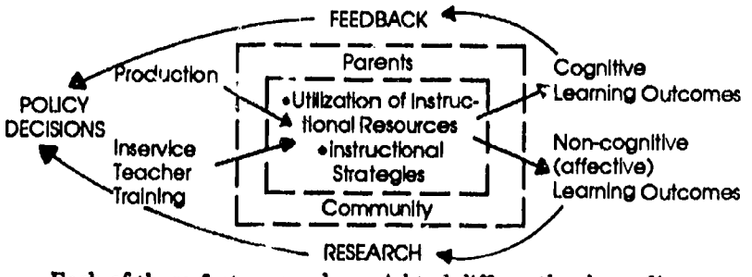
2) Evidence of the impact of classroom management in cross-cultural settings is yet unknown, although Brophy (1987:7) asserts "that there is no evidence that different classroom management principles apply to different racial or ethnic groups..." and that familiarity with the local languages and customs may enable teachers to respond more effectively to their students. Therefore classroom management practices will need to be experimented with in different contexts—rural, urban, semi-rural and urban-marginal—and the cultural norms and values of a country will have to be considered.

3) The fundamental premise of classroom management is that the teachers' role is to maintain student engagement in academic endeavors rather than to focus on student distractions and discipline. However, such emphasis on disciplinary interventions will need to be considered within the context of developing countries. But insuring that students and teachers get to school and have instructional materials to work with may be more important than discipline issues.

4) The different attributes of classroom contexts such as multi-age groupings, large class sizes, maturity levels of students, available school facilities, the nature of urban and rural schools, and teacher expectations and attitudes, may present teaching/managing challenges of different magnitude in developing countries as compared to industrialized countries.

5) Finally, understanding the complexity of teaching and considering the importance of teachers as resources and managers within classrooms will require a different conceptualization of the teacher and his/her profession in developing countries.

For the purpose of this paper then, "classroom management" refers to teaching and management together. Teaching, understood as instructional strategies, and management, understood as patterns of use of instructional resources, are the dual concepts that explain how educational goals can be achieved through classroom practices. Teaching and management are the intervening factors between policy initiatives and educational outcomes. For example, the effects of policies with respect to production of materials and selection and training of teachers are mediated, or realized, through the instructional strategies and classroom management practices of teachers. Policymakers can make a better selection among options that affect teachers by understanding how classroom management practices affect learning outcomes, and how those practices are in turn influenced by central policies.



Each of these factors can be weighted differently, depending on context.

Applicability of the Concept of Classroom Management to Developing Countries

Educational efforts in the developing world have traditionally focused on issues of access, teacher availability, school facilities, and instructional materials—the quantitative allocation of resources. The prevailing rationale has been that once most students are in classrooms, and the teacher is present, then the basic conditions for schooling and learning are present. Acting on this premise, educational policymakers usually focus first on issues of availability of resources and access and later on issues of quality. Allocation of resources alone without regard to the teaching process, however, does not guarantee learning. Rather, it is both the quantity and quality of the interaction between teachers and students that are relevant (Calderhead, 1984; Doyle, 1986).

Given limited resources, the best policy options are those that produce the same outcomes, but at lower cost, or that increase outcomes at no additional cost. Changes in classroom management practices are one way to do this. Educational quality then can be viewed as a function of:

> ...(a) the level of material inputs allocated to school per pupil (resource concentration), and (b) the level of efficiency with which a fixed amount of material inputs are organized and managed to raise pupil achievement (Fuller, 1985:23).

Fuller cautions that it is not the aggregated sum of various material inputs that accounts for levels of quality—more is not necessarily better—but the management capacity of teachers or how well they use resources in the classroom. Mere allocation of material inputs is, therefore, not enough. More innovative ways of understanding how schools work and how quality can be improved are the issues (Fuller, 1986:63). For example, although some gains in learning will result just from giving textbooks to children, learning gains can be increased much more if teachers organize students' use of the books.

To understand how to improve management capacity it is important to identify factors that are directly related to quality of education, particularly to classroom management. These factors include teacher background (including issues such as pre- and in-service training and teacher behaviors related directly to achievement), efficient use of instructional time, assessment of student performance, and use of instructional materials (Fuller, 1985:24).

While policymakers or school principals can initiate changes in the educational structure, the curriculum, and administration, it is teachers who are expected to have the greatest impact on learning. Acceptance of the idea of teachers as decision makers and managers requires a basic change in the notion of teachers as passive agents of the education system. As a result, the change in concept has policy implications: policymakers should take appropriate measures to enhance the management capability of teachers in order to improve educational outcomes.

Classrooms as Contexts

Teaching takes place in the classroom, a complex site where what happens is a function not only of the physical setting but also of the human participants, and their behaviors toward each other. Erickson and Shultz (1977) consider that:

> Contexts are not simply given in the physical setting... nor in combination of personnel (two brothers, husband and wife, fireman). Rather, contexts are constituted by what people are doing and where and when they are doing it. As McDermott (1976) puts it succinctly, "people in interaction become environments for each other."

Classrooms vary in terms of student/teacher ratios, age ranges, levels of attrition, retention and repetition rates, provision of basic instructional materials and, in some cases, community support for schooling (Wells, 1976). The national curriculum cannot anticipate the different circumstances in which teachers must implement it. Furthermore, education systems with severe resource constraints spend most (often over 90%) of the annual budget on salaries, leaving little for material inputs. A teacher's capabilities to manage and direct learning activities under these conditions are critical.

Classrooms are defined by their location (rural, urban, semi-rural, and urban-marginal), size, number of students, region, grade distribution, resources, language of instruction (first or second language), numbers of teachers, and other criteria. Classrooms vary widely, from those developed by the community on an available plot of land, to those supported through local initiatives, and those receiving funding and materials from the government. In many countries, multigraded classrooms with one teacher for up to six grades are not unusual. Several common elements can be identified from observations made in rural and urban classrooms in Costa Rica (Brenes et al., 1987; Montero-Sieburth, 1983, 1986, 1987), Guatemala (Montero-Sieburth & Loera-Varela, 1986), Latin America (Arancibia, et al., 1986; Avalos, 1985; Munoz Izquierdo, et al., 1979; Moore, 1983) and Thailand (Classroom Environment Study Report, 1985). Understanding the context in which teachers work is essential for the identification of those classroom management practices that could be most effective in terms of learning outcomes. To facilitate the discussion in the rest of the paper, the following section is a composite description, based on repeated observations, of a "typical" classroom in Latin America.

Latin American Composite Description

Physical Layout

The classroom is situated in a large building with a physical layout that allows for benches to be placed across the room. Where there are no benches, chairs are brought in by students from their homes, or desks are provided. Sometimes there are so many desks or benches that students have to walk across them in order to reach the blackboard. The teacher's desk is to one side or at the front of the room; there are sometimes blackboards on one wall, and usually a cabinet with a lock. Bookshelves are scarce. Lighting is frequently provided by only one large window, since the other windows have been covered to avoid distractions. Hanging light wires or sockets without light bulbs are common. Depending on the vicinity, the classroom is either carpeted from wall to wall with students, or, in more rural areas, a scattering of students will be grouped in the center of the room with whatever available facilities there are. The blackboard shines since it has been painted over or had "milk" applied to give it a smooth surface for the chalk to move upon. Materials are scarce, especially chalk and pencils. Toilet paper is at such a premium it is kept by the teacher or is locked in a drawer and students have to ask for it when going to the bathroom. In some schools, toilet paper is nonexistent, unless provided by parents' groups or teachers.

Intersection of Instructional Delivery, Time, and Context with Behaviors

In general, the teacher's class delivery occurs in the following order. A roll call is taken by the teacher while students are asked to take out notebooks or textbooks from the locked cabinet. In some cases, the teacher hands out materials or has a few students distribute books. These activities alone take up 15% of the allocated class time. For the next 70% of the class time, the teacher presents information through lectures, asks questions, asks for recitation, dictates, writes notes on the board if chalk is available, checks homework either by moving around from seat to seat, or by having students line up and present their work individually, and monitors seatwork. During the

question and answer routines, the teacher directs questions to the entire class and often expects a choral response. Questions are answered by the teacher when there is no response. Feedback on individual progress is infrequent and arbitrarily given; students' efforts do not often get the teacher's open recognition (verbal praise or acknowledgement). Much of the instruction is teacher-centered, with limited opportunity for students to be involved in experiments or to demonstrate their understanding of concepts. Much time is spent with teachers dictating or writing the homework assignments on the chalkboard, while students copy them down. Students use the blackboard for drills, homework exercises, or exemplification of answers to subject matter problems.

About one-third of this time is spent on discipline, transitions between learning activities, organizing sports and other non-academic activities, such as celebrations, festivities, etc., interruptions from school administration, from visiting parents, from students asking for permission to go to the bathroom, and on occasion from vendors selling their wares to teachers. Teachers discipline students either openly within the group or by taking students aside to reprimand them. Punishment may take the form of seating changes or segregating students in one corner of the classroom.

The teacher's engagement in activities does not mean that all students are also engaged in learning. In some instances, as the teacher sits down to grade notebooks with students clustering around him or her, the rest of the class may be reading silently, drawing, or talking with each other. Engagement may be social, rather than academic. In some instances, class time is broken up by the school lunch or breakfast which is prepared and eaten during recess. In Guatemala, a high protein drink called *incaparina* is served during recess at about 10:30 a.m. It serves to sustain the students until the end of the school day at noon.

In other instances, time for teaching subject matter per week is allocated by guidelines from the central educational office, and the teacher organizes her/his time accordingly. In most cases, the teacher controls the subject matter preference. In general, language arts, mathematics, and in some cases, religion are more frequently taught than science or social studies. For the remaining 15% of the available time, the teacher will dictate new information, write the homework assignments and exercises on the blackboard to reinforce the lessons, or organize non-academic activities in preparation for celebrations or sports activities. The social dimensions of community life intersect with schooling to the degree that preparation for celebrations or sports may consume much of the academic learning time available, significantly reducing the actual total of school attendance days.

Instructional materials, including pencils, blackboards, and paper, are limited; those available are usually controlled by the teacher. In some cases, the materials are provided by the central education office or local parents' group; in others, textbooks are commercially produced, bought by families with means, and used as a guide by the teacher. Where textbooks are scarce, they are shared in groups of twos, threes or fours. The teacher's book is sometimes the only instructional material. The use of real-life objects such as vegetables and plants for instruction is common. Textbooks are collected either by one student, or brought by individual students to the teacher for storage after the lesson is over. At the end of the school day, students leave with their notebooks to complete the remaining homework assignment.

This composite description of a "typical" classroom suggests that although the presence of instructional materials is important, how they are used is the more critical question. The resources used within classrooms, their cultural relevance, and the creativity of the teacher are not always considered. How teachers and students spend their time in the classroom, how they use materials, how they interact with each other, would seem to be the critical determinants of learning. We turn now to research on use of time.

Section III: Factors That Limit Amount of Time Available

Time as a resource is finite; there is only so much of it. The total amount of time available to teachers for instruction, and to students for learning in the classroom, is limited or constrained by the presence of teachers and students in the classroom. This section reviews research on teacher and student absenteeism, and suggests policy options to reduce both, thereby increasing the total amount of time each is present in school.

Teacher Availability and Absenteeism

Not only is there a severe shortage of (qualified) persons willing to teach in rural areas (Dworkin, 1980; Marsh, 1984), but there are also high rates of teacher absenteeism. In the countryside, the loss of a teacher often means the closing of a school. Absenteeism is defined as long term absence by a teacher, or chronic, short term absences where no substitute teachers are available. Teacher turnover, the departure of teachers from school in order to leave the teaching assignment or the teaching profession, is considered here as a special aspect of teacher availability.

Time as a resource is finite; there is only so much of it.

Research reports and statistics on teacher availability in developing countries are scanty. Systematic research on teacher attendance is limited. The World Bank, for example, in a report on sub-Saharan African education describes the following:

> In rural areas, classes of 80 or more pupils are not uncommon. These classes may be held in dilapidated structures, frequently without roofs which usually means that teaching is suspended whenever it rains. In many classrooms there are virtually no educational inputs to be found other than the teacher at the front of the room — no books to read, no benches to sit on, write on and make calculations. There are many reports, too, of teachers who are chronically absent from work, especially in settings where housing for teachers is in short supply or the payment of teachers' salaries is unpredictable. It is inconceivable that very much learning can occur under these conditions... In some African countries — especially in remote rural areas, there are reports of teachers leaving the profession to work in other sectors of the economy...Often the major complaint of teachers assigned to unfamiliar rural areas is the absence of good housing. Frequently, there is not available even rental housing of a reasonable standard (World Bank, 1986).

In some rural Latin American countries, observers report teachers are absent because they must attend meetings or bring official reports to a capital, or take care of some responsibility in off-school premises (Montero-Sieburth, 1986; Fuller, 1985). In Kenyan rural schools, teachers are reported to take off half or whole days from school to attend to second jobs, usually on farms or in small shops. In such situations, students are occasionally monitored by teachers from another classroom, or by older students, but for the most part spend their time unsupervised and untaught (Githiora, 1987).

Absenteeism is the consequence of other elements in the teacher's life. For example, it is likely that teachers' attendance is determined by location of residence, availability of transport, existence of roads, and health conditions. Information about the teacher's life could, therefore, be a starting point for policies to reduce teacher absenteeism.

Practices and policies for the assignment of teachers to schools vary from country to country. In some countries (e.g., Mexico, Pakistan) new teachers are routinely assigned to the more remote schools, no matter what the teacher's background is. Given the adverse conditions of life in rural areas, teachers attempt to transfer to more favorable locations. The

result is that rural schools have a high rate of teacher turnover and largely inexperienced teachers (Marsh, 1984), both of which have negative effects on student learning outcomes (Githiora, 1987).

Ankrah-Dove (1982) identifies two models useful to policymakers considering the assignment of teachers to rural areas: the rural deficit model and the rural challenge model. The rural deficit model takes the perspective that life in rural communities is unattractive to teachers and that consequently they must be compulsorily posted and/or receive a host of incentives to keep them there. The rural challenge model takes the perspective that the rural school provides a special challenge for the motivated teacher and that teachers should be specially trained towards the attainment of the personal maturity and self-reliance necessary to accept that challenge. At the same time, as an added incentive, rural teachers should have career opportunities that equal those of urban teachers.

The implications of Ankrah-Dove's work are that dissatisfaction and turnover among teachers could be reduced by assignment and incentives policies that take into account the career objectives and personal circumstances of teachers. For example, persons who have entered teaching seeking intellectual development can be expected to stay in rural areas only if they are provided with opportunities to continue to develop their intellectual abilities, for example, through in-service training programs. Persons who enter teaching for monetary rewards or job security will not respond to these kinds of incentives, and instead must be offered premiums for working in isolated areas, or long-term contracts. Policies for reducing teacher absenteeism should be context specific, which means that decisions about their application will have to be made in the school, or at the district level.

Efforts in the United States suggest that teacher attendance can be improved by stressing the importance of the issue, documenting and publishing actual costs of teacher absences, making the attendance record part of teacher evaluation, and involving the teacher's immediate supervisor. Absence rates have dropped when teachers talk directly to a supervisor, and therefore have the opportunity to make some alternative arrangement that makes a full day's absence unnecessary (Elliot, 1982).

The implications for developing countries are that policies for reducing teacher absenteeism should be context specific and directed at the school level. Teacher involvement, through mechanisms such as self-reports, may be inducements to the teacher's own continued attendance, particularly when shared during teachers' meetings. The cost to students of teacher absences can only be speculated upon, but in terms of what this may mean for student achievement or for student participation in school, most educators believe that the cost is significant. Indications from the study and analysis of educational costs for Costa Rica suggest that teacher absenteeism is not only frequent but costly since it is tied to socialized medical visits and also requires hiring substitute teachers (Sanguinetty, 1988). Higher teacher absenteeism or turnover usually means less learning opportunity. Moreover, teacher absenteeism also reinforces educational inequality, as it is more frequent in those areas where the presence of a teacher is the only opportunity to receive schooling.

Student Absenteeism

Educational "wastage," in the research literature for developing countries, refers to a trio of school attendance issues: absence, repetition, and dropping out. For policymakers and researchers, the three issues must be considered together (UNESCO, 1984). "Student absenteeism" is usually defined as chronic student absence from school for reasons other than serious illness or other temporary life situations; "repetition" as the academic failure that, as a consequence, forces a student to be retained in the previous grade; and "dropping out" as a student's departure from school for more than a year. Absenteeism, repetition, and dropping out are closely connected (McDill, Natriello, and Pallas, 1985). For instance, Arancibia (1987) reports that in Latin America high levels of repetition increase the dropout rate, although the correlation between student absenteeism and achievement is inconsistent. In particular, Munoz Izquierdo et al. (1979) found that in Mexico, teacher absenteeism and low teacher expectations exacerbate student absenteeism. High rates of student absenteeism, in turn, are associated with high repetition rates and low rates of school completion.

The situation of women and girls is especially acute (Kelly and Altbach, 1986; Safilios-Rothschild, 1979). UNESCO reports:

> In general, the overall trends indicate that women's access to primary education continues to be least in the low income nations of Africa, Asia, but not of Latin America, as well as in North Africa and the Middle East. In these areas, about one-third or less of the primary students are women (UNESCO,1984).

Educational "wastage" is also generally higher in rural areas and for female students, but "it is also of interest to note that although girl students show greater rates of educational wastage than boys, their wastage is more often due to dropping out while boys' is more often due to repetition of grades" (The World Bank, 1986). Generally, girls' absence from primary school seems to be due less to academic failure than to withdrawing from school for nonscholastic reasons. Boys, on the other hand, tend to remain in school regardless of scholastic performance (Safilios-Rothschild, 1979). However, depending on the context, especially where industrial employment exists, boys drop out and girls stay in. While research indicates that girls drop out to engage in some economic activity, such as becoming workers, mothers' helpers, or guardians, or because they become pregnant, the particular features which cause girls' absences have not been systematically documented. However, in spite of the general trend of reduced learning opportunities for girls, a study from Pakistan (Malik, 1985) found that the dropout rate for girls is just slightly above that for boys, while girls tend to repeat more frequently than boys. No differences were found comparing results from urban and rural areas.

Among the solutions recommended for the alleviation of absenteeism and dropping out in developing countries are: compulsory primary school education; availability of free textbooks and other educational materials; food programs, including breakfast and lunch; health care, including inoculations against infectious disease; programs to help reduce time spent by rural women in household tasks; adapting school calendars to rural labor needs; intensification of training women as primary school teachers; separate school facilities for girls, with women teachers; changing criteria for teacher promotion to include the percentage of girls who finish school; freeing texts of sexist content; and providing literacy programs for illiterate mothers.

One World Bank Report (Haddad, 1979) surveyed two components of educational wastage, repetition, and dropping out, and identified critical variables for policy considerations. In Haddad's report, repetition is considered a higher contributor to wastage because it is a main cause of inefficiency in a school system and because it directly affects dropout rates. In addition, educational costs are greatly increased, Haddad asserts, by high repetition rates which tend to have negative effects on learning.

Haddad has examined criteria for promotion, and concluded that promotion is usually determined by school-based tests which ignore higher level cognitive assessments and the attainment of important social goals of education. He concluded that promotion criteria such as these do not justify their determinative power. While automatic promotion is not proposed as a means to reduce repetition, it is suggested that: 1) new measures be used to assess the rate of learning in the cognitive, affective and social dimensions; 2) promotion standards be modified where retention is very high; 3) school facilities be improved to encourage attendance; and 4) non-graded curricula and ability-grouping practices be used.

Several countries have attempted to reduce educational wastage by implementing preschool programs that help children to adjust to the school environment. Halpern and Myers (1985) conclude in a review of the literature that preschool programs have a modest impact on initial adjustments, although the impact are higher in the developing countries. However, other practices, such as automatic promotion or remedial programs for students that fail, seem to rapidly overcome the impact of early schooling. Preschool programs are more controllable and may result in lower costs. However, their ability to reduce waste or increase academic achievement has not been investigated sufficiently.

Policy Recommendations

- To provide an adequate number of teachers for rural schools, policymakers need to offer both material and non-material incentives to teachers. To effect this policy, ministries of education must be able to differentiate between the career orientations of candidates for teacher positions, and must have the authority to award incentives differentially.
- Teacher absenteeism can be reduced by increased supervision of teachers, either by supervisors or headmasters; by increased motivation (through training opportunities and the like); and by reduction of bureaucratic demands on teachers' time that take them away from their classrooms.
- Policy options to reduce student absenteeism include policies that increase learning, thereby reducing failure and repetition. These can include readiness programs, such as pre-school, or programs to improve quality of instruction. (See sections that follow.) Provision of material incentives such as lunch, health care, and uniforms may act to reduce absenteeism.

Section IV: Factors That Influence How Time is Spent

The previous section reviewed research on factors that limit the total amount of time teachers and students spend in classrooms. This section looks at research on determinants of how teachers and students spend their time in classrooms. The thesis of this section is that the more time students and teachers spend on tasks directly related to the curriculum, the more students will acquire the knowledge, skills, and values that the curriculum is meant to convey. In other words, the more time-on-task, the more learning.

At the same time, of course, how much is learned depends on how that time is spent. Teaching and learning time can vary considerably in terms of "quality", that is, in terms of how much is actually learned as a consequence. (For example, a "boring" teacher can spend even more time than an "exciting" teacher covering a point, and teach less.) Amount of learning is a function of the time spent learning multiplied by the efficiency (or quality) of that time.

This section looks at ways in which teachers can manage time, and instructional materials, to increase not only the amount of time spent on instruction, but the quality of that time.

Instructional materials include: textbooks, workbooks, reading materials, teachers' guides, reference books, maps, charts, games, models, pictures, radio, tapes, slides, motion pictures, and television. Instructional materials are an important variable because they complement, supplement, or replace direct instruction. As such, instructional materials directly affect teachers' instructional and management capacity. When teachers have textbooks and guidebooks these may compensate in part for lower levels of education and training. These materials are the medium which translate curriculum goals into instruction and learning. Finally, textbooks can extend the opportunity to learn and continue to engage students beyond the classroom when students read them at home. The effective management of instructional time often involves creative use of instructional materials, but this optimal use of time is only possible when materials are available.

According to Lockheed (1987) and Fuller (1986), the influence of school variables on student performance in developing countries is greater than in developed countries where student background variables are more likely to have an effect. Among the school factors that are consistently related to student achievement are the presence and use of instructional materials, time spent on learning, and teacher education (Lockheed, 1987).

Teachers have primary control of the use of instructional materials and directly influence student time spent on learning: this can be called a "proximal" variable with respect to learning outcomes. Teacher education, and the availability of instructional materials are more "distal" variables, and are controlled principally by persons outside the school. The rest of this section discusses in detail the use and provision of instructional materials.

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Instructional Time

The Relationship Between Time and Achievement

The relationship of time to achievement has been researched since the 1920s (Smyth, 1985b) in the United States, but the most inspirational study has been Carroll's School Learning Model (Carroll, 1963) which treats learning as a function of time. The model considers learning to be directly influenced by the time that students need to learn, and the quality of instruction given, as well as the time students actually spend on learning (Carroll, 1985).

$$\text{Degree of Learning} = f\ \frac{\text{time actually spent}}{\text{time needed}}$$

The notion of time-on-task is based on the theory that pupils learn by participation and experience.

Allocated time is the time set aside for teaching and learning activities, and is defined by the number of years required to obtain a diploma, the number of school days in a school year, the number of hours in each school day, and the proportion of a school day that is dedicated to a particular subject matter. Teachers have control over allocated time by the way in which they use it to engage students in learning. (This is known as the time-on-task, or engaged time and academic learning time.) Student learning is affected by how time is actually used, not by the amount of time available (Stalling, 1983). Effective teaching and appropriate task context are necessary to produce achievement gains within the allocated time (Cotton & Savard, 1981). The notion of time-on-task is based on the theory that pupils learn by participation and experience. How time can be used on-task, however, depends on the subject matter, the availability of instructional materials, and how teachers organize such resources (Harnischfeger & Wiley, 1985).

In Mexico, a typical teacher underutilizes 50% of the allocated time by absenteeism, interruptions, lack of planning, early leaving, and non-academic tasks (Munoz Izquierdo et al., 1979). In addition, teachers spend triple the amount of time on reading and writing lessons in the morning sessions as they do in the afternoon sessions. the afternoon sessions have more off-task activities. In Colombia, off-task time has been estimated at 40% (Arancibia et al., 1986). Although it is neither possible nor desirable to spend all academic time-on-task, reducing waste-time will certainly make more time for learning.

The reported correlation between time-on-task and achievement ranges from .09 to .44, mostly in math and reading classes (Frederick & Walberg, 1980). Although in some cases the impact on achievement is positive but not statistically significant (Seifert & Beck, 1983, 1984), in other cases, such as in an Australian study, time-on-task has a strong impact on achievement, accounting for approximately 58% of the variance (Leach & Tunnecliffe, 1984). In Thailand, the time-on-task in mathematics classes was the only classroom-level factor associated significantly with achievement (Classroom Environment Study Report, 1985).

Time and Instruction

From the instructional perspective, how time is used for academic engagement must be considered in connection with pacing and grouping. Pacing is the rate at which instruction covers a specific amount of curriculum content in a certain time (Karweit, 1983). Some studies have found diverse pacing procedures; however, most teachers pace their instruction to accommodate low achievers (Dahlof, 1971), and this negatively affects the more able students (Barr, 1976). Time-on-task has more impact on students at or below their class mean than on students above their class mean (Karweit & Slavin, 1981). Pacing is affected by the accumulated knowledge and hierarchical nature of the subject matter (Karweit, 1978). During transitions from one activity to another in class, much of the time is off-task and hence affects student engagement (Arlin, 1979).

Seatwork is a very common way of grouping. It requires students to perform tasks, usually reading or writing, on their own, often without direct supervision from the teacher. Research in Thailand indicates that about 30% of teaching activities involved written seatwork (Classroom Environment Study Report, 1985). The impact of seatwork on learning and achievement depends on the availability and appropriateness of textbooks, workbooks, or ditto materials, and the monitoring skills of the teacher. When instructions are not clear and tasks are perceived as too difficult to accomplish, low achievers cannot benefit from seatwork (Anderson, Brubaker, Alleman-Brooks, & Duffy, 1983). As student engagement is positively associated with substantive academic interaction between teachers and students, seatwork which requires students to work on their own decreases interaction and thus often increases time-off-task (Seifert & Beck, 1984; Filby & Cahen, 1985).

Most of the above-mentioned teaching strategies are commonly used in developing countries, although their effectiveness in such environments is controversial. In Thailand, for example, these strategies have been related to achievement (Classroom Environment Study Report, 1985) but in Latin America such strategies have been identified as promoters of non-active learning and related to low achievement (Arancibia, 1986). In some African countries, these teacher-centered strategies are regarded as appropriate to local cultural expectations (Windham, 1985).

In general, teachers can improve student time-on-task by planning activities, giving clear instructions, clarifying the specific objectives to be accomplished, taking student needs and level of ability into account, making high success opportunities avail-

...the research question is not whether homework should be required, but rather for which students and with which tasks, sequences, and structures.

able, and praising students for correct responses (Martin & Canty, 1980).

Homework as an Extension of Time-on-Task

Homework is a very common instructional practice to engage students in learning. Despite its general use, however, it is only recently that researchers have demonstrated its connection with achievement. A review of cross-national strategies conducted by the International Association for the Evaluation of Educational Achievement (IEA) indicated that time spent on homework was one of the best predictors of achievement, when controlling for ability (Wolf, 1979). Consistently, additional cross-national studies report that in six of the eight available studies homework tended to have a positive impact on achievement. In fact, it is one of the school practices that shows a high positive relationship with achievement (Schiefelbein & Simmons, 1981).

At this time, the research question is not whether homework should be required, but rather for which students and with which tasks, sequences, and structures (Coulter, 1979; Pendergrass, 1985). These questions help to find strategies for successful homework management. A study in Venezuela finds that teachers specially trained in providing written feedback on homework are able to significantly increase achievement among their students (Elawar and Corno, 1985).

Other studies show that homework does not improve learning without family support. While the mother is usually the most directly involved in homework, siblings are the helpers in societies where the older generations had no access to schooling. This is the case, for example, among Arabs of the rural areas of Israel (Tamir, 1985).

Finally, school-based home instruction, in which specially trained parents extend or multiply the quality and quantity of academic instruction beyond school time, reduces student time dedicated to "non-educational activities." A quantitative synthesis of 29 studies shows that providing instruction to parents has been successful in over 90% of the cases, improving achievement from the 50th to the 69th percentile of the control group distribution (mean effect at 76th percentile). This strategy, however, is more expensive than homework, and assumes such contextual factors as family and cultural support for learning (Frederick & Walberg, 1980).

Time and Alternative Instructional Approaches

There are alternative approaches that use time in a different way from the conventional classroom: mastery learning allows individual learners to pace their own learning; the Adaptive Learning Environment Model increases the academic engagement time; the Reduced Instructional Time approach reduces the time students need to learn. These delivery systems require the development of special instructional materials, a reorganization of the time frame of study, and a redefinition of the role of the teacher. The following section describes these approaches in more detail.

• Mastery Learning

Based on Carroll's model, the mastery learning approach assumes that students with different ability levels require different amounts of time to accomplish the same tasks. Therefore, each student should be given the time she or he needs to accomplish the objective. The curriculum content is broken down into small units of learning to be mastered at the student's own pace. Formative evaluation is provided after the student has completed each unit. The student then moves on to the next level, again at his or her own pace. Individualized teaching and extra-time tutoring are commonly used in this approach (Bloom, 1968).

The mastery learning approach incurs more costs because of the need to train teachers for their new role as tutors, and to develop special materials. However, its supporters consider that the quality effects justify the increase in costs. Critics argue that the quality effects are overstated, although it is not known whether the difference in achievement is due to the increase in time available for slow learners, or to the increased attention and monitoring by the teacher.

Mastery learning has been introduced in Bolivia as a didactic model to improve the quality of instruction (Pena, 1986). However, policymakers should be aware that it has not been proven able to enhance learning at all levels for all kinds of students and that it requires a significant increase in costs.

• Adaptive Learning Environment

The Adaptive Learning Environment Model (ALEM) is designed to provide more learning opportunities in regular classrooms through self-paced and individualized instructional strategies. The goals are to permit teachers to spend more time in instruction, to help students to use their learning time more

...some developing countries have few or no instructional resources. In these instances adding a little can make a big impact on achievement.

efficiently, and to improve achievement. Teachers develop skills to monitor student accomplishments, and students are responsible for completing the tasks that are determined by them and the teachers.

This model has increased teacher time on instructional activities and student engaged time in relevant academic activities, and has improved achievement significantly. The program has been applied mainly in mathematics and it is not known how effective it will be with less structured subject matter (Wang, 1985). The ALEM's approach is especially useful in multigraded classrooms and is cost-effective since its aim is to reduce learning time. It also requires minimal organizational change (Thiagarajan & Pasigna, 1988).

• Reduced Instructional Time Project

The Reduced Instructional Time project (RIT) in Thailand is one of the best organized low cost learning systems. Its objectives are to find effective instructional methods to reduce the time students need to learn, and to develop appropriate materials to reduce the time teachers need to provide instruction. The RIT project has been successfully implemented in multigraded schools with a student/teacher ratio of 70:1. Instructional materials have been developed and used to foster individual and peer learning, so as to free teachers to monitor students' time-on-task, to help students improve their learning skills, and to provide remedial teaching. The role of teachers changes from being the only source of instruction to managing materials and activities. Teacher instruction time was reduced by 20-30% in the first grade, 30-40% in the second grade, and by 50-90% from the third to the sixth grades (Nichols, 1982; Thiagarajan & Pasigna, 1988).

Although the RIT requires initial investments in material development, teacher training, and organizational changes, it has proven to be cost-effective because it reduces time spent on non-instructional activities, and improves both the quality of instruction and student achievement. Moreover, RIT shows an equalizing effect, as achievement levels for students in rural schools have been raised to those of students in large schools from urban areas (Thiagarajan & Pasigna, 1988).

The research on instructional time reveals that this variable can be controlled by educational policymakers and teachers to raise achievement, regardless of exogenous factors such as socioeconomic background (Heyneman and Loxley, 1983). Improved time management is cost-effective because it focuses on the intensive and effective use of time, an existing resource, to improve learning, without calling for additional resources.

The improvement of teachers' instructional and management skills is, therefore, a promising policy option for the improvement of learning outcomes and school efficiency. We have discussed several kinds of policies to improve these skills: training for teachers, development and distribution of appropriate instructional materials, development and distribution of materials for self-instruction by students (e.g., workbooks). The table below summarizes what research suggests is the academic impact of policies that affect time-on-task by teachers and students.

A Summary of Research on the Academic Impact of Policies that Affect Time-on-Task

Time-on-Task Policy Options	Academic Impact High	Moderate	Low
Academic learning time	x		
Pacing		x	
Seatwork			x
Direct Teaching	x		
Mastery Learning			x
ALEM/RIT	x		
Homework		x	
School-based home instruction	x		

Instructional materials can be broadly divided into two categories: textbooks, which are the most basic of all learning materials, and other materials which include word cards, worksheets, notebooks, dittos, fact sheets, various forms of audiovisual materials, homemade materials from the environment, and programmed materials.

In contrast to industrialized countries where there are a lot of instructional materials, some developing countries have few or no instructional resources. In these instances adding a little can make a big impact on achievement. Having any materials at all becomes increasingly important (Windham, 1985; Thiagarajan & Pasigna, 1988).

Many researchers argue that the availability of the textbook appears to be the most consistent school factor in predicting academic achievement. One

multinational study reports correlations between textbooks and educational aspirations and achievement in Chile, while educational attainment among underprivileged minority children in Malaysia was found to be particularly associated with textbook availability (Heyneman, 1978). In Uganda, a strong correlation was found between textbook availability in the classroom and student examination performance regardless of student socioeconomic status, and El Salvadorean children without textbooks achieved significantly lower test scores than those who had textbooks (Heyneman, 1978). The Philippines study also reports that the production and distribution of high quality text materials substantially improve student knowledge of science, mathematics and language (Heyneman et al., 1984).

The above mentioned Chilean study – on the influence of school resources, especially textbooks — demonstrated that (1) educational variables are more powerful predictors of occupational attainment than family social status; (2) changes in achievement levels are primarily explained by quality of education rather than family backgrounds; and (3) the main problems connected with textbook utilization are negative teacher attitudes and the inability of poorer children to purchase them (Schiefelbein and Sepulveda, 1983).

What the high correlation between textbooks and achievement shows is not only the effect on the individual student, but also the effect a teacher has when using textbooks.

> When few or no students have textbooks, the teacher has to use the textbook as a guide, and rely on the blackboard or on oral dictation; and students have to copy materials into their own notebooks....This wastes the time and energy of both teacher and students. Where most or all students have texts, a teacher has the option of working with small groups...and of engaging in other teaching practices. If this is the case then textbooks may be important not simply as learning aids for individual students who have them, but as a necessary condition for teachers to use more effective teaching techniques (Heyneman, 1978:23).

Textbooks, however, are often not available in developing countries. The acute shortage of textbooks adversely affects teachers' ability to teach and manage the class:

> (In) Liberia in 1983, a majority of classrooms had few if any textbooks for every twenty primary school students. In Somalia in 1984...a shortage of 2,280,000 textbooks existed relative to what the national curriculum required for primary education. Even in Botswana, a relatively prosperous nation with a geographically concentrated population and good transportation...in 1984... shortages of textbooks and delayed delivery of instructional materials [were common]" (Windham, 1985:35).

That instructional materials so basic as the textbook are not made available is due to many reasons. Many developing countries do not provide free textbooks because their educational expenditures are limited, and this puts children from poor families at a severe disadvantage. In Ecuador, for example, updated first grade textbooks were made available in 1970 but were priced at slightly more than a day's wage for a laborer (Heyneman, 1978). This is a prohibitive cost for poor families. Another reason for the nonavailability of textbooks is the problem with the delivery system. Many rural areas are inaccessible, and thus even with a free distribution system, textbooks do not always get delivered.

The complexity of the tasks of educational publishing is one reason why quality textbooks are rare. Textbooks must be accurate in content, up-to-date, and educationally sound; otherwise they may encourage counterproductive teaching methods. A study of mathematics textbooks in the Dominican Republic found that the textbooks taught mathematics "as a set of rules, a rigid discipline in which there is little place for creativity" (Luna et al., 1986:9). Futhermore, good textbooks must also be visual and

> offer structure, variety, and present materials in different ways...(They) should motivate ...and reinforce...(Textbooks) must be organized and divided into units that fit the classroom situation and the time available for teaching the subject...(They) should provide for individualization, for the different abilities represented in the classroom... Good textbooks require creative and seasoned authorship, developed and supported by a professional organization specializing in educational publishing"(Neuman, 1980:11).

Textbook publishing entails selecting and coordinating an author team; coordinating content with curriculum; determining the general appearance of

Teachers select the textbooks that they consider suitable to their students' backgrounds and abilities.

the book; creation of the artwork; specifying the typesetting, printing, and binding; determining the need for ancillary materials to accompany the student textbooks; setting prices; marketing; warehousing and distribution; collecting feedback from teachers. Reviewing, editing, rewriting, testing, and re-editing the content material are essential to the process of producing good textbooks. This process often takes several years (Neumann, 1980; Searle, 1985).

Textbooks are often of poor quality because of the lack of creative and seasoned authors who should be subject specialists and educational communicators at the same time, and also because of the lack of editorial and management expertise. The publishing tasks are complex, and there has not been comprehensive planning and long term commitment. In comparison, financing may be less of a problem because publishing does not involve very advanced or expensive technology (Pearce, 1982; Searle, 1985).

There are, however, success stories of governments publishing and distributing free textbooks, the Mexican case being one of the most notable of them. Mexico has had twenty years of experience with the development, publication, and distribution of free primary school textbooks (Neumann and Cunningham, 1982). Not only is the government able to provide every child with free textbooks in Spanish, but it has also published textbooks in a number of indigenous languages. The textbooks are colorful and well designed. Teachers select the textbooks that they consider suitable to their students' backgrounds and abilities. The Mexican government accords the production and distribution of textbooks the same priority as teachers' salaries and school buildings in its budget allocations. At the same time, the government also supports a dynamic private publishing industry.

The Mexican experience shows that textbooks must be a long-range government commitment supported by regular and adequate annual expenditure. In the Mexican case, this has ranged from between 2-4% of the total annual educational expenditures. The lesson here is that development of an effective textbook program requires a serious political commitment, as well as adequate funding.

Relevance of Instructional Materials

Relevance refers to the match between textbook characteristics and the interests and values of students, parents, community members, and the larger society. It is possible for materials to be highly relevant at one level, e.g., for one community but less so for another. In general, national curriculum boards are concerned only with relevance at the national level. The correlation between the degree of relevance of instructional materials and level of student achievement has been evaluated in several studies.

Chesterfield (1978) found that rural Brazilian elementary school children made statistically significant gains in word use and descriptive power in reading and writing after a year of using instructional materials (textbooks, charts, and posters) containing words and imagery appropriate to the locale but with structural situations equivalent to the basic first-grade text used in the area. In a multinational study of bilingual education programs, Dutcher (1982) found that minority language children who received primary instruction in their mother tongue, were more likely to improve academically than were minority children taught in a second langauge. This is attributed, in part, to the fact that literacy attainment is more easily achieved in a first language if the child has reached a cognitive level appropriate for learning basic skills. In the National Education Commission's review of Thailand, "Determinants of Effective Schools," BRIDGES' Education Development Discussion Paper #1, the use of comic books in contrast to conventional methods was shown to promote effective learning, particularly in relation to health education in the seventh grade.

Finally, a UNESCO report of a Study Group Meeting for the Education of Disadvantaged Groups and Multiple Class Teaching in Asia and the Pacific (1980) described a number of programs—most of them in small rural schools or disadvantaged urban schools—tailored to the needs of minority, female, and handicapped children, including the use of instructional materials in tribal languages and self-learning modules for multiple-grade classrooms. Preliminary evaluations of most of these programs report positive gains in student achievement and teacher satisfaction.

Utilization of Textbooks

How textbooks are utilized makes a difference in learning. The Dominican study finds no achievement gains in schools which have textbooks (Luna et al., 1986). The ZIMSCI teacher training project in Zimbabwe reports no change in learning outcomes when teachers were not trained in the use of available textbooks. A Chilean study also confirms that "less

experienced teachers are less likely to use textbooks than those with more experience, and 78 percent of all the teachers in the survey expressed negative or ambivalent attitudes toward the use of textbooks" (Psacharopoulos and Woodhall, 1985). In other words, merely providing teachers or students with textbooks does not ensure that teachers will use them in instruction, nor that gains in learning will result.

These findings point out the importance of teacher training in using textbooks to improve their teaching and learning outcomes. The introduction of new textbooks and new curriculum, therefore, requires careful preparation, promotion, and publicity. Teacher's editions and allied materials are particularly helpful to less qualified teachers. At the same time, a well structured program of teacher training should include the analysis and effective use of textbooks (Neumann, 1980).

Other Instructional Materials

Instructional materials other than textbooks have been shown to have an effect upon achievement. For example, a study in Ghana finds positive correlations between the use of daily newspapers as instructional materials and reading achievement (Heyneman, 1978). A Brazilian study reports that the reading and writing abilities of primary school children improve after using posters and charts depicting environmentally-specific words and imagery (Chesterfield, 1978). An experimental study in Venezuela finds improvement in children's achievement in mathematics when teachers provide written feedback (Elawar and Corno, 1985).

In other words, there are several kinds of instructional materials—of which textbooks are one—that use print to communicate information and to generate learning. The choice of material should depend on ease of production and distribution, unit cost, and relative effect on learning outcomes.

"Mastery learning" is an effective teaching strategy that uses programmed instructional materials. The materials present the subject matter divided into small units, require frequent student response with immediate feedback, and have been successful in developed countries (Kulik, Shwarb, and Kulik, 1982; Anderson, 1985). Such projects in the Philippines (Chapman and Boothroyd, 1986), Indonesia (Mudhiman, 1981), Liberia (Nichols, 1982), and Thailand (Potar, 1984) play a significant role in improving the efficiency of primary education. The Thai RIT project reports higher learning gains for experimental groups in rural areas, and higher average scores in five subject areas, Thai language, mathematics, life experiences, character development, and work education (Pasigna, 1986). However, because mastery learning and programmed instructional materials minimize teachers' direct instruction, they require literacy skills and self-initiative, and may have limited use in the early grades (Thiagarajan & Pasigna, 1988). The adoption of these approaches also requires an efficiently administrated system to develop the materials, distribute them, and to provide assessment and feedback. As adequate literacy and efficient delivery systems are not common in developing countries, these self-instructional materials have limited applications and the role of the teacher remains central to the student learning process.

Instructional materials produced by government or commercial publishers, which are developed to serve the official curriculum and to attain national, cultural, and educational goals, may or may not meet the personal needs of teachers and students. For this reason, educators have advocated that teachers produce their own materials, on the grounds that they are in the best position to know which materials and teaching methods are most effective in their classrooms (Hawes, 1976). Teacher produced instructional materials are likely to reflect teachers' beliefs, perceptions and expectations about their students, and serve "as a source of ideas, guides to planning, and definition for what is possible" (Kerr, 1981:368). Unfortunately, they are also likely to vary in quality, introducing inequalities in the quality of instruction provided across classrooms and schools. This problem can be offset either by supervision of teachers to ensure common high standards of quality, or by district-wide workshops with teachers to ensure uniform quality and application.

Expecting teachers to create instructional materials, however, presupposes the teacher's knowledge of instructional development and production techniques. A study of Australian elementary school teachers' knowledge and use of social studies curriculum materials finds that most teachers have very little involvement in materials development, show little interest in the content, and are mostly concerned with meeting course requirements when selecting topics (Marsh, 1984). Therefore, training teachers to develop instructional materials from locally available resources is necessary (Komoski, 1980). While teacher resource centers to produce

...training teachers to develop instructional materials from locally available resources is necessary.

teacher-made materials have been developed in Ghana, they have been underutilized due to poor communication and management (Kyei-Anti, 1983). Instead, it appears that optimum conditions for developing materials may be found in school-based clusters which work jointly with the community at large. Both pre- and in-service training programs could be organized for teachers to encourage them to produce their own instructional materials.

Teacher Training

The teacher is one of the most important factors in helping students learn, given that the more scarce the resources, the more innovative the teacher must be. To compensate for adverse working conditions, teacher training is of vital importance. Recent literature suggests that pre-service training is less useful than in-service training because the trainees have no relevant experience in a real setting, whereas in-service training is more effective with unqualified, practicing teachers (Verspoor and Leno, 1986). In-service Education and Training of Teachers (INSET) has been seen as a means of revitalizing general morale within the teaching profession as a whole since it provides a lifelong, ongoing process for gaining accountability for educational change and reform. One of the major trends in INSET is to shift the base of training from specialist institutions to individual schools and to focus on their needs. New and low cost in-service teacher training strategies use study circles, or clusters, and networks to disseminate new ideas and innovative practices. In these clusters and networks, teachers participate in identifying training needs and develop instructional materials to deal with local problems. Thailand, Sri Lanka, and the Philippines have developed successful models of this kind of teacher training. Simulation and peer critique are also found to be very effective in improving teaching practices.

Other options to consider are distance education, and the mobile teacher training units which are often established to support correspondence study (Guthrie, 1985). Radio can also be used as a form of on-the-job training, although it has more implications for curriculum reform.

As multigrade classrooms are a common feature in developing countries, this issue must be addressed in relation to effective teaching and classroom management. Stromquist (1982) has shown that multigrade teaching makes teachers individualize instruction and play the role of tutor rather than lecturer. In addition, multigraded classes increase the size of the school, and several research studies suggest that the efficiency of the school increases until a certain size is reached (about 200 at the elementary level). Bray (1987) lists some possibilities for multigrade teaching which include a different arrangement of desks and two sets of blackboards for addressing students in different grade levels. The use of paraprofessionals, aides, and older children as tutors for younger children also helps to give more attention to individual students.

The teacher training curriculum should provide a knowledge of content areas, time management skills, instructional strategies, organizing skills, interpersonal skills, and techniques for producing simple instructional materials. Since teaching is directive, active, engaging, and complex, incorporating both social and academic domains, teacher training that extends this sensitivity is most useful.

Research has indicated that it is how teachers use instructional materials that makes an impact on learning (Luna, 1986; Schiefelbein, Farrell and Sepulveda-Stuardo, 1983). Too often, teachers make students recite from textbooks, and encourage passive learning. Therefore, training teachers to use instructional materials to engage students in active learning is very important (Komoski, 1980). Teachers should also be trained to select instructional materials that are appropriate to the levels of their students.

Researchers have suggested that teachers in developing countries become involved in the production of instructional materials for local-level use in rural schools, since it is assumed that teachers are in the best position to know which materials and teaching methods would have the most positive effects on achievement (Hawes, 1976).

Policy Recommendations

- Student time-on-task can be increased by activities that engage the student while the teacher is busy on other matters. These include seatwork (use of notebooks, workbooks, exercise sheets, assignments), homework, and self-instructional materials. The effectiveness of seatwork depends on the quality of the materials (that is, the substantive content) given to the students. The effectiveness of homework in terms of learning outcomes is increased considerably by:

a) parental participation with students in the homework. This clearly depends on the educational level of the parents and their disposition. Teaching

parents how to instruct their children at home has an appreciable impact on learning in school.

b) prompt feedback by teachers with respect to student performance on homework. Self-instructional materials (e.g., programmed instruction booklets) can be very effective, but considerable investment is required in the design and development of the materials. Over time the investment in development of these materials can prove to be cost-effective.

- The proper utilization of any new technology of instruction requires training. This is true for teacher use of seatwork, homework, and even self-instructional materials. Teacher training is, therefore, an essential component for any of the policy options discussed. Research has not discussed which kinds of training are most appropriate.
- In countries in which most students do not now have textbooks, provision of textbooks is the most cost-effective way to improve learning outcomes. Textbooks have this effect for several reasons, in part because they permit students (and teachers) to spend more time on academic tasks and in part because they are more likely than other materials to be closely linked to the official curriculum.
- Textbooks can be used in ways that do not raise levels of learning. Training teachers in methods of textbook utilization can significantly increase the contribution of textbooks to increased learning outcomes. Textbooks should not be introduced without training in their utilization.

A Summary of Research on Academic Impact of Instructional Materials

Instructional Materials	Academic Impact		
	High	Moderate	Low
Availability		x	
Use	x		
Relevance	x		
Textbooks	x		

Section V: Conclusion: Policy Options

The thesis of this review has been that some gains in learning outcomes can be produced by a more judicious use of existing resources; that is, without large expenditures on education. I have argued that teachers are the central actors in any program to improve learning outcomes, because they have the most effect on learning in classrooms, and can also have some effects on learning outside the classroom. The methods that teachers employ in utilizing resources for the teaching-learning process were defined as classroom management practices.

This final section summarizes the results of the previous discussion in terms of policies that have a direct effect on instructional time, policies that affect the use of instructional time through instructional materials, and policies that attempt to increase teachers' skills in classroom management.

Improving teachers' use of what is already available or improving their design skills can increase quality without increasing overall costs.

Instructional Time

- Teacher absenteeism can be reduced by policies that:
  a) place teachers closer to their family residence.
  b) increase supervision of teachers by headmasters or supervisors.
  c) reduce the need for teachers to be absent from school to arrange salaries, promotions, transfers, etc. This can be done by supervisors or headmasters instead.
  d) provide incentives to teachers in terms of their career orientations. Example: workshops to exchange information on pedagogy, etc.
- Student absenteeism can be reduced by policies that:
  a) increase learning, thereby reducing failure and repetition. This can be done through readiness programs such as preschool; by changing promotion standards where there is a high repetition rate; or by improving students' ability to pass, through improving teaching and offering remedial programs.
  b) provide material incentives for attendance such as free lunch, health care, and uniforms.
  c) include more radical steps such as non-graded curricula, or a broadening of the definition of desirable learning to include social and affective skills as well as academic skills.
- Central policies can affect how teachers use their time in classrooms:
  a) by reducing time spent on non-instructional matters. Example: policies that relieve teachers of administrative duties by reassigning them to supervisors and aides.
  b) by providing incentives for attention to the instructional task. Example: policies that reward teachers for academic performance of students (e.g., on a standardized test).
  c) by providing instructions on how teachers should spend their time. Example: teacher guides and manuals that clearly specify how teachers should conduct their classes.
  d) through training, both pre-service and in-service, that instructs teachers in methods and strategies for effective instruction.
- Policies can also affect teacher involvement in how students employ their time outside the classroom:
  a) by training teachers to assign more homework and to provide feedback to students about it.
  b) by motivating parents to increase their involvement in their children's learning at home. Parents can't teach children to read if they don't know how to read. However, teachers/supervisors may train parents through special meetings or training sessions.

Instructional Materials

Improvements in the supply and in the quality of instructional materials can affect both the amount of time spent on instruction and learning, and the efficiency (or quality) of that time.

a) Research shows that the single most important instructional material is the textbook.

b) Expendable instructional materials and equipment such as blackboard, chalk, pencils, maps, dictionary, etc., increase time-on-task (Windham, 1985).

c) Teachers can introduce local materials that also help to improve the quality (relevance) of the instructional process (Laesa, 1983).

d) The contribution of improvements in the quality and quantity of instructional materials to improved learning outcomes can be increased considerably by training teachers in their utilization.

Policymakers usually consider the production of instructional materials an important aspect of the educational system. These materials not only enhance the qualitative aspects of educational services, but are also a means to promote citizenship and national integration. A common goal of many national plans has been the local production of official textbooks to promote nationalism.

In addition, if they are distributed free, as in Mexico, or heavily subsidized, it has been assumed that textbooks provide greater educational opportunities to those children whose parents cannot afford school supplies. However, materials alone are insufficient to make an impact on learning. They must be efficiently used by teachers, who will usually need special training to do so. If, textbooks do make an important difference in academic achievement, as has already been documented, policymakers should not think only in an additive way. More does not necessarily mean better. How teachers actually use the existing instructional materials varies widely from teacher to teacher, and this variable has the greatest impact on achievement. Where it is not possible for the teacher to be a creative agent by designing his or her own materials — which requires special skills and knowledge — instructional materials should be selected carefully so they fit the curriculum goals and type of student.

Knowledge of what is available and what impact it has on learning may avoid a bias towards considering textbooks as the most important material. Improving teachers' use of what is already available or improving their design skills can increase quality without increasing overall costs. Consequently, increasing the teacher's classroom management skills could improve the internal efficiency of schooling, and maximize the value of existing instructional materials by making better use of them.

This is important, given that between 80 and 90% of the education budget is usually spent on teacher and administrative salaries. Very limited economic resources can be allocated to the production and development of instructional materials, and most developing countries will not be able to increase their educational budget in the near future. These economic realities limit the alternatives to: asking for international aid in order to produce local textbooks, as has been the case with projects run by international agencies like the World Bank, UNESCO, and USAID and; developing low-cost innovative systems, where it is possible to increase the teacher/student ratio, and at the same time, promote quality, or modifying existing teacher training programs to emphasize local development of instructional materials.

To enhance academic achievement through educational materials, policymakers will have to consider low cost alternatives because few developing countries are able to produce a set of materials for each pupil for each school year. As a consequence, options such as producing inexpensive books designed to be used by many pupils for some years (i.e. comic books, newsprint materials, etc.), promoting the implementation of low cost learning systems, and enhancing teachers' ability to design their own materials (making use of local raw materials) may be preferred choices.

However, policymakers need to take into account several points:

a) In most systems, the teacher is the single most important agent in the educational process, because traditional strategies are based on teachers' control of classroom interactions and allocation of learning resources.

b) Parental preference for traditional teaching strategies may preclude the introduction of innovative measures to deal with student absenteeism and drop out.

c) The production of new instructional materials should be coordinated with training teachers in the design, selection, and use of the materials.

d) Education is a human-intensive process requiring intervention and monitoring; thus the use of unconventional materials and methods such as programmed instruction and mastery learning should be properly managed by teachers. Teacher training is an investment in teachers' skills and knowledge for classroom management. Enhancing the quality of instruction and management will reduce the need for investment in expensive materials.

The idea of classroom management is double-edged: it can be used by policymakers as a control to obligate teachers to follow strict schedules, pedagogy, curriculum orientation, etc. But in a larger sense, the idea of classroom management is a tool for strengthening the teacher's knowledge of her/his role. By becoming more aware of this role, and the interactive aspects of the teaching-learning process, teachers enhance the students' ability to learn.

Instructional strategies and the allocation of learning resources present challenging tasks for the educational attainment of developing countries. Yet, because policymakers and researchers alike are concerned with finding the most efficient and effective means for providing quality education, it seems that the investment in teachers' management capabilities may be a small price to pay, with greater returns on the investment than any other present course of action.

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