Evaluating Primary Education

Qualitative and Quantitative Policy Studies in Thailand

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Abstract

Primary education provides a fundamental base for all further schooling, training, and self-education. In Thailand, the quality and efficiency of primary schooling is currently a major educational policy issue. With the support of the International Development Research Centre, the Office of the National Education Commission of Thailand quantitatively and qualitatively analyzed the many issues related to the quality and efficiency of primary education in Thailand. The qualitative study provides an in-depth understanding of the complex processes that influence and condition the translation of educational inputs into outputs and outcomes. In the quantitative study, four empirical indicators are used to reflect school efficiency; using factor analysis, a composite index of efficiency is created. In combination, the qualitative and quantitative studies illustrate the importance of social science analytical techniques when evaluating an educational system and lead to a plethora of recommendations that are of interest to both education researchers and policymakers.

Résumé

Les études primaires constituent une base fondamentale pour toute forme subséquente d'études, de formation ou d'auto-apprentissage. En Thaïlande, la qualité et l'efficacité de l'enseignement primaire posent actuellement un important problème en ce qui concerne la politique de l'éducation. Avec l'appui du Centre de recherches pour le développement international, le bureau de la Commission nationale de l'éducation de la Thaïlande a procédé à des analyses quantitatives et qualitatives de nombreux aspects de la qualité et de l'efficacité de l'enseignement primaire en Thaïlande. L'analyse qualitative étudie en profondeur les processus complexes qui influencent et conditionnent la transformation des intrants éducationnels en extrants et résultats. L'analyse quantitative se fonde sur quatre indicateurs empiriques pour établir l'efficacité des écoles ; au moyen d'une analyse de facteurs, on a établi un indice composite de l'efficacité. Les deux analyses combinées illustrent l'importance des techniques analytiques des sciences sociales lorsqu'il s'agit d'évaluer un système d'éducation, et donnent lieu à tout un éventail de recommandations à l'intention à la fois des chercheurs et des décideurs dans le domaine de l'éducation.

Resumen

La educación primaria proporciona una base fundamental para toda escolarización, capacitación y autoeducación posteriores. En Tailandia la calidad y eficiencia de la escuela primaria se ha convertido actualmente en una cuestión primordial de la política educacional. Con el apoyo del Centro Internacional de Investigaciones para el Desarrollo, la Oficina de la Comisión de Educación Nacional de Tailandia analizó cuantitativa y cualitativamente las muchas cuestiones relacionadas con la calidad y eficiencia de la educación primaria en Tailandia. El estudio cualitativo proporciona una comprensión profunda del complejo proceso que influye y condiciona la transformación de los conocimientos adquiridos por los estudiantes en rendimiento y resultados. El estudio cuantitativo utiliza cuatro indicadores empíricos empleados para reflejar la eficiencia de la escuela; con la ayuda del análisis factorial, se crea un índice compuesto de la eficiencia. La combinación de los estudios cuantitativo y cualitativo ilustra la importancia de emplear las técnicas analíticas de las ciencias sociales cuando se evalúa un sistema educacional. Además, estos estudios han producido una plétora de recomendaciones que son de interés para investigadores de la educación y formuladores de políticas.

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FOREWORD

The environment for educational research in Thailand is one of the richest in the developing world. Strong research cadres in several universities, coupled with a well-staffed national research and development centre, the Office of the National Education Commission of Thailand (ONEC), have produced pioneering work in several areas of study. Particularly noteworthy have been studies that reflect well-developed social science research methods. Given Thailand's particular ethnic, cultural, and sociocultural diversity, extensive and representative national surveys of its many regions have long been the norm. The strong influence on education of religion, the community, and phenomena such as rural–urban migration has also encouraged the implementation of more qualitative, anthropological studies of schooling. In this regard, Thailand has a decade-long history of conferences, publications, networks, research, and more recently, graduate studies in anthropology and education, giving it a stronger and livelier tradition in this field than any other country of the region.

This unique combination of interest in both quantitative and qualitative analyses of education led IDRC (International Development Research Centre) to support ONEC to carry out research from both perspectives on issues related to the quality and efficiency of primary school education. Building on research done earlier by ONEC and supported by the Ford Foundation, these research projects were large and complex undertakings, each requiring extensive preparation, the training of researchers in new methods, and considerable intensity of labour both across the large sample of the quantitative study and into the selected villages and schools of the qualitative study.

This book both presents reports from each of the separate studies and describes how the two approaches and their results complemented and, in most cases, reinforced each other. The opportunity to replicate such a useful combination of perspectives in educational research is necessarily limited, in both the developing and developed worlds, but the insights gained through this particular experience in Thailand — for the research teams, the sponsoring institution, and the donor agency — proved that this complex exercise was worthwhile.

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INTRODUCTION

By combining multiple observers, theories, methods, and data sources, sociologists can hope to overcome the intrinsic bias that comes from single-method, single-observer, single-theory studies.

Norman K. Denzin (1970:315)

If you cannot count it, it doesn't count — and if you can count it, it's not it.

Viviane Glickman (1977:355 in Bates and Robinson 1977)

Paul Lazarsfeld was also very important in helping me think about the qualitative–quantitative distinction. His first big job was to get me out of the qualitative vs quantitative trap. His work is living proof that it is not an either/or proposition, it is a matter of degree of emphasis. Every research study is inevitably both qualitative and quantitative to some degree. But even more important, he recognized the importance of the interaction between qualitative and quantitative "types" in working toward an improved understanding of educational processes.

William W. Cooley (1978:13)

The importance of primary schooling

Primary education provides a fundamental base for all further schooling, training, or self-education. It also provides the basis for developing the capacity to cope with rapidly evolving and changing societies in an information age. Its universal availability and quality are central to the human resource capacity of any society.

Although primary schooling has many objectives, which may differ somewhat from country to country, several key elements are important in nearly all contexts. First, primary schooling should enable students to become literate and to do simple arithmetic calculations so that they can function effectively in modern society. Second, primary schooling should equip graduates with a sound base from which to continue their formal education or, alternatively, receive training in the private sector. Those remaining in agricultural settings should be literate and have sufficient arithmetic skills to enable them to become aware of new techniques and approaches to improve their agricultural productivity, and to enable them to protect and exercise their basic economic and political rights. Third, a basic Thai belief is that primary schooling should instill in children a strong sense of national identity. During their primary schooling, they should also acquire a good understanding

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of the national language. This objective is particularly important in countries such as Thailand, where there is considerable cultural heterogeneity. Finally, primary schooling should acquaint individuals with the basic social and cultural rules of society. Students should develop habits appropriate to at least some of their society's customs and norms.

The importance of primary schooling is reflected in the large public expenditures allocated for this level of education. In Thailand, 55% of the education budget is allocated for primary schooling (Unesco–NEC 1983), which amounts to approximately 10% of the national budget.

Primary education in Thailand

During the last 5 years, there have been major changes in Thailand's primary education system. In 1978, the basic structure of Thai education was changed from a 4-3-3-2 system to a 6-3-3 system. Thus, the basic primary cycle was reduced from 7 to 6 years. In the same year, the basic curriculum was reformed to make it more effective and more relevant to local needs. From 1966 to 1980, most rural Thai schools came under the authority of the Provincial Administration Organization, Ministry of Interior. In 1980, however, control of rural primary schooling was returned to the Ministry of Education, a change that many felt was politically impossible. These changes directly reflect the recommendations of Thailand's Education Reform Committee, established in 1974 in the aftermath of the 1973 student revolution (NEC 1974). An excellent overview of Thailand's primary education reform can be found in Sippanondha (1984).

During the 1960s and 1970s, there was a dramatic expansion in the number of primary schools and students in Thailand. Now, there is a school near almost every village. This achievement is a result of a massive construction program during the past two decades. Primary education is nearly universal in Thailand, although in certain urban slum areas and in some remote provinces of the northeast, north, and south, participation rates are still below 100% (Unesco–NEC 1983); see also MOE (1983) and Sopon (1985).

To illustrate the dramatic changes that have taken place in primary education in Thailand, it is useful to look at the transition rate from grades 4 to 5. Before the structural and curricular changes of 1978, many children stopped attending school after the fourth grade; from 1967 to 1977, only 58% of grade 4 students went on to grade 5. By 1980/81, this transition rate had increased to 97%. Whether this constitutes a genuine improvement in the quality of primary schooling is dependant on the extent to which academic standards are being maintained or strengthened. Both our quantitative and qualitative research studies provide data relevant to this question.

Some basic data on primary education in Thailand are presented in Table 1. As shown in the table, nearly all Thai schools now offer the full

Table 1. Statistics on primary education in Thailand, 1985.

General

Number of students in primary schools	6419214
Number of teachers	335215
Number of schools	31250
Student–teacher ratio	19.1
Ratio of teachers to classrooms	1.27

Characteristics of schools

Schools offering all six grades (%)	92.3
Schools with only one teacher (%)	0.003
Small schools (<120 students) (%)	36.3
Large schools (<720 students) (%)	1.6
Schools with electricity (%)	43.3
Schools with a water supply (%)	41.5
Schools offering preschool education (%)	33.4
Schools in remote areas (%)	12.0
Schools that provide lunches (%)	42.5
Schools with telephones (%)	1.5

Teacher's qualifications

Teachers with a bachelor's degree or higher (%)	39.4
Teachers with an associate (higher certificate) degree (%)	41.2
Teachers with a lower certificate (%)	17.7
Teachers with more than 3 years of high school (%)	0.4
Teachers with 3 years of high school (%)	0.8
Teachers with less than 3 years of high school (%)	0.6

Characteristics of students

Ratio of grade 6 to grade 1 students	0.875
Ratio of grade 6 to grade 5 students	0.998
Ratio of grade 6 to grade 4 students	0.999
Repeater rate (average for all grades) (%)	4.62

Source: ONPEC (1985).

6 years of primary education, and one-teacher schools have been eliminated almost entirely.

Methodological context

Before stating the objectives, it may be useful to summarize some major methodological trends that strongly influenced the strategies employed in this policy study of primary education in Thailand.

Shifting from descriptive to analytical approaches

During the past two decades, strengthening the analytical dimension of policy-related educational research has been emphasized. Reflecting this trend are a controversial, but highly analytical, study of equality of educational opportunity in the United States (Coleman et al. 1966) and

a more recent study on attending private schools (Coleman et al. 1982). Extensive research on inequality and mobility by Jencks et al. (1972, 1979) also reflects the trend toward more analytical studies. Additional information on this trend can be found in Blaug's (1974) study on Thailand, Farrell and Schiefelbein's (1985) study on Chile, and the work of Cochrane (1986), Psacharopoulos et al. (1987), and Jamison and van der Gaag (1987).

Shifting from experimental to naturalistic settings

Despite the rigorous internal validity of experimental studies, their questionable external validity has led to considerable disillusionment with rarefied experiments conducted in nonnatural settings (Cooley 1978; Argyris 1980). In such cases, rigour is often substituted for relevance. Although research carried out in natural settings is far more complex and costly, there is increasing recognition that such research must be actively encouraged.

Shifting from simple to highly complex analytical techniques

Concomitant with the exponential growth in computer technology, there has been an increase in the emphasis placed on highly complex analytical and quantitative techniques. In the 1950s and early 1960s, it was common to find many quantitative policy-related educational research studies that used no more than t–tests, simple bivariate correlations, or, at most, analyses of variance. The findings of such studies were sometimes questionable because there were inadequate statistical controls to account for the possible influence of extraneous variables.

From the late 1960s to the present, there has been rapid growth in the use of multiple variable and multivariate analyses, facilitated by easy access to powerful computer software packages, such as SPSSX and SAS, and increasingly powerful microcomputers. Among the many techniques now widely used are multiple classification analysis (Blau and Duncan 1967), causal modeling (Blalock 1971), path analysis (Land 1969), structural equations (Goldberger and Duncan 1973), logit and probit analysis (Knoke and Burke 1980), discriminant analysis (Kleeka 1980), canonical correlation, analysis of covariance structures (Jöreskog 1973), and multidimensional scaling (Adelman and Morris 1974).

Many of these approaches go well beyond "simple" recursive multiple regression. The structural equations approach, for example, makes it possible to analyze complex multiequation models involving reciprocal causal relations. Logit and probit analysis facilitates multivariate analysis of dummy dependent variables, which are common in education studies (e.g., studies involving dropouts, continuation, or the educated unemployed).

Another technique that is growing in importance is the analysis of covariance. Cronbach and Snow (1977) argue persuasively that

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educational treatments can have different impacts on individuals with different traits (or operating in different contexts). Radio education, for example, may be effective for rural students, but ineffective in urban settings. Randomization without appropriate disaggregation of data may reveal that radio education is ineffective when, in fact, it may be quite effective in rural contexts. Thus, analysis of covariance, focusing on key relationships for various subgroups, can be a helpful mechanism to deal with the fundamental problems raised by Cronbach and Snow (1977).

In the measurement field, scholars at key institutions, such as the Educational Testing Service of Princeton, have developed new, more powerful techniques of measurement, such as the Rasch Scaling Model, which is based on a complex mathematical foundation (Demaline 1979).

Common critiques of quantitative methods and the growing interest in qualitative approaches

Despite the rapid growth in popularity of advanced quantitative techniques, there is increasing disillusionment with such approaches, even among some of the most prominent "quantifiers." Mohr (1978:31 in Klees et al. 1982) paraphrases Cronbach, saying:

> I give up! There is no possibility of developing a theory of learning. I used to think that introducing some interaction terms would do it but now I see that it is still insufficient even to go to 7th and 8th order interaction and my conclusion is that such complexity is impossible to deal with.

Klees et al. (1982) present a rather devastating critique of multiple regression analysis. They argue that all models are inevitably incomplete and are, therefore, subject to specification error. Models in which important variables have been omitted, or that contain variables that overlap significantly, may give rise to highly misleading results and interpretations.

Another serious problem with many quantitative studies is the gap between abstraction and reality. Many quantitative variables are only substitutes for more complex realities. In a Coleman-type study of primary school achievement in Thailand (NEC 1977), for example, it was found that teachers' qualifications were not significantly related to students' achievement. Teachers' qualifications were being used as a substitute for teaching ability. The researchers, however, were the first to admit that teachers' qualifications are a poor substitute for teaching ability. Also, some quantitative models become so complex and abstract that it is difficult to perceive any links between the abstraction and natural, real-world phenomena.

Given this "crisis in quantitative methodology" (Klees et al. 1982), it is understandable that there is a growing interest in in-depth qualitative studies of an ethnographic nature in natural settings (Bogdan and Biklin 1982). It is thought that such approaches can help develop a deeper understanding of educational phenomena. Dreeben's

(1968) study of what is learned in school showed the great potential of qualitative research in field settings (see also Cummings (1980)). Reflecting this trend as well was Wolcott's (1975) ethnographic study of teachers and technocrats. Qualitative education studies conducted overseas provided an understanding of the complex processes of education in developmental contexts (Holmes 1973; Foley 1976, 1977; Gurevich 1976; Shaeffer 1979; Brown 1986). In the evaluation field, emphasis on the use of qualitative methods is growing (Patton 1980).

Despite the growing popularity of qualitative research, many quantitative researchers remain unconvinced and skeptical. They view qualitative research as highly subjective and lacking in precision. They also note the problem of small sample size, typical of much qualitative research. Another problem involves the notion that qualitative research is much easier to conduct than quantitative research. Many of the uninitiated underestimate the need for careful and arduous training before undertaking qualitative research. Such research is highly demanding in terms of interpersonal communication skills, local language proficiency, perceptiveness, and writing ability. Given such a context, mediocre qualitative studies are just as likely to occur as weak quantitative studies.

The movement to integrate quantitative and qualitative research methods

From 21 to 23 July 1976, a major conference was held in Monterey, California, USA, to bring together prominent quantitative and qualitative researchers to discuss the possibility of greater cooperation and communication (Fienberg 1977; Rist 1977; Textor 1977). This conference was organized jointly by the Council on Anthropology and Education, the National Institute of Education, and the Far West Laboratory for Educational Research and Development. A similar conference was held in Thailand at the Rose Garden, 1–2 October 1978, involving prominent quantitative and qualitative researchers from Thailand. This was followed by a Thai national meeting in 1979 and a regional Southeast Asian seminar in 1981, both focusing on qualitative educational research.

Three general views seem to have emerged from these meetings. The first is of a conflicting nature, i.e., the argument that one method is superior to the other. The qualitative researcher, for example, may attack quantitative research studies for being superficial and lacking validity. Similarly, the quantitative researcher may criticize qualitative research studies for being unrepresentative, impressionistic, unreliable, and subjective. The second view, well articulated by Rist (1977), emphasizes détente, i.e., both types of research can prosper, "each with its own order and logic." In Rist's view, it may be premature and naive to think of there being a "grand synthesis" of quantitative and qualitative methodologies. The third view stresses the merging of qualitative and quantitative techniques in a single study or design (Denzin 1970; Textor 1977; Supang et al. 1978).

At the Monterey and Rose Garden conferences, the second view seemed to dominate. The popularity of this view probably derives from two factors. First, the dominance of academic specialization does not encourage efforts to merge differing analytical approaches. Second, from a practical perspective, merging of the two approaches may lead to more complex, costly, and time-consuming research designs. Nevertheless, the third view seems to offer excellent possibilities for developing a deeper and better understanding of educational processes.

Objectives

This study is basically a policy-oriented evaluation of primary schooling in Thailand. Its major concern is the efficiency and quality of primary schooling. Through the use of both quantitative and qualitative research approaches, we hope to identify key factors to explain the marked variations in efficiency and quality. The qualitative part of the study is intended to provide an in-depth understanding of the complex processes that influence and condition the translation of educational inputs into outputs and outcomes. A final objective of the study is to utilize the research results to formulate policies designed to enhance the efficiency and quality of primary schooling in Thailand.

In an earlier study (Fry et al. 1981), the authors suggested a two-phase strategy of integrating quantitative and qualitative research methods. We proposed that the qualitative research follow the quantitative research and draw on the major results of prior statistical analyses to assist in selecting sites for in-depth ethnographic research. In this study, it was decided, based primarily on pragmatic concerns, to proceed simultaneously with the quantitative and qualitative studies of primary schooling in Thailand.

A quantitative study of primary school efficiency

The first part of this volume presents a quantitative analysis of primary school efficiency. The rigorous analytical methods employed reflect the growing strength of local research in countries such as Thailand. Although this study derives from the genre of educational production function research, it is much broader in focus and overcomes many of the major problems normally encountered in studies of this type.

Most educational production function studies assume that schooling results in a single outcome or output, such as cognitive achievement. If schooling results in multiple outcomes, however, this basic assumption is clearly violated. In this study, schooling is assumed to have multiple outcomes, and four basic types of empirical indicators are used to reflect school efficiency. Using factor analysis as a tool to substantiate the construct validity of the efficiency concept used in this study, a composite index of efficiency is created. Frequently, noncognitive achievement is ignored in studies of this type, but in this study it is one of a number of key indicators of school efficiency.

Many studies of this type suffer severely from multicollinearity because many educational and socioeconomic variables are highly interrelated. Again, factor analysis is employed as a statistical means to reduce the data set and eliminate redundant variables. By dealing directly with the potential problem of multicollinearity from the outset, problems created by highly unstable statistical estimates are avoided.

In some populations, certain variables display little or no variation. In such cases, it is common to conclude erroneously that such variables are not significant. In this quantitative study, great care is taken to ensure that all variables included have adequate variance. Variables with inadequate variance are not considered.

Another serious problem facing studies of this type relates to issues of aggregation (Robinson 1950; Hannan 1971). There is a tendency to use variables involving different units of analysis simultaneously (e.g., the individual, the school, and the community). This can lead to misleading results and an underestimation of the effect of the school. Malo (1978) has examined this problem thoroughly in his study of school achievement in Indonesia. To avoid ambiguities of this type, the school is used as the unit of analysis throughout our quantitative study.

Many studies of educational achievement or school outcomes utilize multiple regression analysis. Although simple recursive multiple regression analysis is a robust technique for testing the explanatory power of multiple-variable models, it does not provide information about the linkages among the independent variables. Thus, we employ a path analytic framework to clarify the complex interdependent processes that link inputs to outcomes.

Multiple statistical methods have been utilized in the quantitative study rather than a single method. Among the techniques used are item analysis, factor analysis, multiple regression, multiple classification analysis, and canonical correlation.

By using multiple regression techniques and following a rigorous analytical approach, the quantitative models tested can explain 64% of the variance in students' achievement. To understand other important factors not included in the statistical models and to illuminate the complex processes affecting the quality and efficiency of schooling, a major qualitative study was undertaken simultaneously.

An anthropological study of school quality

The second study presented in this volume is the first major anthropological field study of education ever attempted in Thailand. It is based on 18 months of fieldwork in four Thai schools and their communities. The schools represent two major geographic areas of Thailand, the central and northeastern regions. In each region, two schools were paired. The schools were selected in a manner that would exhibit a maximum variance in quality, while keeping community and environmental variables as similar as possible. Thus, in both regions a school of poor quality was matched with a school of high quality. The

major goal of the research was to try to explain these differences in quality and to gain an in-depth understanding of what is happening in Thailand's rural primary schools. Of special interest is the extent to which the new 1978 curriculum is actually being implemented, and the extent to which it is relevant to rural life in Thailand. Another important concern is the attitude of ordinary villagers toward the role and purpose of primary education. Are citizens' needs consistent with the goals articulated nationally by the Ministry of Education?

Quantitative studies of primary school efficiency have frequently lacked variables that accurately measure the performance and morale of teachers and principals. In this study, attention is focused on the behaviour of teachers and principals and its impact on the quality of primary schools.

Many qualitative studies are criticized for totally ignoring quantitative dimensions and for perpetuating the tyranny of a small sample size ($n = 1$). This unusual qualitative study attempts to respond to such criticisms. The use of four schools and communities in two different geographic areas represents an important degree of replication. Quantitative data on the four schools, including achievement tests administered to students in each school, were also collected and analyzed.

A major risk inherent in anthropological field studies is the use of inadequately prepared and trained fieldworkers. For this study, fieldworkers were carefully trained, with technical assistance from anthropologists at the University of Illinois and the National Institute of Development Administration (NIDA), a major graduate institute in Thailand. For the most part, the fieldworkers displayed remarkable skill in developing a rapport with local individuals at the field site.

Summary

The quality and efficiency of primary schooling is a major educational policy issue facing Thailand in the 1980s (Supang and Fry 1985). It is hoped that the two studies presented here, drawing on both advanced quantitative and rigorous qualitative research methods, will elucidate the many factors affecting primary school quality and efficiency. Such an integrated approach might also facilitate an in-depth understanding of the complex interrelated teaching and learning processes found in primary schools that influence the transformation of various school inputs into educational outcomes. The qualitative part of this study provides for participatory research, emphasizing the need to listen to the villagers' concept of primary schooling. The attention given to voices from the "rice roots" is an important aspect of this study. The two studies in combination provide an excellent illustration of the importance of social science analytical techniques when evaluating an educational system.

Part I

Quantitative Analysis of Primary School Efficiency

THE QUANTITATIVE STUDY

Education is one of the major factors responsible for the development of a country. Highly successful examples of development can be found in countries such as Japan, South Korea, and Singapore, where human resources have been emphasized (Cummings 1980). Human resources constitute the foundation upon which material development can occur, and education represents a major form of human resource development. The importance of education is reflected by the expansion of educational programs in many countries, facilitated by yearly increases in education budgets. Educators from various countries are cooperating in their efforts to increase the efficiency of their educational systems.

It is one of the State's primary responsibilities to educate its people so that they will become productive, law-abiding citizens with social responsibilities. Because primary education in Thailand is compulsory, the State is responsible for providing the necessary school buildings, teachers, and teaching equipment to meet the increasing demand for education by a growing population. Education is a form of investment, and the Thai government has invested heavily in primary education (Blaug 1971). Although the budget for primary education is much higher than that for other levels of education, it is never adequate to meet the targets established. At present, a major aim of the government is to standardize the quality and efficiency of schooling and to provide all children with an equal opportunity to attend primary school. Any inefficiency in the educational system will result in wasting limited resources.

The "true" external efficiency of primary schooling can only be assessed by conducting tracer studies on primary school graduates. Given Blaug's (1971) study of this type, we have concentrated our efforts in this study on the internal efficiency of primary schooling. To accomplish this, it is important to examine all geographic regions and all types of schools, as well as to assess the determinants of efficiency. Findings from this study should help the government plan and set policy for primary education.

A previous study of efficiency in primary education was carried out jointly by the Office of the National Education Commission, the Local Administration Department under the Ministry of Interior, and the Department of General Education under the Ministry of Education. This study, conducted between 1973 and 1975, evaluated students' cognitive achievement. It involved 987 schools, 23 555 grade 3 students, and 1 974 parents in 52 provinces of Thailand.

The study revealed marked discrepancies in students' achievement among different types of schools and in different regions. Even within the same geographical region, achievements varied among different types of schools. A comparison of the average cognitive achievement scores revealed that students from private schools and schools under the authority of the Department of General Education obtained the highest scores both in inter- and intraregional comparisons, whereas students attending provincial schools obtained the lowest scores. With respect to geographic region, Bangkok students had the highest scores, followed in decreasing order by students from the central, southern, and northern regions, respectively; students in the northeastern region had the poorest scores.

Another finding (NEC 1977) revealed that several key factors influence students' achievement, such as school size, the student's socioeconomic background, access to preprimary school education, and grade repetition. This study was carried out prior to a major curriculum change in 1978 and was based, therefore, on the 1964 curriculum. Interestingly, only students' cognitive achievement was evaluated. Other aspects related to primary school efficiency, such as students' noncognitive achievement, students' opportunity of access to primary schools, internal school efficiency, and school–community relations, were not evaluated even though they are also major functions of primary schooling.

Background

In 1979, the Office of the National Education Commission, in a joint undertaking with the Ministry of Education and the Ministry of Interior, carried out a major research project entitled "An evaluative study of primary school efficiency in Thailand." Its general objectives were to evaluate the efficiency of the primary education system and to establish criteria to determine the degree of efficiency within a school. The term "efficiency in primary education" was redefined to include various aspects of school performance. Schools were the units of analysis used in this research, which was carried out in 399 primary schools and involved 11 442 students, 399 headmasters, 1074 teachers, and 3951 people in the related communities. The schools were located in 18 provinces of Thailand.

Preliminary reports on this research have been presented. *An evaluation of education wastage during the academic year 1973/74 and academic year 1976/77* is a macrostudy that determines the degree of educational wastage in primary schools under the previous curriculum. *The assessment of grade 3 students' cognitive achievement in 1980* (NEC 1981) compares grade 3 students' cognitive achievement in 1980 with the national average of students' cognitive achievement scores in 1973. It presents the average achievement scores of students from different types of schools and different geographical and educational regions. The reports establish educational indices and compare the growth and disparity of students' achievement during the past 7 years.

The present research aims to identify problems that affect the degree of efficiency in primary schools in different regions and to establish patterns or profiles that may be used as indices of educational efficiency. In this chapter, the basic concept of efficiency in primary education and related variables are defined; Chapter 3 presents the methodology used; Chapter 4 provides an analysis of underlying information relevant to explaining disparities in primary education; and Chapter 5 focuses on the various determinants of these disparities. In Chapter 6, a detailed analysis of the interrelationships among the basic elements of the efficiency index is presented. In Chapter 7, the major policy implications of the study are discussed.

Findings from this research can serve as guidelines for persons responsible for educational policy and planning. They will also point out where, within the present system, opportunities for improvement lie and those defects that can be corrected. This research was relevant to policy formation for the 5th Educational Development Plan, which came into effect in 1982.

Objectives

Our general objective was to assess the efficiency of primary education after the introduction of the 1978 curriculum. Our specific goals were to synthesize basic information on primary education in Thailand; to explain, by establishing efficiency indices (i.e., students' achievement, students' opportunity of access to primary education, the internal efficiency of the primary education system, and school–community relations) disparities in the primary education system; to evaluate efficiency in primary schools through the use of a composite index of these four indicators; and to identify key factors and components that would explain efficiency in primary education.

Efficiency in primary education

An efficient educational system should enable students to develop both cognitive and noncognitive skills and knowledge as required by the curriculum, ensure that primary education is readily accessible to all children, permit targets to be reached within the regular time frame set for primary education, and establish good school–community relations.

In this assessment, key components that link input to output at each phase of educational development are considered. These components can later serve as indices of efficiency for different aspects of primary education. Thus, we begin with the students, the first major input of the primary education system, and use children's opportunity of access to primary education as the first index of efficiency. Once children are in school, the next indices considered are internal efficiency and school–community relations. The last index, which appears at the end of the educational process, is the outcome in terms of students' achievement.

Opportunity of access

An important goal of Thailand's government is to provide its citizens with an equal opportunity to receive an education without discrimination based on gender, race, religion, place of residence, or socioeconomic background. The first attempt to achieve this goal was made 100 years ago under King Rama V, who laid the foundation for modern education in Thailand (Wyatt 1969). Previously, education had been confined to temples (for boys), the Palace, and home. King Rama V's reform established formal education in schools

> so that everyone — be it my children or the children of my poorest subject, being children of a noble lord or children of a slave — shall receive an equal opportunity in education. I hereby declare that education in this country is our first priority and that full development in education must soon take place.
> (Kasemsak 1974:14)

Now, 100 years later, his wish is still unfulfilled. Inequality still exists with respect to educational opportunity among people from different socioeconomic backgrounds and from different provinces of Thailand, as documented in the report of the Preliminary Committee for Educational Reform (NEC 1976). The report pointed out differences in primary school enrollment ratios among provinces. Poverty and a lack of nearby schools were the causes of the differences. Many parents thought that their children were too young to travel some 6 or 7 km to the nearest school. In slum areas, parents did not register their children with local authorities and, as a result, could not send them to the local school. Another problem was that there were not enough schools offering free primary education. In 1978, the general national opportunity in primary education, or the primary school enrollment ratio, was 92.8% (NEC 1980a). Again, however, the opportunity among children in different geographic locations varied from 88.0 to 99.1% (NEC 1980b). Thus, opportunity of access to primary education continues to be influenced by geographic location as well as the student's financial and social background.

A study carried out in 1974 (NEC 1977) revealed that differences in educational opportunity also affected students' achievement. Students who could afford to go to large, well-equipped schools with qualified teachers tended to come from families with high socioeconomic backgrounds. The study revealed that Bangkok possessed the greatest number of well-equipped schools, whereas many schools in the northeastern region were small and were staffed by teachers who were not qualified or who had poor qualifications. The study also assessed students' cognitive achievement and it was not surprising that Bangkok students again obtained the highest average scores, whereas the lowest average scores were obtained by students in the northeastern region.

In the present study, the opportunity to receive an education was measured by comparing the number of students attending primary schools with school–age population in the geographic–administrative district in which the school was situated. This measurement not only

reveals the distribution of opportunity with respect to the level of schooling but also reflects the captive power of the schools in their local communities. Our findings indicate that the average opportunity for primary education, or the captive power of the school over the local community, is 0.05, with the highest average being 0.97 and the lowest average being 0.001. The standard deviation in opportunity for primary education is 0.11. Schools under the authority of the Department of General Education have the highest average opportunity or highest captive power, whereas private and provincial schools have the lowest average opportunity respectively.

A second indicator reflects the distribution of opportunity of access to grade 1 by comparing the ratio of students in grade 1 with the number of 6-year-old children in the same district who should be in grade 1. The average opportunity of access to grade 1 was measured as 0.04, with the highest average being 0.28 and the lowest average being 0.0. The standard deviation in opportunity of access to grade 1 is 0.10. Again, schools under the authority of the Department of General Education had the highest average opportunity (0.077), whereas the lowest average opportunity (0.03) occurred in provincial schools.

One of the major objectives of assessing efficiency in primary education is to evaluate the performance of primary schools in the area of providing educational service to the local community. Measuring the opportunity of access to grade 1 reflects both the extent of the school's administrative power over the community and its captive power in providing service to students. It has been found that there is a significant correlation ($0.34, p < 0.01$) between opportunity of access to primary education in general and opportunity of access to grade 1. Thus, opportunity of access to grade 1 is excluded from this quantitative study, the more general measure of access to primary school being used instead.

Index of primary educational wastage

This variable reflects the degree of internal efficiency in a primary education system. An efficient educational system should enable students to graduate within the standard frame. If students spend more than the time normally required to graduate, there is wastage in the educational system.

An index of educational wastage, or the wastage ratio, can be estimated from the ratio between input and actual output, i.e., the number of years a student spends in primary school relative to the ideal or expected number of years required to graduate. The input is measured in student years and the output is the number of students graduating from primary schools. Based on the student flow from the beginning to the end of the educational cycle, therefore, it is possible to estimate the input, output and index of educational wastage.

Educational wastage and efficiency are negative and positive dimensions of the same phenomenon, i.e., if there is a high degree of

educational wastage, the efficiency is low and vice versa. The index of educational wastage is one if the system is completely efficient. The higher the index, the greater the wastage. In reality, no educational system is completely efficient as there are always failures and dropouts. In this study, the average index of wastage was 1.31, with a standard deviation of 0.35. The highest index obtained was 4.51. The highest average index of wastage occurred in private schools (1.45), followed by municipal schools in Bangkok. The lowest index of wastage was found in provincial schools (1.25).

There are other ways to measure the efficiency of an educational system. Werdelin (1972), who proposed the flow model of students in different classes, suggested that the choice of a model should depend largely on the information available in a country. Various models range from primitive to very sophisticated. A primitive model, for example, will indicate the ratio between the number of students in grade 1 and the number of these students who graduate 6 years later. More sophisticated, true cohort models study one particular group of students, following them over a long period through each phase of schooling, and computing the proportion of promotions, failures, and dropouts for each class. Such models are more suitable for countries that have excellent longitudinal data bases.

This research uses the stationary population model of efficiency assessment with a moderate degree of constraint and chooses to follow the student flow from the first year of primary education to the last year; thus, it can assess the inputs and outputs of the whole system. This method can also reveal the number of graduates from the level under study and the number of academic years each student has spent in school before graduation. Such data are based on the general presupposition that key parameters remain constant, i.e., the number of schools, entries, rate of promotion, and rate of failure remain constant throughout the study period.

School–community relations

Efficiency in education is not confined to the educational system alone, but is related to other systems in society as well. In this case, the relationship between a school and its local community is used as another index of school efficiency. This relationship is indispensable.

A school cannot be built in a jungle where there are no children; similarly, the community cannot exist without a school. Moreover, the management of a school cannot take its own course and ignore local conditions. Students' lives are immersed in their culture and their parents' background and way of life. Thus, a good school should not only provide an education, but should also enlarge the students' experiences and foster positive attitudes that enable students to make use of their education productively within their communities.

A school is a unit within a society that can exist only through the goodwill and cooperation of the people it serves. Thus, establishing a

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good relationship between the school and the community should be one of the school administrator's major duties. Many principles to establish such relationships have been proposed (e.g., Stoops and Raffarty 1961; Jacobson et al. 1963). From these suggestions, school–community relations[1] can involve mutual participation in (1) decision-making, curriculum development, school activities, and finding solutions to school problems; (2) providing assistance in terms of donations, labour, teachers and teaching equipment, and suggestions; and (3) providing community services such as vocational training, adult education, recreation, library facilities, and information services.

To establish such relations, a school must do its best to allow local residents to participate meaningfully in local educational management. In this way, the school will reduce the burden on the State to provide education and will achieve greater efficiency.

In measuring school–community relations in this study, the maximum score obtainable was 20. Headmasters, in their capacity as a representative of the school and someone closely corrected with the local community, provided the data that formed the basis for establishing this scale. Findings revealed an average score for school–community relations of 9.64, with a standard deviation of 4.22. It was observed that schools located in urban or major districts had lower scores than schools located in rural districts, with average scores of 8.71 and 10.36 respectively. Schools in the northern and northeastern regions had higher average scores than schools in the central region and those in Bangkok. Rural schools had a higher average score (10.86) than other types of schools. Private schools had the lowest average score (6.54), which is lower than the national average for school–community relations.

Students' achievement

In general, achievement is the degree of success obtained after inputting a certain amount of effort. It is also an output and should reflect certain physical or intellectual abilities of an individual. Students' achievement relates not only to intelligence but may also indicate the effectiveness of the school's curriculum and the efficiency of school administrators and teachers (Chauncey and Dobbin 1963). In studying a system consisting of inputs, educational processes, and outputs, one of the most desirable outputs is students' achievement. Thus, students' achievement is one of the major indices reflecting the degree of efficiency of the primary education system.

In this study, the cognitive and noncognitive achievement of grade 3 students was measured. The maximum score obtainable was 181, with 120 items measuring cognitive achievement and 61 items reflecting

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[1]Although we view the extent of school–community relations as a positive aspect of efficiency, there are those who argue that such relations are enhanced in schools that overemphasize the social mobility function of primary schooling (Bennet 1978) and neglect, for example, curricula relevant to agricultural development (Shute 1984).

noncognitive traits. Students' achievement scores were determined based upon the results of two tests of their basic cognitive achievement in arithmetic (two sections, each with 20 questions) and in the Thai language (four sections, each with 20 questions). Students' noncognitive scores were determined based upon the results of another test involving 7 questions on attitudes, 1 on pastimes, 5 on self-study, 8 on problem-solving, 6 on values and attitudes toward careers, 17 on values and attitudes toward self and others, and 17 on general knowledge.

There are reasons for including both cognitive and noncognitive achievement scores in this study. First, our study indicates that there is a significant correlation between these two types of achievement ($r = 0.67, p < 0.01$). Second, the main objective of the 1978 curriculum is to promote both cognitive and noncognitive achievement among students. Our inclusion of noncognitive achievement in this study is consistent with the work of Bloom (1976), who also discusses the affective outcomes of schooling.

Research variables

There are two types of variables, dependent and independent. In this study, a total of 106 variables relevant to efficiency in primary education were taken into consideration (Appendix 1). Certain characteristics of these variables, i.e., means, standard deviations, and frequency distributions, are classified according to type, geographic region, and location. These findings provide extensive information on the status of primary education in Thailand. Details related to selecting these variables are presented in Chapter 5.

The dependent variables used reflect the four major aspects of primary education discussed in the previous sections, i.e., students' cognitive and noncognitive achievement, opportunity of access to education, internal efficiency of school management, and school—community relations. Certain componential variables are multiple measures. For convenience in our analysis and interpretation, these variables were grouped into one single measure and a composite index of efficiency was established as a means of synthesizing these major dimensions of efficiency.

The independent variables used to measure efficiency in primary education consist of four types, namely data on school characteristics, the performance and background of students, the qualifications and background of teachers, and characteristics of the local community. Details related to the 27 independent variables used in this study are presented below and details on the process of selecting these variables are presented in Chapter 6. Statistics on each of the independent variables are presented in Appendix 2.

Number of classrooms is a continuous variable measured by means of a questionnaire that is completed by school principals. It reflects school size, which is expected to influence disparity in students' achievement and in students' opportunity of access to primary schools.

Headmaster's years of government service is also a continuous variable, information upon which is obtained from school principals. It is hypothesized to be related to disparity in students' achievement, to wastage in primary education, and to school–community relations.

Number of teachers residing in the community is a continuous variable that may be related to students' achievement and their opportunity of access to primary schools.

Percentage of grade 6 graduates is another continuous variable that may help explain the disparity in students' opportunity of access to primary education and it may influence school–community relations.

Distance from the school to the district office is a continuous variable reflecting school location. It is expected to be significantly related to students' achievement.

Means of transportation to school is a categorical variable, with alternatives such as bicycling, boating, and walking. It is expected that this variable is significantly related to students' achievement because without an appropriate means of transportation to school, a student's attendance will be hindered. In this study, it was found that 58% of students walk to school.

Community cooperation regarding the school's extracurricular activities is a dummy variable that is expected to be significant in explaining both students' achievement and school–community relations.

Extent of school–community cooperation is a continuous variable based on the headmaster's view of the school and its community. It provides data on school–community relations.

Average income is a continuous variable, information upon which is obtained from an open-answer questionnaire. It is expected to influence students' achievement. In this study, the highest annual income per family was found to be THB 80 000 and the lowest was THB 500, indicating an extremely broad income distribution (in July 1988, 25 Thai baht [THB] = 1 United States dollar [USD]).

Proportion of population supplied with electricity is a dummy variable reflecting the degree of development in each community. The low level of development suggested by a lack of electricity may affect students' achievement and students' opportunity of access, as well as school–community relations.

Extent of district emigration in 1980 is a continuous variable. The District Educational Supervisor provides information on this variable, which may affect students' achievement and children's opportunity of access.

Student–classroom ratio is a continuous variable that is expected to have an impact on students' achievement and children's opportunity of access.

Availability of facilities and teaching materials is a continuous

variable consisting of a checklist of 20 teaching materials. It is expected to relate directly to students' achievement.

Student–teacher ratio in 1979 is a continuous variable that may affect students' achievement as well as educational wastage.

Expenditures per student in 1979 is a continuous variable that may influence educational wastage and school–community relations.

Age of grade 3 students is a continuous variable that may affect children's educational opportunity and wastage because a student's age is related to school entry and failure.

Preschool education is a dummy variable. It is expected to directly affect students' achievement. In this study, 40.6% of the grade 3 students sampled indicated that they had preschool educational experience.

Students' repetition is a dummy variable that may affect students' achievement and educational wastage.

Proportion of students with living fathers is a dummy variable that may explain certain psychological traits related to students' confidence, morale, and parental assistance and, therefore, may relate to students' achievement.

Regularity of students having pocket money for school is a continuous variable used to determine the socioeconomic background of a student's family because children at the grade 3 level are unable to provide reliable data on their parents' profession and income. Students in the central region were found to have pocket money more regularly than students in other regions. It was also found that students in schools under the authority of the Department of General Education received pocket money more regularly than students in other types of schools. In provincial schools, few children received pocket money.

Regularity of having lunch at school is a continuous variable that may affect students' achievement. On average, it was found that 2.9% of students never eat lunch at school, 17.2% sometimes eat lunch at school, and 79.8% always have lunch at school.

Students' absence is a continuous variable that can affect students' achievement and educational wastage. In this study students' absence ranged from a minimum of 0 days to a maximum of 92 days.

Students' readiness and attitude toward school is a continuous variable, information upon which was obtained from grade 3 students who were asked eight questions on various aspects of school, such as learning, subject matter, teachers, and friends. The student responded by indicating either a positive or negative attitude toward the question. This variable may relate directly to students' achievement.

Teachers' qualifications is a categorical variable, based upon the teacher's educational background, i.e., whether the teacher has a lower teacher's certificate, an upper teacher's certificate, a bachelor's degree,

or has undertaken graduate studies. This variable may affect students' achievement and students' opportunity of access.

Teaching experience is a continuous variable that is expected to help explain students' achievement and educational wastage.

Time spent on correcting homework is a continuous variable reflecting teachers' commitment to their profession.

Total score of the community's attitude toward schools is another continuous variable. To obtain information on this variable, officials from the Office of the National Education Commission interviewed community residents. This variable may affect school–community relations.

CHAPTER 3

RESEARCH METHODOLOGY

Population and sample

The population under consideration in this study is made up of the set of primary schools throughout Thailand. In 1977, a total of 31 652 schools came under the authority of the Local Administration Department, the Department of General Education, various municipalities, and the Private Education Office (NEC 1978).

In this study, schools are used as the units of analysis. A sufficient sample of schools is necessary to ensure that the results are representative of the total population under consideration. Hence, 20% of the schools existing in Thailand in 1977 were used to ensure a standard error of no more than 4% at the 95% level of confidence. Based on these assumptions and using a sampling fraction of 20%, 400 primary schools were selected. Detailed calculations used to determine the sample size are presented in Appendix 3.

One of the major objectives of this study is to explain those factors that significantly contribute to efficiency in primary schools. This can be accomplished by studying and measuring the variance of factors that are thought to be relevant to such efficiency. It is imperative, therefore, that the units of analysis have as much variance as possible. In 1977, the number of primary schools under the authority of different government departments varied dramatically. Provincial schools made up 91% of all schools. Also, there were twice as many private schools as municipal schools (Table 2).

To avoid oversampling among provincial schools and undersampling among other schools, it was decided that 50% of the schools studied would be provincial schools and the other 50% would be made up of the other three types of schools. Thus, 200 provincial schools under the authority of the Local Administration Department were selected, along with 112 private schools, 48 municipal schools, and 40 schools under the authority of the Department of General Education, Ministry of Education. The geographic distribution of the schools is presented in Table 3. Additional details on the selection of schools are presented in Appendix 4.

A comparison between the target number of schools and the actual number used in the sample is presented in Table 4. Further details on the distribution of schools by geographic and educational region and by type of school are presented in Appendix 4.

Table 2. Number of primary schools.

Region	Type of school				
	MOE[a]	Provincial	Municipal	Private	Total
Bangkok	39	—	386	598	1 023
Central	46	7 088	185	597	7 916
Northern	20	6 666	84	149	6 919
Northeastern	24	11 822	71	248	12 165
Southern	13	3 328	75	213	3 629
Total	142	28 904	801	1 805	31 652
Percentage	0.4	91.3	2.5	5.7	

[a]MOE, schools under the authority of the Department of General Education, Ministry of Education.

Table 3. Distribution of sample group.

Region	Type of school				
	MOE[a]	Provincial	Municipal	Private	Total
Bangkok	11	—	23	38	72
Central	9	50	11	37	107
Northern	8	46	5	9	68
Northeastern	7	82	4	15	108
Southern	5	22	5	13	45

[a]MOE, schools under the authority of the Department of General Education, Ministry of Education.

Data collection

A pilot study was conducted in 1979 to test and improve the instruments before putting them into use in 1980. This pilot study took place in Chaiyaphum, Lampang, and Karnchanaburi between 16 and 23 September and in Bangkok between 24 and 28 September. Problems that arose during the pilot study were then corrected.

Data were collected from all four types of schools in four provinces during the pilot study through interviews with headmasters, grade 3 teachers and students, the guide who took the fieldworkers to the school sites, and people in the local community.

Four working groups (one for each province) set out to collect the data, spending approximately 1 week in primary schools in each province. In addition to the data collected through interviews, general information on school location and the population in the community was obtained from available sources.

The subjects used to measure students' cognitive and noncognitive achievement were tested for reliability. The results are shown in Table 5.

Table 4. Comparison of the target number of schools and the number actually used.

Region	MOE[a] Target	MOE[a] Actual	Provincial Target	Provincial Actual	Municipal Target	Municipal Actual	Private Target	Private Actual	Total Target	Total Actual
Bangkok	11	12	—	—	23	22	38	35	72	69
Central	9	11	50	47	11	14	37	38	107	110
Northern	8	8	46	47	5	5	9	9	68	69
Northeastern	7	7	82	81	4	4	15	14	108	106
Southern	5	5	22	23	5	5	13	12	45	45
Total	40	43	200	198	48	50	112	108	400	399

[a]MOE, schools under the authority of the Department of General Education, Ministry of Education.

Table 5. Reliability of students' achievement tests.

Subject	Reliability (KR 21)		Total score
Cognitive achievement			
Arithmetic	0.83	(0.86)	40
Arithmetic concepts	0.71		20
Arithmetic problems	0.75		20
Thai language	0.97	(0.94)	80
Language usage	0.89		20
Reading comprehension	0.87		20
Vocabulary	0.90		20
Spelling	0.78		20
Noncognitive achievement	0.70		61

Note: Figures in parentheses indicate the reliability of the primary school efficiency test used in 1975 based on Kuder Richardson's formula 21.

Data collection took place between 5 July and 8 August 1980. Twelve teams of fieldworkers (each team consisting of two provincial education supervisors, two officials from the Office of the National Education Commission, and one driver) were dispatched to the different regions. Data were collected from 11 442 students, 1 074 grade 3 teachers, 399 headmasters, 399 community leaders, and 3 951 people in the local communities. Altogether, information was collected from 399 schools in 10 educational regions, 18 provinces, 93 districts, and 249 subdistricts.

Research instruments

In studying the factors contributing toward students' achievement, it is necessary to consider major variables such as students, teachers, headmasters, school buildings, educational expenditures, and local communities. In this study, both surveys and interview questionnaires were used.

Grade 3 students' cognitive achievement test

This achievement test is a multiple-choice test involving two subjects, arithmetic and the Thai language. The arithmetic test consists of two sections, one on concepts and the other on problem-solving. The Thai language test consists of four sections: spelling, language usage, reading comprehension, and vocabulary. Each section consists of 20 questions that are closely related to the subject content as stated in the curriculum. This achievement test has been tested both for its discrimination power and its reliability (Kuder Richardson's formula 21 has yielded a reliability of 0.94 and 0.86 for the Thai language and arithmetic tests, respectively).

Questionnaires

The questionnaire for grade 3 students consisted of two sections, namely general information on the students and their socioeconomic background, such as age, sex, preschool education, repetition, parents' education and profession, provision of breakfast and lunch, days of absence from school, number of clothes in possession, home furniture, and teaching methods used in school, and a noncognitive achievement questionnaire on students' habits, pastimes, self-study, ability to solve problems, social values, attitude toward jobs, values and attitude toward self and others, and general knowledge. The questionnaire had a total of 61 questions, which were read to the students one question at a time. The students then filled in the answers.

The questionnaire for grade 3 teachers consisted of five sections, namely general information concerning teachers' age, gender, qualifications, teaching experience, income and first language spoken; teachers' devotion, based upon the time spent on planning lessons and marking homework, the number of assignments given to students, the frequency of assessment tests, and the time spent on PTA activities; teachers' attitude toward their career, the objectives of the new primary education curriculum, primary school administration, the nature of the school curriculum, texts or teaching materials used in the school, primary school students, and primary school teaching methods; teaching methods used by primary school teachers, such as lectures, explanations, demonstrations, experiments, discussions, and problem-solving sessions; and teachers' morale, i.e., teachers' spirit in general, their job satisfaction, and their feelings about school conditions, their superiors, salaries, responsibilities, relationships with colleagues, school facilities, the government sectors they are under, and their life as teachers. This questionnaire was completed by the teachers.

The questionnaire on the headmasters' view of the school and its local community consisted of two sections, namely general information on the headmasters' age, gender, teaching experience, experience as a headmaster, academic qualifications, job satisfaction, and residence in the school village, and information on school facilities and their potential to provide services to local communities. This questionnaire

consists of items on the number of residential teachers in the village, the total number of teachers, the percentage of students who have completed the 6 years of compulsory primary education, the percentage of students in 1978 who continued on to secondary schools, school location, means of students' transportation to and from school, the distance and transportation facilities from the school to the district office, students' activities that are assigned by the school, services offered by the school to the students and the local community, and the relationship between the school curriculum and community needs. This questionnaire was sent to the headmasters 2 weeks prior to data collection by officials from the Office of the National Education Commission.

The questionnaire on general information about the school and the village consisted of three sections, namely district information on the number of children in the district attending primary schools and the number of children between 6 and 14 years of age during the 1979 academic year; village information on the total population in the village, the number of emigrants and immigrants in 1980, village size, road conditions from the district to the village, and facilities for health services; and school information on wages, expenditures in general, and expenditures on light and heavy equipment, land, building, and other items during the 1977, 1978, and 1979 fiscal years. This questionnaire was sent to district education supervisors 2 weeks prior to data collection by officials from the Office of the National Education Commission.

The interview questionnaire on the school's local community consisted of two sections. The first covers general information on the school community, the information being obtained through interviews with school community leaders or persons who know the community well. These people were either village heads, district officers, members of the municipal council, headmasters, or other knowledgeable individuals. One person was interviewed in each community. The questions concerned community geography, the site, soil types, floods, the number of households, the nature of settlement, available communication with other communities, the population and its standard of living and jobs, irrigation, electricity, health facilities, the village library, and community assistance to the school.

The second section dealt with community members' attitudes toward schools. The information was obtained through interviewing members of the school community on the degree of cooperation between the school and the community, the degree of community satisfaction with the services offered by the school, PTA activities, school welfare, learning and teaching in school, teachers' and students' conduct, and general information related to the school. Interviews associated with this questionnaire were conducted by officials from the Office of the National Education Commission.

FOUR DIMENSIONS OF PRIMARY SCHOOL EFFICIENCY

In this chapter, the four indices of efficiency in primary education are analyzed with respect to school location (within or outside major districts), geographic region, type of school, and educational region.

Students' achievement

A study of students' achievement reveals that the average score for noncognitive achievement by students in the schools studied is 71.2% and the average cognitive achievement score is 50.1% (Table 6). There is also a lower degree of disparity in the students' noncognitive achievement than in their cognitive achievement. The students' average achievement score (cognitive and noncognitive combined) is 57.2%, with a coefficient of variation of 12.5.

Further examination of these data reveals that students attending schools located within major districts have higher cognitive and noncognitive achievement scores than those in schools outside major districts. As well, there is less disparity in students' achievement in major districts than in other geographic regions. Students in Bangkok and in the central region have the highest cognitive and noncognitive achievement scores, followed by students in the southern region; the lowest achievement scores were obtained by students attending schools located in the northeastern region. In fact, the latter's achievement scores are the lowest in all respects and are considerably below the national average. Students in the central region had slightly higher noncognitive achievement scores than those in Bangkok.

With regard to comparing students' achievement among different types of schools, private and Ministry of Education (MOE) school students had the highest scores, with students in MOE schools obtaining the highest cognitive scores and students in private schools obtaining the highest noncognitive achievement scores. The next highest achievement scores were those obtained by students attending municipal schools and those schools under the Bangkok Metropolitan Authority; students attending provincial schools had the lowest scores in all respects.

With respect to different educational regions (Fig. 1), students in regions 1, 6, and 12 (provinces in the central plains near Bangkok) had

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higher cognitive and noncognitive achievement scores than those in other regions (Table 7). Students in region 1 (the area surrounding Bangkok) had the highest cognitive achievement scores, whereas the highest noncognitive achievement scores were obtained by students in region 12 (the eastern area). Regions 9, 10, and 11 in the northeast had the poorest achievement scores in all respects, with students in region 10 obtaining the lowest achievement score and a coefficient of variation indicating a greater degree of disparity than in any of the other educational regions. Students in region 9 had the lowest noncognitive achievement scores and the greatest disparity in comparison with the other regions.

Table 6. Students' achievement scores.

	Cognitive achievement		Noncognitive achievement		Total achievement	
	Mean (%)	CV[a]	Mean (%)	CV	Mean (%)	CV
District						
Major	55.79	18.63	72.79	5.95	61.52	12.79
Others	45.56	23.16	69.89	8.07	53.76	15.58
Geographic region						
Bangkok	59.88	16.55	73.80	4.73	64.57	11.03
Central	54.98	14.67	74.33	6.79	61.50	10.04
North	46.08	21.90	69.33	6.31	53.92	14.50
Northeast	41.14	25.66	67.56	7.30	50.04	16.37
South	49.98	15.66	70.62	4.83	56.94	10.56
Type of school						
MOE	58.33	11.59	73.85	2.89	63.70	7.24
Private	57.98	18.50	74.39	6.19	63.51	12.71
Provincial	43.18	21.44	68.64	7.52	51.76	14.20
Municipal	51.12	15.39	72.28	7.12	58.25	10.79
Bangkok	54.63	14.78	71.34	2.62	60.26	8.78
Educational region[b]						
1 (central)	58.73	15.81	73.51	4.88	63.71	10.54
3 (south)	48.30	17.03	69.98	4.97	55.61	11.34
4 (south)	52.28	13.01	71.51	4.49	58.76	8.87
6 (central)	54.26	13.42	73.77	5.98	60.83	9.78
7 (north)	46.46	19.80	68.80	6.89	53.98	13.83
8 (north)	46.23	23.22	69.89	5.89	54.20	14.94
9 (northeast)	40.57	20.30	66.90	8.43	49.44	13.68
10 (northeast)	37.29	30.95	67.46	7.48	47.46	18.70
11 (northeast)	45.50	20.95	68.10	6.07	53.12	14.18
12 (east)	55.22	17.34	75.85	7.78	62.17	11.38
Average	50.05	20.95	71.16	6.27	57.16	12.46

Notes: The educational regions specified represent contiguous geographic areas composed of several provinces. The provinces of the northeast, for example, are grouped into three subregions, namely 9, 10, and 11. Major administrative control of primary schooling, however, lies at the national and provincial levels. The regions indicated in the table relate primarily to areas covered by 12 regional educational research and development centres.
[a]CV, coefficient of variation.
[b]See Fig. 1.

North 8

Northeast 9

North 7

Central 6

Central 5

Northeast 10

Northeast 11

Central 1   East 12

South 3

South 4

South 2
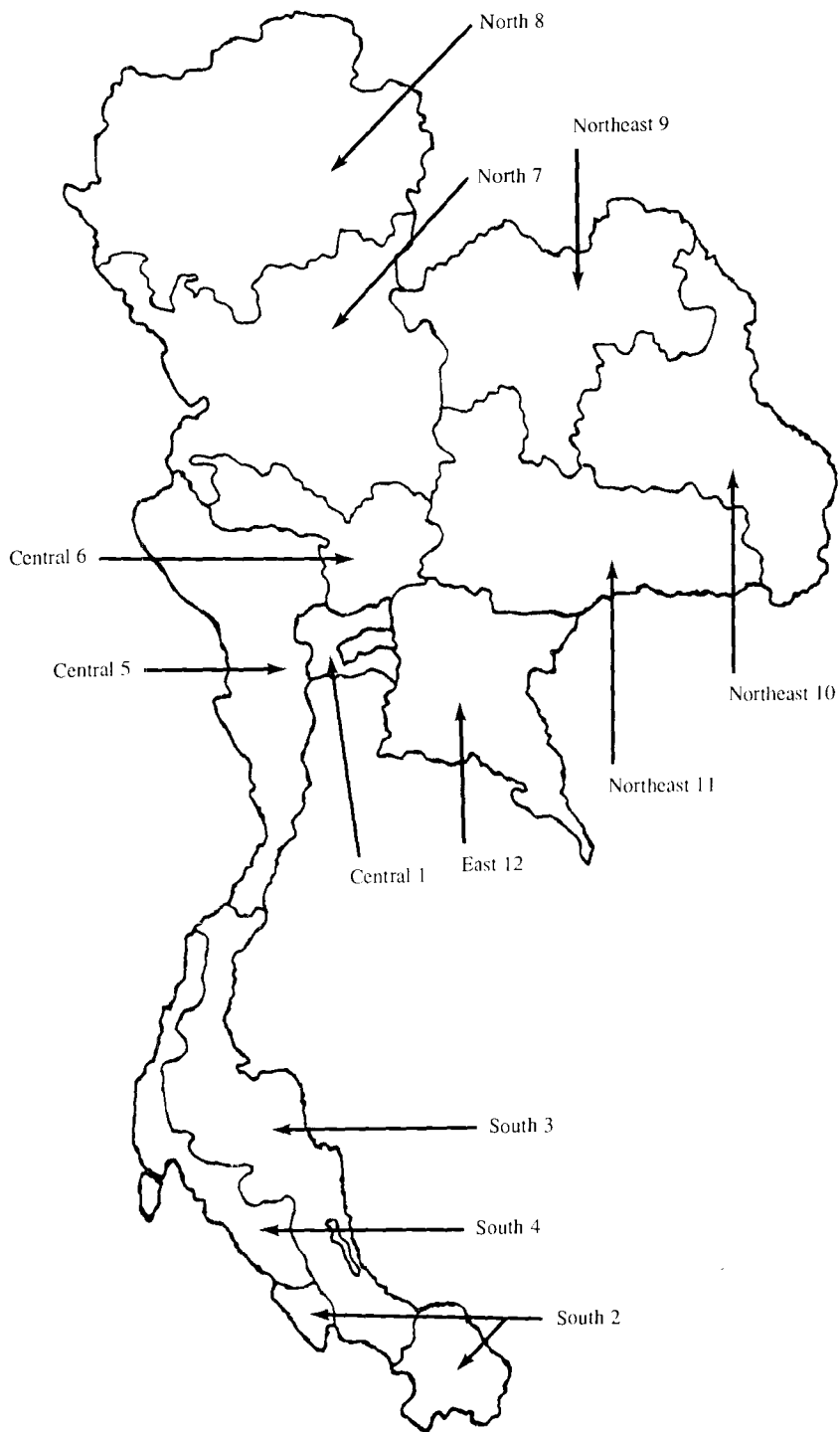
Fig. 1. Educational regions of Thailand.

Access to primary education

Opportunity of access to primary school is one way of measuring efficiency in primary schools as this can reflect the capacity of the school and the district to provide educational services. Findings reveal that the average opportunity of access to primary school is 4.6%, with a coefficient of variation of 239.1, indicating that schools in different parts of the country have widely differing capacities to offer educational services.

A study shows that the capacity of schools located within major districts is 6%, twice the capacity of schools located outside of major districts. From a geographic perspective, schools in the northeast have the highest opportunity of access (6%), followed by schools in Bangkok, the north, and the south, respectively, whereas schools in the central region have the lowest opportunity of access (3%).

The greatest disparity can be found among different types of schools. Ministry of Education schools have the greatest capacity (13%), followed by schools in Bangkok and municipal schools (7%); private and rural schools have the lowest capacity (approximately 3%). Clearly, the disparity in opportunity of access to primary school is significantly dependent upon the size of the school. Information on the number of students per school, which is used to determine school size, indicates that provincial schools are among the smallest, with only about 250 students per school.

Wide disparities also exist among different educational regions. Region 10 in the northeast has the highest capacity, providing an opportunity of access to primary school of 11%. The lowest capacity occurs in regions 9 and 12 (approximately 2%) (Table 7).

Table 7. Summary of various measures of education by region.

Educational region[a]	Opportunity of access to primary education	Educational wastage index	School-community relations score	Composite index of efficiency in primary education
1	4.8	1.39	39.5	51.8
2	—	—	—	—
3	3.1	1.35	54.1	49.4
4	4.8	1.33	44.0	50.3
5	—	—	—	—
6	4.0	1.30	49.8	52.6
7	5.8	1.32	54.1	50.7
8	2.6	1.35	55.5	50.6
9	1.8	1.26	55.0	46.0
10	10.6	1.12	52.3	46.5
11	5.6	1.34	53.6	48.4
12	2.2	1.29	40.5	50.3

[a]See Fig. 1.

Wastage index in primary education

A major problem in primary schools in developing countries is educational wastage, resulting from failure to manage the educational system in a manner that enables students to complete their education within the time frame prescribed by the syllabus. Thus, the wastage index can be used to determine the efficiency of specific primary schools as well as the primary education system as a whole. The more the wastage index exceeds 1.00, the greater the educational wastage resulting from students' failure and dropouts.

From our studies of 399 primary schools throughout Thailand (Appendix 5, Table A5-2), we find that the average wastage index is 1.31, with a coefficient of variation of 26.66. Surprisingly, schools located within major districts have a higher wastage index than those located in other districts.

With respect to region, schools in Bangkok have the highest wastage index. The higher wastage in urban areas may be due to the higher economic opportunity costs of schooling in such areas. The next highest wastage index occurred in schools located in the south, north, and central regions, respectively; the lowest wastage index occurred in schools in the northeast.

A study of different types of schools reveals that private schools have the highest wastage index (1.45), followed by Bangkok metropolitan schools, municipal schools, rural schools, and Ministry of Education schools, respectively. Thus, it appears that provincial and Ministry of Education schools have been the most successful in enabling students to complete their primary education within the time limit set by the curriculum. These results do not take into consideration the quality of primary school graduates, however, which is reflected by the students' achievement. Our studies have shown, in fact, that provincial school students have the lowest achievement scores.

A look at the wastage index for different educational regions indicates that there is a higher degree of educational wastage in regions 1 (central), 3 (south), 8 (north), and 11 (northeast) than in other regions. Regions 12 (in the east), 9, and 10 (in the northeast) have lower wastage indices, with region 10 having the lowest educational wastage index (Table 7).

School–community relations

There are three types of school–community relations, namely participating in decision-making, providing assistance, and offering services. This study reveals that the average school–community relations score per school is 48.2 (Appendix 5, Table A5-3). Schools located in outer rural districts obtained higher average school–community relations scores than those located in major districts. Schools in the north, northeast, and south had higher scores than those

located in the central region and in Bangkok. Schools in Bangkok, in particular, had the lowest score (36.8), which is much lower than the national average. Thus, it appears that urban society adversely affects school—community relations.

Findings from a study of the school—community relations among different types of schools confirm this result. Provincial and municipal schools, which are located mainly in the provinces, have higher scores, especially rural schools, which have the highest score (54.3). Ministry of Education and Bangkok metropolitan schools follow with a score of 53.2; private schools have the lowest scores.

There is also a corresponding pattern in school—community relations among different educational regions. Schools in region 8 (north) have the highest scores, followed by regions 9 (northeast) and 3 (south). The lowest score occurs in region 1, the provinces nearest Bangkok (Table 7).

Summary

The different components of primary education efficiency show disparities among different regions and types of schools under different government departments. Provincial schools, for instance, are at a disadvantage with regard to opportunity of access to primary education
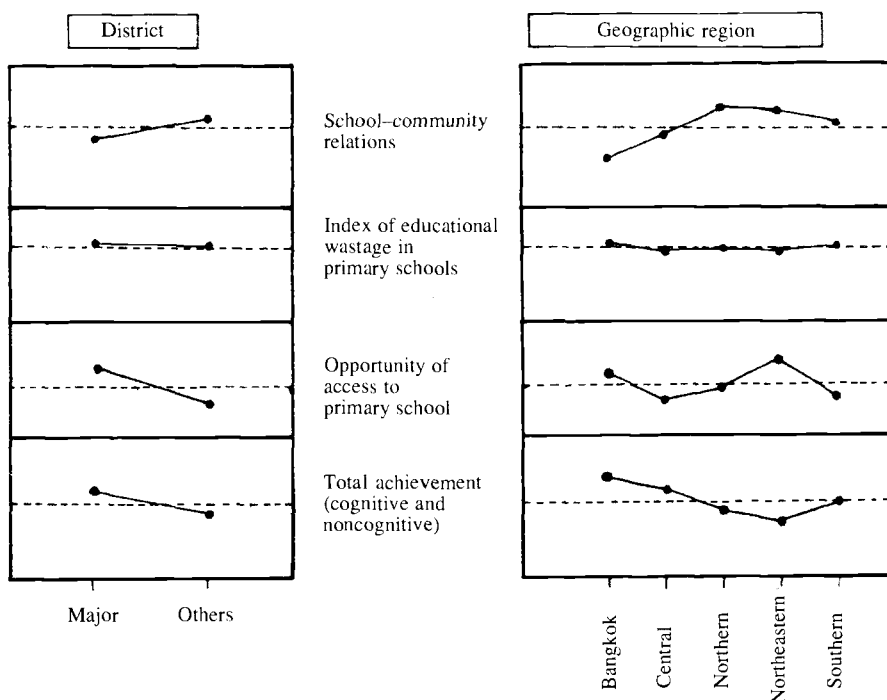
Fig. 2. Efficiency of primary education by district and geographic region (dashed line is national average).

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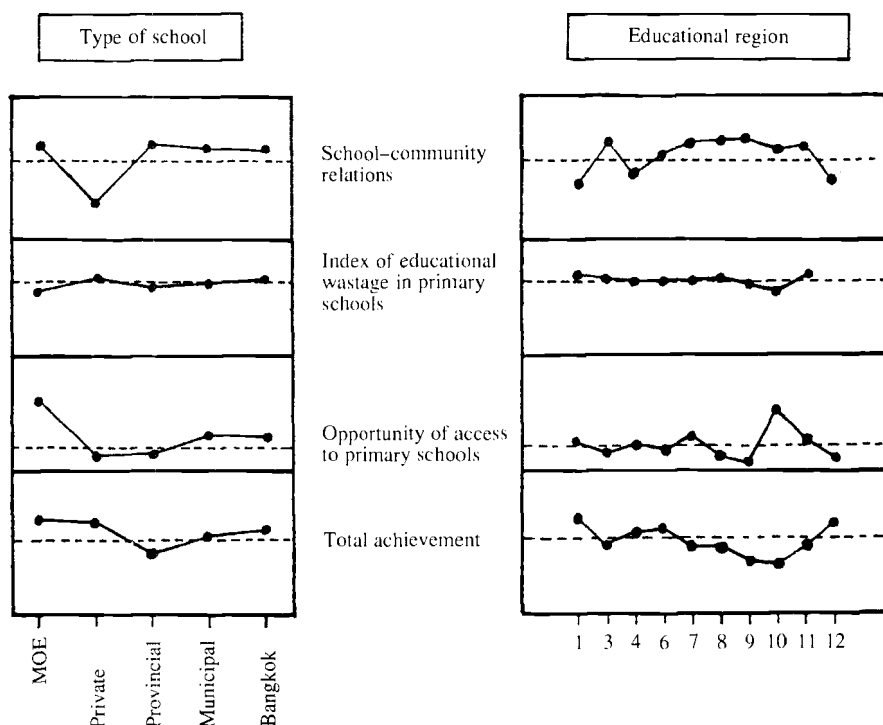
Fig. 3. Efficiency of primary education by type of school and educational region (dashed line is national average).

and students' achievement, but excel in their internal efficiency in enabling students to complete their primary education within the time limit set by the curriculum. Provincial schools also have better school–community relations. Ministry of Education schools, on the other hand, have high students' achievement, opportunity of access to primary education, and internal efficiency, but their score is only slightly above 50% for school–community relations.

Thus, an assessment of primary school efficiency based upon the various components of efficiency can provide a more balanced and accurate account of the condition of primary schools. Figures 2 and 3 present a profile of the advantages and disadvantages of, and disparities among, the components of primary education efficiency.

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INDEX OF EFFICIENCY IN PRIMARY EDUCATION

One of the major objectives of this study is to assess efficiency in primary schools by studying the functions of primary schools, such as students' cognitive and noncognitive achievement, opportunity of access to primary education, internal efficiency in educational management, and school–community relations. In reality, schools differ in terms of these four components of efficiency. It is necessary, therefore, to look at more than one dimension of primary school functions simultaneously. In this study, efficiency will be looked at in terms of its conceptual structure of four elements and then we will integrate these four components into a composite index of efficiency for primary education.

Establishing the composite efficiency index

Nine variables are used in this assessment of efficiency in primary education: students' achievement (cognitive and noncognitive) — cognitive achievement consisting of two variables, namely students' achievement scores from two standardized tests in arithmetic and the Thai language, and students' noncognitive achievement scores being obtained from students' performance in a standardized noncognitive achievement test; opportunity of access to primary education — consisting of two variables, namely opportunity of access to grade 1 and opportunity of access to primary education in general; efficiency in educational management — consisting of the educational wastage variable; and school–community relations — consisting of three variables, namely community–school assistance, school–community participation in decision-making, and the school's participation in offering services to the community.

Factor analysis has been applied to these nine variables using the principal factor method with varimax rotation. (Details of this analysis are discussed in Chapter 6 under the section entitled "Structure of factors reflecting efficiency in primary education.") The analysis shows that four factors have elements with a factor loading of more than 0.40. Details on factor loadings and factor score coefficients are presented in Appendix 6 (Tables A6-1 and A6-2, respectively).

Appendix 6, Table A6-1 shows variables with high factor loadings. It can be seen that the first factor consists of three variables, namely cognitive arithmetic achievement, Thai achievement, and noncognitive

achievement. The second factor consists of three variables reflecting school–community relations. The third factor consists of two variables, namely those measuring opportunity of access, and the fourth factor consists of only one variable, the wastage ratio. These variables are the key elements of our composite index of efficiency, and the factor score coefficients with high factor loadings (Appendix 6, Table A6-2) are used as coefficients in calculating the composite index of efficiency using Kim's (1975) equation:

$$Y = FZ$$

where Y is the composite index of primary education efficiency in each school, F is the matrix of factor score coefficients, and Z is the standard score of each variable with a factor loading greater than 0.40.

Disparities in the composite efficiency index

The composite index of efficiency in primary education, presented in the form of standard scores, is particularly useful for comparing existing discrepancies among primary schools in different parts of the country. To facilitate interpreting the index of efficiency, it has been transformed into a standard score with a mean of 50 and a standard deviation of 10. Any primary school with a composite index below 50 is then classified as being below the national average and, hence, in need of improving its efficiency.

A study of the composite index of efficiency (Table 8) reveals considerable disparity with respect to efficiency among schools. On average, for instance, primary schools located within major districts are more efficient than those in the outer districts, with average scores being higher than the national average, whereas the average score of schools in the outer districts is slightly below the national average.

A study of different geographic regions reveals that primary schools in Bangkok have the highest composite index, followed by schools in the central region and those in the north respectively. Schools in the south and in the northeast have composite indices that are below the national average. Schools in the northeast, in particular, have the lowest composite index compared with schools in other regions.

A study of efficiency in different types of schools reveals that the highest composite index occurs in Ministry of Education (MOE) schools. This index, in fact, is the highest in all respects in this study. The next highest index is found in Bangkok and in municipal schools. The average efficiency in these schools is higher than the national average, whereas private and provincial schools have efficiencies lower than the national average. The lowest composite index (47.6) was found in provincial schools. In terms of disparity within the same type of school, Ministry of Education schools, despite having the highest composite index of efficiency, had the greatest disparity. The least disparity was found among Bangkok schools.

With respect to geographic region, schools in regions 6 and 1 (central) had high efficiency, followed by schools in regions 7 and 8 (north), 12 (east), and 4 (south). These schools all have indices above the national average, whereas schools in regions 9, 10, and 11 (northeast) and 3 (south) have indices below the national average and, therefore, need improvement, especially schools in region 9, which have the lowest composite index in all respects. Figure 4 summarizes the disparity in the composite index of efficiency in primary education.

Another point to be considered is the source of the variation. In Table 8, eta squared (η^2), which determines the percentage of disparity in the composite index, indicates that the different school types are the major source of variation. Approximately 14% of the disparity is accounted for by the different types of schools, whereas only 4–5% of the

Table 8. Composite index of efficiency for primary education.

	Mean (%)	Standard deviation	Coefficient of variation
District			
Major	52.45	10.73	20.46
Others	48.09	8.96	18.63
$\eta^2 = 0.0468\ (4.68\%)$			
Geographic region			
Bangkok	52.01	8.34	16.04
Central	51.37	8.13	15.83
North	50.44	13.10	25.97
Northeast	47.08	10.95	23.25
South	49.77	7.07	14.21
$\eta^2 = 0.0354\ (3.54\%)$			
School type			
MOE	59.46	13.80	23.21
Private	49.26	8.67	17.60
Rural	47.62	8.72	18.31
Municipal	52.30	8.45	16.16
Bangkok metropolitan	53.49	8.18	15.29
$\eta^2 = 0.1370\ (13.70\%)$			
Educational region			
1 (central)	51.77	8.32	16.07
3 (south)	49.38	7.28	14.74
4 (south)	50.30	6.93	13.78
6 (north)	52.63	8.34	15.85
7 (north)	50.72	12.51	24.66
8 (north)	50.55	13.93	27.60
9 (northeast)	45.99	5.84	12.70
10 (northeast)	46.53	14.11	30.32
11 (northeast)	48.37	10.19	21.07
12 (east)	50.33	7.78	15.46
$\eta^2 = 0.0424\ (4.24\%)$			
Average	50.45	9.56	18.96
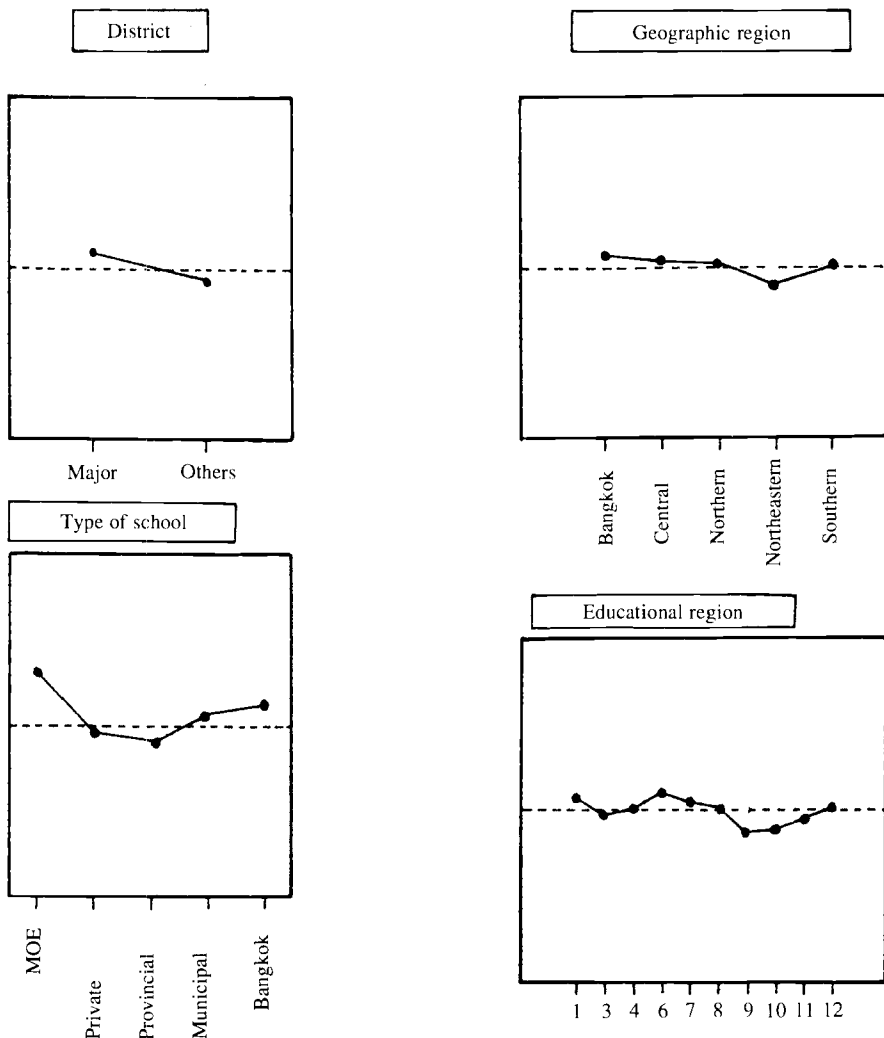
Fig. 4. Disparity in the composite efficiency index
(dashed line is national average).

disparity is related to other sources. Additional data on disparity in
primary schools are presented in Appendix 7.

Characteristics of primary schools

Variation in efficiency

Analysis of the disparities in the composite index of efficiency
confirms that the efficiency of primary schools varies among different
school sites, geographic regions, school types, and educational regions
throughout the country. Although the major source of variation seems to

be the different types of schools, it would be more practical to say that the different sources of variation combined have contributed toward approximately 26% of the total disparity. The other 74%, therefore, is suspected to be related to disparities within the same group of districts, geographic regions, school types, and educational regions. To determine such internal differences, it is essential to consider data on school conditions and students' socioeconomic background as well as the community environment surrounding the schools. Detailed case studies are used for this purpose. Using our findings on the composite index of efficiency, the 10 schools with the highest composite indices and the 10 schools with the lowest composite indices were studied to determine the characteristics that differ between the two groups. These comparisons are presented in Table 9.

The disparities in the characteristics of schools with high and low efficiencies are combined to reflect composite disparities among districts, geographic regions, types of schools, and educational regions. Attempts to reduce these disparities would increase both the efficiency and the equity of the primary education system in Thailand.

Physical condition of schools

Size

On average, schools with high efficiency are much larger than their counterparts, with the number of classrooms being four or five times greater than in those schools with the lowest indices of efficiency.

Site

Schools with high efficiency are usually situated in well-developed areas near major districts with good postal services and more facilities for traveling from home to school.

General physical condition

From the community's point of view, schools in better physical condition are considered to be more "efficient."

School quality

Students' accomplishments

Schools with high efficiency have a greater number of students passing grade 6 and continuing on to secondary school than schools with low efficiency.

School equipment

There is twice as much teaching equipment in schools with high efficiency as there is in schools with low efficiency.

Table 9. Characteristics of schools with high and low efficiencies.

	Mean ($\bar{X}$) of 10 schools with the highest efficiency	Mean ($\bar{X}$) of 10 schools with the lowest efficiency
School's physical condition		
School size		
Number of classrooms	30.60	7.80
Number of students	1 143.00	242.00
School site		
Disturbances	0.50	0.40
Distance from district (km)	3.89	14.50
Means of transport to school	3.80	1.70
School's general condition		
Community's view	2.52	2.02
School quality		
Students' accomplishments		
% of grade 6 students passing	99.60	77.90
% of grade 6 students continuing		
on to secondary school	87.60	51.90
Teaching equipment		
Number of items	18.00	9.80
Student–teacher ratio	24.02	18.90
School personnel		
Headmasters experience (years)	23.00	17.40
Teachers		
Number residing in community	31.70	3.40
Teaching experience (years)	11.45	8.46
Weekly teaching load (periods)	65.31	56.32
Time spent on marking homework (h)	7.59	3.96
Description of community		
Community size		
Number of households	2 121.00	317.10
Community development		
Electricity supply	1.00	0.50
Population migration		
Rate of immigration	0.048	0.019
Rate of emigration	0.173	0.046
School–community assistance		
Community assistance	2.52	2.04
School assistance	2.16	2.09
Community's attitude toward school	23.19	20.82
Students' social and economic background		
Preschool education		
Kindergarten education	0.53	0.36
Class repetition		
Ratio with passes	0.84	0.72
Parents' education		
Father's education	2.57	1.90
Parents' career		
Ratio of farmer parents	0.25	0.69
Home socioeconomic background		
Regularity of students' pocket money	2.70	2.33
Number of home supplies	7.55	5.06
Number of days absent from school	2.89	4.55
Homework		
Ratio of students doing homework	0.98	0.88

Student–teacher ratio

Schools with high efficiency have a greater student–teacher ratio (with an average of 24 students per teacher). The greater ratio results from this type of school being much larger in size.

School personnel

Headmaster

Headmasters in schools with high efficiency had 5–6 years more experience than those in schools with low efficiency.

Teachers

In schools with high efficiency, more teachers reside within the community and they have more teaching experience. These teachers also spend more hours teaching and more time marking homework.

School community

Size

Schools with higher efficiency are situated in larger communities, with approximately seven times the number of households, than schools with low efficiency.

Development

All of the schools with high efficiency are situated in communities that are supplied with electricity, whereas about half of the schools with low efficiency are located in communities without electricity.

Population migration

There is a higher ratio of both emigration from and immigration into communities with high efficiency schools.

School–community assistance

There is a greater degree of mutual assistance between schools with high efficiency and the community.

Attitude toward school

On average, community members have a more positive attitude toward schools in communities with high efficiency schools.

Students' socioeconomic background

Preschool education

A greater number (53%) of students in schools with high efficiency

have attended kindergarten. Only 36% of students in schools with low efficiency attended kindergarten.

Class repetition

There is a lower failure rate in schools with high efficiency.

Parents' education

Students in schools with high efficiency come from families in which fathers have higher levels of education.

Parents' career

The majority of the parents of students attending schools with low efficiency are farmers, whereas the parents of students attending high efficiency schools are nonfarmers.

Home economic background

Students attending schools with high efficiency receive pocket money more regularly than those attending schools with low efficiency.

Absence from school

Students attending high efficiency schools miss less school than students attending low efficiency schools.

Homework

Students attending schools with high efficiency do their homework more regularly.

An improvement in primary education efficiency

The disparity in the composite index of efficiency indicates that the efficiency of primary education varies within different regions. This disparity is related to certain characteristics of the schools, students, and school communities, some of which facilitate efficiency, while others tend to impede it. A study of such patterns and their impact on any change in the composite index of efficiency inevitably helps determine future guidelines for improving the efficiency of this level of education. Thus, at this stage, the emphasis is on the analysis of the explanatory power of variables on schools, students, and the social and economic setting of school communities and the extent to which these variables increase or decrease efficiency in primary education. Multiple classification analysis (MCA) will be used for this purpose.

Multiple classification analysis (Kim and Kohaut 1975) is a combination of regression analysis and analysis of variance techniques. It is highly appropriate for studying the patterns of change in a dependent variable, which, in this case, is the composite index of

efficiency, associated with different categories of key independent variables, namely school districts, geographic regions, and school types, while simultaneously controlling the influence of quantitative variables related to the efficiency disparity, such as school conditions, students, and the socioeconomic standing of the school communities. In this way, it is possible to note the degrees of increase in efficiency through changes in major explanatory variables, which may point toward improvements that can be most effective and feasible.

Table 10 shows the change in the mean or average composite index of efficiency before and after adjustments for the influence of several variables classified in terms of school districts, geographic regions, and school types. The average efficiency before adjustment does, in fact, reflect the present composite index of efficiency.

It also reveals the disparity in different regions, which results from schools receiving various degrees of influence that can contribute negatively or positively toward efficiency. Primary schools in urban districts, for instance, come under various influences that induce greater efficiency than schools in rural districts. In other words, urbanization appears to be highly related to improvements in primary education efficiency. In contrast, schools in districts with few or none of the characteristics associated with urban society are at a greater disadvantage. Thus, after eliminating the advantages and disadvantages resulting from exogenous forces such as urbanization, it is possible to ascertain the actual efficiency in primary education. In fact, the average composite index of efficiency after adjustment is the true average efficiency as there are statistical controls for other influencing factors.

Analysis of the data presented in Table 10 reveals that after adjustment for the influence of other variables, schools with low efficiency increase their efficiency for all classifications. At the district level, every variable has a positive influence on efficiency in primary schools in major districts, whereas the influence is negative for schools in other districts. Adjustment of school-related variables, in particular, would increase the efficiency among primary schools outside major districts by 3.84%, which is a greater increase, compared with the change resulting from the adjustment of other variables. The range, which is the difference between the highest and lowest composite indices of efficiency, also reveals that adjusting the influence of school variables would be highly effective in decreasing disparities among different school districts.

With respect to geographic region, primary schools in Bangkok and in the central region are influenced by numerous variables in a positive manner, which has brought about their greater efficiency, whereas primary schools in the north, northeast, and south are at a disadvantage in every respect. Among the most important variables are the more favourable socioeconomic conditions of the central region and its proximity to Bangkok. Thus, changes in school variables, student variables, and community variables are essential to reduce educational disparities among Thailand's major geographic regions. An adjustment

Table 10. Multiple classification analysis of the average efficiency index.

	Preadjustment: current situation	Postadjustment, influence through school variables[a]	% change	Postadjustment, influence through student variables[b]	% change	Postadjustment, influence through community variables[c]	% change
District							
Major	52.45	50.08	− 4.51	50.53	− 3.66	50.66	− 3.41
Others	48.09	49.94	+ 3.84	49.58	+ 3.09	49.49	+ 2.91
Range	4.36	0.14		0.95		1.17	
Geographic region							
Bangkok	52.02	48.63	− 6.51	49.86	− 4.15	49.65	− 4.55
Central	51.37	53.64	+ 0.52	51.14	− 0.44	51.27	− 0.19
North	50.44	51.90	+ 2.89	50.68	+ 0.47	50.56	+ 0.23
Northeast	47.08	47.83	+ 1.59	48.30	+ 2.59	48.36	+ 2.71
South	49.77	50.28	+ 1.02	50.39	+ 1.24	50.42	+ 1.30
Range	4.94	4.07		2.84		2.91	
School type							
MOE	59.46	53.02	− 10.83	57.24	− 3.73	58.59	− 1.46
Private	49.26	47.18	− 4.22	46.13	− 6.35	49.60	+ 0.69
Provincial	47.62	49.49	+ 3.92	49.79	+ 4.55	47.79	+ 0.35
Municipal	52.30	50.45	− 3.53	52.06	− 0.45	51.44	− 1.64
Bangkok	53.49	52.60	− 1.60	53.95	+ 0.85	53.08	− 0.76
Range	11.84	5.84		11.11		10.80	

Note: The average composite index of the sample schools' efficiency is 50.00
[a]School variables consist of school size, expenditures per student, student–teacher ratio, headmaster's experience, and district–school distance.
[b]Student variables consist of preprimary school education, class repetition, and students' readiness and attitudes.
[c]Community variables consist of the population's income, community cooperation with schools, and the community's attitude toward schools.

in school variables would have the greatest effect on efficiency in the northern primary schools, whereas adjusting student variables is the best way to narrow the disparity in efficiency among schools in different geographic regions, followed by adjusting the community variable.

With regard to different types of schools, Ministry of Education and municipal schools seem to have been positively influenced by every variable, which has made their composite indices high throughout. Private schools have more disadvantages associated with community variables, especially the school–community variable, which, as indicated in the previous chapter, is significantly below average. Provincial schools are at a disadvantage in every respect. Therefore, adjusting the community variable would benefit private schools, whereas adjusting all of the variables related to the school, student, and community would benefit provincial schools and improve their efficiency. Adjustment of student variables, in particular, would increase provincial school efficiency by 4.55%, whereas adjustment of school variables would increase efficiency by 3.92%. Narrowing the disparity in efficiency among different types of schools can best be accomplished through the adjustment of school variables.

In conclusion, the results of the multiple classification analysis show the actual degree of efficiency in different types of primary schools throughout the country by adjusting or eliminating the influence of other variables related to efficiency. This, in turn, indicates clearly the actual influence of each variable, which can serve as a guideline when considering ways to improve efficiency in different districts, geographic regions, and types of schools.

FACTORS REFLECTING EFFICIENCY

It has been shown in the preceding chapters that considerable disparity exists among the factors used to measure primary school efficiency in different regions. The four factors used are students' cognitive and noncognitive achievement, opportunity of access to primary education, educational wastage, and school–community relations. With these four factors synthesized into a composite index of efficiency in primary education, we find that different types of primary schools in different geographic regions have different levels of efficiency. Schools in minor districts, in the northeast and south, and in educational regions 3, 9, 10, and 11, as well as provincial and private schools, have lower efficiency scores than the national average.

This disparity is hypothesized to be the result of various determining influences, such as schools, teachers, students' socioeconomic background, and the varying degrees of school–community relations. These determining factors are expected to vary with respect to the degree and direction in which they relate directly or indirectly to school efficiency. Therefore, a detailed study of the varying impact of these determining factors is relevant and useful to any future plans to improve primary school efficiency.

Moreover, the use of a composite index to measure efficiency in education is also a new concept based on a hypothesized crystallization of four key indicators. Therefore, the index must be empirically verified. Such an index is consistent with the view that schools have multiple outcomes. This chapter concentrates on verifying the structure of the composite index, selecting variables, studying the role and effect of these variables on educational efficiency, and, finally, on constructing a model of primary school efficiency.

Measuring primary school efficiency

A factor analysis of the basic variables related to efficiency in primary education is used to verify the internal structure of the four factors used to measure efficiency in primary education to test its construct validity as well as to determine the degree of crystallization among the four key empirical indicators. As mentioned earlier, nine basic variables are used to measure efficiency in primary education.

These nine variables are analyzed using the principal factor method with varimax rotation, which results in four major factors. The

Table 11. Variation in primary school efficiency.

Factor	Eigenvalue[a]	Variation (%)	Cumulative variation (%)
Achievement	2.6766	52.5	52.5
School–community relations	1.3655	26.8	79.3
Opportunity of access	0.5985	11.7	91.0
Educational wastage	0.2238	4.4	95.4

[a]The eigenvalue reflects the variation in efficiency in primary education explained by that particular factor.

variables and their factor loadings are shown in Table 11. An analysis of variables with factor loadings greater than 0.40 has yielded four factors that significantly reflect efficiency in primary education. The first factor consists of three common variables that affect students' achievement scores, namely arithmetic score, Thai language score, and noncognitive achievement score, with factor loadings ranging between 0.69 and 0.98. Among these, the Thai language score has the highest factor loading. The second factor also consists of three variables that influence school–community relations, namely school–community cooperation, school–community participation in decision-making, and school service to the community, with factor loadings ranging between 0.61 and 0.73. In this case, school–community participation in decision-making has the highest factor loading. The third factor consists of two variables, both reflecting educational opportunity, namely opportunity of access to grade 1 and opportunity of access to primary education, each with a factor loading of 0.59. The fourth factor has only one variable, the index of educational wastage. Its factor loading is – 0.42.

The variance of these four factors accounts for a high percentage of the total variance in efficiency in primary education (Table 11). The students' achievement score factor contributes most (52.5%) toward efficiency in primary education, followed by school–community relations (26.8%), opportunity of access to primary education (11.7%), and the index of educational wastage (4.4%).

Thus, an analysis of these four factors validates the hypothesis that efficiency in primary education can be measured using the four independent factors, and that using the composite index of these four factors in the assessment is both valid and appropriate.

Selection of potential variables

An analysis of the relationship between independent and dependent variables, reflecting efficiency in primary education, is, in fact, an examination of the covariation between the two sets of variables or a variance analysis. Thus, the first step is to select certain potential variables with adequate variance for statistical analysis. These variables should have a high correlation with the dependent variables but a low correlation with other independent variables to avoid statistical problems related to multicollinearity. In selecting potential

and independent variables for this study, the following procedure was used.

Step 1: Quintile analysis of the high and low groups

The difference between the high and low groups of the 106 variables expected to play a significant role in determining the disparity among efficiency factors in primary education was analyzed. The scores for each factor (cognitive and noncognitive achievement, opportunity of access to primary education, educational wastage, and school–community relations) were grouped into five quintiles. The first factor, students' achievement scores, was divided into five quintiles ranging from the lowest to the highest. Variables that could best discriminate between the highest (5th) quintile and lowest (1st) quintile were selected. Variables from each of these series are expected to be able to explain the disparity among different factors. Altogether, there are 55 variables in this quintile analysis (Appendix 8). The selection of variables with the greatest difference between the high and low quintiles is, in fact, an attempt to create the greatest variance possible among those explanatory factors, a major principle used in research design. This analysis facilitates the selection of potential variables with adequate variance that can be used to explain the disparity in each factor related to efficiency in primary education.

Step 2: Factor analysis of variable groups

The 55 independent variables obtained from the analysis in step 1 should have adequate variance for the ensuing statistical analysis. To this point, nothing has been ascertained with respect to the nature of their independence or their redundancy. Technically, this problem is called multicollinearity, i.e., a problem caused by positive inter-relationships among independent variables. Moreover, the number of variables obtained in step 1 is still too great and needs to be reduced to facilitate the final analysis. This problem can be solved by factor analysis, using the principal factor method whereby it is possible to extract reduced orthogonal factors from the set of independent variables, with each of the factors measuring different aspects of the phenomenon under consideration.

Step 3: Correlation analysis

Each factor obtained in step 2 consists of a number of variables that help measure and explain the nature of that factor of which they are parts. Variables that appear to measure the same thing and have significantly high correlations ($p < 0.01$) are interchangeable. The variables selected for each factor are expected to play a significant role and can be manipulated by public policy, have high factor loadings, and have a high correlation with the dependent variables of interest.

Selection of potential variables as outlined in the three steps provides 27 variables that can be used to explain the disparity in primary school

efficiency in Thailand. Dependent and independent variables used in this study are listed in Appendix 1 and details on each of the potential variables can be found in Chapter 2 under the heading "Research variables."

The multidimensional roles of schools

This study, which is designed to assess efficiency in primary education, is, in fact, a study of the four different roles played by primary schools and an assessment of their efficiency, defined as a multidimensional phenomenon. Thus, the analysis begins by calculating the canonical correlation between those independent variables that are thought to explain efficiency and the dependent variables that measure efficiency. Each variable that affects a particular aspect of efficiency is then studied independently.

In this section, an analysis is made of the canonical correlation between independent variables that relate to dependent variables or the four factors of efficiency in primary education. This enables us not only to determine the nature and pattern of correlations between the two sets of variables but also to determine the amount of variance in efficiency explained by the independent variables. Path analysis is then used to determine the role and impact of each independent variable that is hypothesized to be related to the disparity in each dimension of efficiency. In this way, it is possible to construct a model of factors of efficiency in primary education and to use it to develop policies that will foster educational improvements.

Canonical correlation analysis

This type of analysis is used here to determine which factors contribute toward efficiency in primary education and to study the pattern of their relationships. Data from 399 sample schools were used in the analysis. The dependent variables used are students' cognitive and noncognitive achievement, opportunity of access to primary education, the educational wastage index, and the school–community relations score.

Independent variables expected to explain efficiency in primary education derive from various sources, namely data on the school (school size, headmaster's years of government service, number of teachers living in the community, percentage of students graduating from grade 6, distance from school to the district office, ratio of students per class, availability of facilities and teaching materials, student–teacher ratio, and expenditures per student); data on the students (means of transportation to school, age, preschool education, repetition, existence of a living father, regularity of having pocket money for school, availability of school lunch, days of absence from school, and readiness and attitude toward school); data on the teachers (qualifications, teaching experience, and time spent correcting homework); and data on

Table 12. Canonical correlation analysis.

Pair	Eigenvalue	Canonical correlation coefficient
1	0.68	0.82
2	0.39	0.62
3	0.16	0.41
4	0.15	0.38

the local community (cooperation of the community, extent of school–community cooperation, average population income, access to electricity, extent of district emigration, and community's attitude toward school).

This analysis yields four pairs of canonical variables that help explain the relationship between the independent variables and primary school efficiency. In other words, there are four patterns of correlation between the independent variables and efficiency indices with canonical correlations ranging between 0.38 and 0.82, each of which is statistically significant at the 0.01 level. The amount of variation explained in each pair of canonical variables as expressed by eigenvalues lies between 15 and 68% (Table 12), with the first canonical pair having the highest correlation and, consequently, the greatest explanatory power. Table 12 shows that the first and highest canonical pair is the set of independent variables used to explain students' cognitive and noncognitive achievement, with a canonical correlation of 0.82 and an explanatory power between the independent variables and the achievement variables of 68%.

Path analysis

In this study, Alwin and Hauser's (1975) path analysis technique was used to establish the influence of each variable on the efficiency indices.[2] Four path models corresponding to each measure of efficiency were specified to determine the direct and indirect effects, with the last model assessing the effects of all efficiency indices on the composite efficiency index.

Path model explaining students' achievement

A path model to explain students' cognitive and noncognitive achievement in grade 3 was constructed (Fig. 5). In the figure, the type of district and the geographic region are treated as exogenous variables, with students' achievement being treated as the dependent variable. The students' socioeconomic background, type of school, school's characteristics, headmaster's and teacher's characteristics, community attitudes toward school, and students' readiness and attitude toward school are the major intervening variables.

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[2]For a discussion of the statistical assumptions underlying path analysis, refer to Appendix 9.
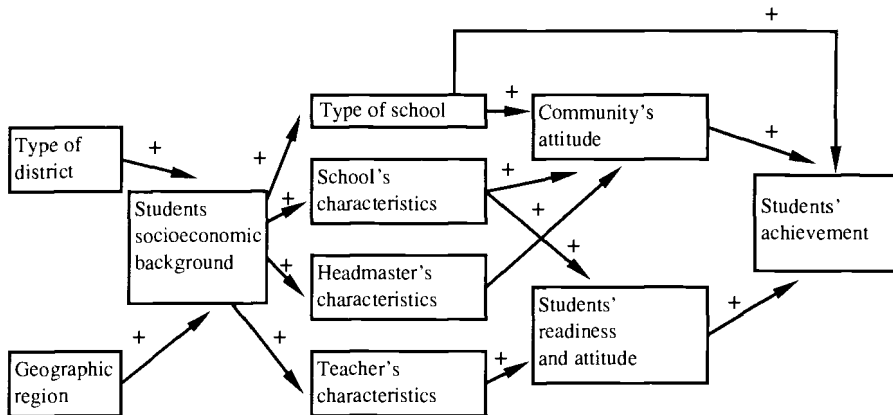
Fig. 5. Path model for students' achievement.

In this model, the correlation between variables and their effects is recursive, with only right hand and vertical branching directions in which reciprocal effects are not possible. In general, students from urban districts are more likely to come from well-off families. Students from schools in the northeast are more likely to have a poorer socioeconomic background. In fact, the socioeconomic factor is highly indicative of the type of school, the school's characteristics, and the teacher's characteristics, i.e., students with better socioeconomic backgrounds tend to be found in schools under the authority of the Ministry of Education, private schools, or municipal schools, which have higher standards of teaching and headmasters and teachers with better qualifications and more experience than the average for the schools sampled. Similarly, students with better socioeconomic backgrounds obtain higher ratings with respect to the community's attitude toward school, greater readiness, and more positive learning attitudes. This subsequently contributes to higher students' achievement scores.

Path analysis is used to analyze correlations among variables in the model of student achievement. Students' socioeconomic background, variables related to the teacher, and variables related to the school are studied to determine to what extent they have a direct or indirect effect on students' achievement. Analysis in this model begins by studying the correlation coefficients of the 17 independent variables that have been included to explain students' achievement, namely variables related to district type, geographic region, students' socioeconomic background, teachers and schools, school size in terms of the number of classrooms, the teacher–student ratio, expenditures per student, the headmaster's experience, and grade 3 teachers' qualifications. The last three variables are community attitude toward school and students' readiness and attitude toward school, with students' achievement as the dependent variable.

The means, standard deviations, and correlation coefficients for the 17 variables are presented in Appendices 2 and 10. It is noticeable that there is a fairly wide range of correlations between students' achievement and the independent variables — from 0.00 correlation

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with community attitude toward school to a 0.73 correlation with students' regularity of having pocket money for school. The following variables had a high correlation with students' achievement: having pocket money for school, access to preschool education, geographic region, school size, type of school district, students' readiness and attitude, and school type (especially provincial schools, whose correlation with students' achievement is, as expected, highly negative ($r = -0.60$). Thus, there are significant correlation coefficients between factors related to students' socioeconomic background, students' characteristics, and school background and the achievement factor. Each factor, therefore, is significant in explaining the disparity in achievement among primary schools.

Table 13 presents beta coefficients for 11 regression equations related to students' achievement, with the addition of one more independent variable at the end of each equation. All of the variables in this model can account for 65% of the variance in students' achievement. (Appendix 11 includes the results of separate multiple regression analyses of students' cognitive and noncognitive achievement.)

The beta coefficients in Table 13 also show that district type, geographic region, the two variables on students' socioeconomic background, school type, school size, community attitudes toward school, and students' readiness and attitude are significantly related to students' achievement. Among these eight variables, those reflecting students' socioeconomic background have the greatest explanatory power relative to other variables as indicated for equation 3. The greatest variance in students' achievement can be explained by the variable reflecting the students' regularity of having pocket money for school, with a beta coefficient of 0.61. When variables on schools and students' readiness and attitude are added to the equation, the beta coefficient for regularity of having pocket money for school gradually decreases to 0.39. Figures from equation 11 reveal that the students' socioeconomic background has both direct and indirect effects through other variables on students' achievement, which is verified later when analyzing the decomposition of effects.

To obtain the correlations among variables in this analysis, and to compare the extent of the direct effects of each variable in the model on students' achievement and other related phenomena, 16 equations were used in a stepwise multiple regression analysis. The results of this analysis are presented in Table 14. Figure 6 presents a path diagram displaying the significant effects of independent variables on students' achievement. Alwin and Hauser's (1975) technique was then used to decompose the effects of independent variables into direct and indirect effects through intervening variables. The results of this analysis are shown in Table 15. As Tables 14 and 15 and Fig. 6 all deal with the same phenomena, they should be considered simultaneously.

Table 14 and Fig. 6 show that there are eight variables with significant direct effects in the path model explaining students' achievement (for the values of the direct effects, refer to the total achievement (ACH) column in Table 14 and the eight arrows ending

Table 13. Beta coefficients in regression equations explaining students' achievement.

Independent variable	Regression equation number										
	1	2	3	4	5	6	7	8	9	10	11
School located in rural district (RUR)	-0.33^a	-0.32^a	-0.11^a	-0.08^a	-0.06	-0.05	-0.05	-0.05	-0.05	-0.05	-0.07^a
Geographic region where school is located (REG)	-0.40^a	-0.40^a	-0.11^a	-0.12^a	-0.13^a	-0.14^a	-0.15^a	-0.16^a	-0.15^a	-0.16^a	-0.12^a
Number of people in student's household (FS)		0.09^a	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.01	0.04
Socioeconomic status (in terms of regularity of having pocket money for school) (SES)			0.61^a	0.51^a	0.48^a	0.46^a	0.45^a	0.45^a	0.45^a	0.44^a	0.39^a
Percentage of students with preschool education (PRE)				0.24^a	0.19^a	0.17^a	0.16^a	0.16^a	0.16^a	0.16^a	0.15^a
Private school (PRV)					0.09	0.09	0.11	0.15^a	0.16^a	0.16^a	0.15^a
Provincial school (CAO)					0.01	0.03	0.02	0.02	0.03	0.02	0.01
Ministry of Education school (MOE)					0.08	0.06	0.06	0.06	0.06	0.06	0.05
Number of classrooms (SIZE)						0.11^a	0.11^a	0.11^a	0.11^a	0.11^a	0.12^a
Student–teacher ratio (TSR)							0.03	0.04	0.03	0.03	0.02
Expenditure per student (BUD)							-0.06	-0.06	-0.06	-0.06	-0.06
Headmaster's experience (HEXP)								0.04	0.05	0.04	0.03
Headmaster's qualifications (HQUA)								0.01	0.01	0.00	0.00
Teacher's experience (TEXP)									-0.03	-0.03	-0.03
Teacher's qualifications (TQUA)									0.04	0.04	0.06
Community attitudes toward school (CAT)										0.08^a	0.09^a
Students' readiness and attitude toward school (ATT)											0.19^a
R	0.58	0.58	0.74	0.77	0.77	0.78	0.78	0.78	0.78	0.79	0.80
R^2	0.33	0.34	0.55	0.59	0.60	0.60	0.61	0.61	0.61	0.62	0.65
F	98.40	67.65	118.20	113.57	71.89	65.66	54.41	45.96	40.02	38.40	40.82

Note: Beta coefficients in equation 11 reflect the direct effect that each independent variable has in explaining students' achievement. The dependent variable is total achievement.

[a]Significant at the 0.05 level.

Table 14. Significant direct effects of independent variables in the path model explaining students' achievement.

Independent variable	Dependent variable							
	FS	SES	PRE	PRV	CAO	MOE	SIZE	TSR
School located in rural district (RUR)	− 0.20	− 0.34	− 0.15		0.33	− 0.31		
Geographic region where school is located (REG)		− 0.48						0.29
Number of people in student's household (FS)		0.08			− 0.09			
Socioeconomic status (in terms of regularity of having pocket money for school) (SES)			0.39	0.15	− 0.34	0.11	0.20	
Percentage of students with preschool education (PRE)				0.56	− 0.35		0.14	
Private school (PRV)								− 0.20
Provincial school (CAO)							− 0.21	0.19
Ministry of Education school (MOE)							0.27	
Number of classrooms (SIZE)								
Student–teacher ratio (TSR)								
Expenditure per student (BUD)								
Headmaster's experience (HEXP)								
Headmaster's qualifications (HQUA)								
Teacher's experience (TEXP)								
Teacher's qualifications (TQUA)								
Community attitudes toward school (CAT)								
Students' readiness and attitude toward school (ATT)								
Total achievement (ACH)								
R	0.20	0.66	0.47	0.65	0.81	0.37	0.61	0.51
R^2	0.04	0.44	0.22	0.42	0.66	0.14	0.38	0.26
F	16.74	103.64	50.41	143.80	189.90	32.11	59.17	45.54

(continued)

Table 14. Concluded.

Independent variable	Dependent variable							
	BUD	HEXP	HQUA	TEXP	TQUA	CAT	ATT	ACH
School located in rural district (RUR)				− 0.17	− 0.17		0.14	− 0.07
Geographic region where school is located (REG)							− 0.21	− 0.12
Number of people in student's household (FS)					0.13		− 0.13	
Socioeconomic status (in terms of regularity of having pocket money for school) (SES)		0.11	0.18				0.23	0.39
Percentage of students with preschool education (PRE)		0.16	− 0.15					0.17
Private school (PRV)	0.14	− 0.83		− 0.42	− 0.15		0.15	
Provincial school (CAO)					− 0.19			
Ministry of Education school (MOE)			0.16					
Number of classrooms (SIZE)			0.23					0.12
Student–teacher ratio (TSR)						0.12		
Expenditure per student (BUD)								
Headmaster's experience (HEXP)								
Headmaster's qualifications (HQUA)								
Teacher's experience (TEXP)								
Teacher's qualifications (TQUA)							− 0.12	
Community attitudes toward school (CAT)								0.19
Students' readiness and attitude toward school (ATT)								0.19
Total achievement (ACH)								
R	0.14	0.71	0.39	0.29	0.41	0.22	0.39	0.80
R^2	0.02	0.50	0.15	0.08	0.17	0.05	0.15	0.65
F	7.59	134.17	17.91	17.54	20.44	9.86	14.26	40.82
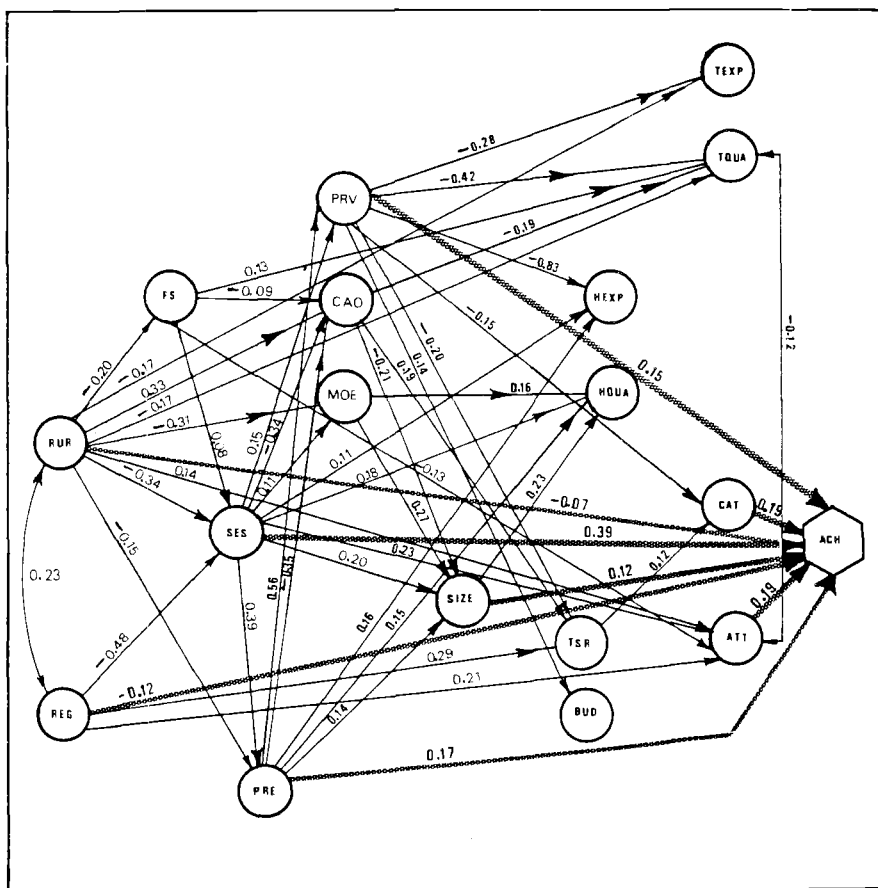
Fig. 6. Path model explaining students' achievement. (Refer to Table 14 for explanation of abbreviations.)

with total achievement (ACH) in Fig. 6). These eight variables are type of district, geographic region, regularity of having pocket money for school, preschool education, type of school (private), school size (number of classrooms), the community's attitude toward schools, and students' readiness and attitude. Among these variables, regularity of having pocket money for school seems to have the greatest impact on students' achievement (beta coefficient of 0.39). This value remains the same despite the forward selection of other variables in the regression equations as indicated by the beta coefficients of its direct effects (Table 15).

A study of the effects of the regularity of having pocket money for school (Table 14, Fig. 6) indicates that the direct effects of this variable are transmitted to other variables in the path model. The effect of the regularity of having pocket money for school on preschool education is as much as 0.39, whereas the effect of preschool education on the type of school (private) is 0.56. Further examination of the private school variable reveals that it has the strongest relationship with the

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Table 15. Total associations, total effects, and direct and indirect effects in the path model explaining students' achievement.

Independent variable	Simple r	Total effects	Indirect effects via:										Total indirect effects	Direct effects	Spurious effects
			FS	SES	PRE	PRV, CAO, MOE	SIZE	TSR, BUD	HEXP, HQUA	TEXP, TQUA	CAT	ATT			
School located in rural district (RUR)	− 0.43	− 0.33	− 0.01	− 0.21	− 0.03	− 0.02	− 0.01	0.00	0.00	− 0.00	0.00	0.02	− 0.26	− 0.07[a]	− 0.10
Geographic region where school is located (REG)	− 0.48	− 0.40	0.00	− 0.29	0.01	0.01	0.01	0.01	− 0.01	− 0.01	0.01	− 0.04	− 0.28	− 0.12[a]	− 0.08
Number of people in student's household (FS)	0.16	0.09		0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	− 0.03	0.05	0.04	0.07
Socioeconomic status (in terms of regularity of having pocket money for school) (SES)	0.73	0.61			0.10	0.03	0.02	0.01	0.00	0.00	0.01	0.05	0.22	0.39[a]	0.12
Percentage of students with preschool education (PRE)	0.52	0.24				0.05	0.02	0.01	0.00	0.00	0.00	− 0.01	0.07	0.17[a]	0.28
Private school (PRV)	0.43	0.09					0.00	− 0.02	− 0.04	− 0.01	0.00	0.01	− 0.06	0.15[a]	0.34
Provincial school (CAO)	− 0.60	0.01					− 0.02	0.01	0.00	− 0.01	0.01	0.01	0.00	0.01	− 0.61
Ministry of Education school (MOE)	0.25	0.08					0.02	0.00	0.00	0.00	0.00	0.01	0.03	0.05	0.17
Number of classrooms (SIZE)	0.48	0.11						0.00	0.00	0.00	0.00	− 0.01	− 0.01	0.12[a]	0.37
Student–teacher ratio (TSR)	− 0.30	0.03							− 0.01	0.01	0.00	0.01	0.01	0.02	− 0.33
Expenditure per student (BUD)	0.02	− 0.06							0.00	0.00	0.00	0.00	0.00	− 0.06	0.08
Headmaster's experience (HEXP)	− 0.18	0.04								− 0.01	0.01	0.01	0.01	0.03	− 0.22
Headmaster's qualifications (HQUA)	0.20	0.01								0.00	0.01	0.00	0.01	0.00	0.19
Teacher's experience (TEXP)	− 0.04	− 0.03									0.00	0.00	0.00	− 0.03	− 0.01
Teacher's qualifications (TQUA)	0.10	0.04									0.00	− 0.02	− 0.02	0.06	0.06
Community attitudes toward school (CAT)	0.00	0.08										− 0.01	− 0.01	0.09[a]	− 0.08
Students' readiness and attitude toward school (ATT)	0.30	0.19											0.00	0.09[a]	0.11

[a]Significant at the 0.05 level.

headmaster's experience and that the effect is, in fact, negative (– 0.83). It has been noted, too, that headmaster variables, i.e., qualifications or experience, do not have significant direct or indirect effects on students' achievement. Thus, we can conclude from this path model that most of the variance in students' achievement can be accounted for by variables related to students' socioeconomic background, especially the regularity of having pocket money for school, which has direct effects and transmits indirect effects through the preschool education, private school, and headmaster's experience variables to students' achievement.

The decomposition of effects presented in Table 15 indicates that the regularity of having pocket money for school has the greatest total effect (0.61), part of which is a direct effect (0.39) and part of which is an indirect effect (0.22). For the most part, the indirect effects are passed on through the preschool education variable (0.10), the students' readiness and attitude variable (0.05), and the school type variable (0.03). This also means that a good socioeconomic background has a great effect, both directly and indirectly, on students' achievement because the parents of such students can afford higher quality education, provide opportunities for valuable learning experiences, prepare their children for primary school by providing them with preschool education, and select nonprovincial schools that have good academic standards. All of these advantages benefit the student, creating favourable attitudes toward primary school and ultimately contributing to higher levels of achievement. Table 15 also shows clearly that the impact of the socioeconomic status variable is not spurious.

A study of the direct and indirect effects of the 17 independent variables listed in Table 15 reveals that, in almost all cases, the variables have greater direct than indirect effects. The exceptions are the district type variable (RUR), the geographic location variable (REG) (northeastern region), the number of people in the student's household (FS), and the headmaster's qualifications (HQUA). It is noticeable that the first two variables have high but negative total effects on students' achievement. The indirect effect of district type on students' achievement is passed on through variables reflecting students' socioeconomic background. The indirect effect of the geographic region is also passed on to variables reflecting students' socioeconomic background. Thus, it appears that schools in major districts and in geographic regions other than the northeast tend to have students with higher socioeconomic backgrounds than the average, which, in turn, has positive direct and indirect effects on students' achievement.

Variables related to teachers and schools have low direct effects that are not statistically significant in terms of students' achievement. One exception is the school size variable (measured in terms of the number of classrooms), which has a significant direct effect of 0.12. It is remarkable that although the simple correlation coefficient between this variable and students' achievement is high (0.48), its indirect effect is only – 0.01. If we had considered only the simple correlation coefficient and the direct effect of this variable without decomposing effects, we would have falsely assumed that its indirect effects were high as well.

In addition, we would not have realized that this variable's relationship with achievement is largely spurious. Thus, school size has a significant direct effect of 0.12 on students' achievement and a 0.23 indirect effect that is passed on via the headmaster's qualifications variable (see Table 14). In the proposed model, however, the headmaster's qualifications variable has no significant effects, directly or indirectly, on students' achievement. Thus, the indirect effects of school size on students' achievement are low. In conclusion, it can be said that the learning environment, composed of elements such as the headmaster's qualifications and experience or those of grade 3 teachers has only slight and insignificant effects on students' achievement.

Path model explaining opportunity of access to primary education

From our initial analyses, it is clear that a wide disparity exists in students' opportunity of access to primary education and that this variable is directly related to school types and school sites, i.e., well-developed communities with a sufficiently large number of households imply large schools with high student–teacher ratios. There are greater opportunities of access to primary education for children in such areas. A model explaining opportunity of access to primary education is presented in Fig. 7.

It is hypothesized that a community's level of development has a direct effect on opportunity of access to primary education as well as an indirect effect through school characteristics. School characteristics, in turn, have a direct effect on opportunity of access to primary education.

Five variables explaining community types and degrees of community development have been selected for the model, namely district type, geographic region (the northeast), availability of electricity, population size in the district, and the extent of district emigration. District type and geographic region are treated as exogenous variables. School type, school size as measured by the number of classrooms, and the teacher–student ratio are intervening variables in the model. The dependent variable is opportunity of access to primary education.

Means, standard deviations, and correlations coefficients of these variables are presented in Appendices 2 and 10. A study of the
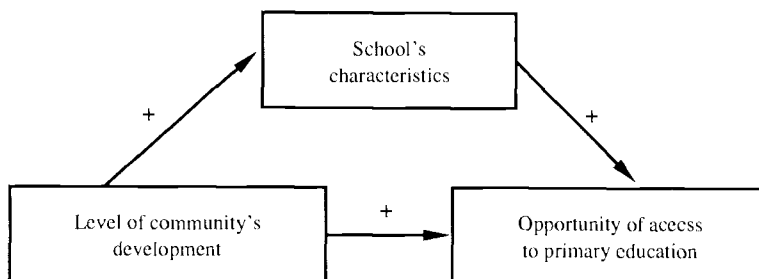
Fig. 7. Path model for opportunity of access to primary education.

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correlation coefficients between opportunity of access to primary education and other variables in the model shows that the values are rather low, the lowest being those between opportunity of access to primary education and private schools (– 0.09) and the teacher–student ratio (0.09). The highest correlation coefficient occurs between opportunity of access and the extent of district emigration. School size and emigration are not dummy variables and have a broad statistical distribution. Their high level of variance probably results from the nature of these variables, which reflects details on individual school types as well as individual districts.

The first step is to consider the opportunity of access to primary education as a function of the two exogenous variables in the regression analysis and then enter each intervening variable one at a time, the results of which are presented in Table 16.

Equation 1 shows that only 3.9% of the variance in opportunity of access to primary education can be explained by the exogenous variables, whereas all of the variables in the model account for 21.1% of the variance, as shown in equation 6. This means that the variables specified in the model can only partially explain the disparities in opportunity of access to primary education.

Although there is limited correspondence between the model and the empirical data, the proposed model can still be used to explain the interrelationships among variables. The beta coefficients in equation 6 (Table 16) reveal that five variables, namely geographic region, population size, extent of district emigration, school type (private), and school size, are significantly related to opportunity of access. Among these, the extent of district emigration and school size have the greatest effects (the beta coefficients being 0.25 and 0.27, respectively). The beta coefficient for the emigration variable decreases from 0.27 in equation 3 to 0.25 in equation 6. The findings with respect to emigration do not appear to be spurious. Its positive effect on opportunity of access may at first seem to be anomalous, but there is a reasonable explanation. Emigration is greater from areas where economic opportunities are limited. Where economic opportunities are fewer, the opportunity costs of primary schooling diminish, resulting in higher than expected enrollment.

Table 17 shows the significant direct effects of independent variables in a model explaining opportunity of access to primary education. The values in the table are also presented in Fig. 8. Table 18 presents both the direct and indirect effects of each independent variable on opportunity of access using Alwin and Hauser's (1975) method.

Table 17 and Fig. 8 indicate that five variables in the model have significant direct effects on opportunity of access. These variables are geographic region, population size, the extent of district emigration, the private school variable, and school size. School size and the extent of district emigration have the greatest direct effects on opportunity of access (0.27 and 0.25, respectively). A study of the emigration variable, which has direct effects on other variables in the model, reveals that

Table 16. Beta coefficients in regression equations explaining opportunity of access to primary education.

Independent variable	Regression equation number					
	1	2	3	4	5	6
School located in rural district (RUR)	-0.17^a	-0.11^a	-0.07	0.00	0.01	0.01
Geographic region where school is located (REG)	0.14^a	0.18^a	0.13^a	0.14^a	0.14^a	0.11^a
Proportion of population with electricity (ELE)		0.15^a	0.14^a	0.13^a	0.07	0.07
Population size (POP)			-0.06	-0.07	-0.13^a	-0.13^a
Extent of emigration from district (EMI)			0.27^a	0.23^a	0.24^a	0.25^a
Private school (PRV)				-0.16^a	-0.18^a	-0.15^a
Provincial school (CAO)				-0.15^a	-0.10	-0.10
Ministry of Education school (MOE)				0.12^a	0.05	0.05
Number of classrooms (SIZE)					0.28^a	0.27^a
Student–teacher ratio (TSR)						0.10
R	0.20	0.24	0.34	0.40	0.45	0.46
R^2	0.04	0.06	0.12	0.16	0.20	0.21
R^2 change	0.04	0.02	0.06	0.04	0.04	0.01
F	8.11	7.94	9.97	9.08	11.02	22.16

Note: The dependent variable is opportunity of access to primary education.
[a]Significant at the 0.05 level.

Table 17. Significant direct effects of independent variables in the path model explaining opportunity of access to primary education.

Independent variable	Dependent variable								
	ELE	POP	EMI	PRV	CAO	MOE	SIZE	TSR	OPP
School located in rural district (RUR)	− 0.39	− 0.36	− 0.28		0.34	− 0.31			
Geographic region where school is located (REG)	− 0.24	0.10	0.21		0.11			0.29	0.11
Proportion of population with electricity (ELE)		0.16		0.34	− 0.37		0.20		
Population size (POP)				0.23	− 0.21		0.21		− 0.13
Extent of emigration from district (EMI)				− 0.13			0.21		0.25
Private school (PRV)							− 0.22	− 0.20	− 0.15
Provincial school (CAO)								0.18	
Ministry of Education school (MOE)							0.24		
Number of classrooms (SIZE)									0.27
Student–teacher ratio (TSR)									
R	0.51	0.44	0.30	0.43	0.75	0.41	0.63	0.51	0.46
R^2	0.26	0.19	0.09	0.19	0.57	0.17	0.40	0.26	0.21
F	68.57	31.02	19.93	30.29	129.38	40.96	64.90	45.54	22.16
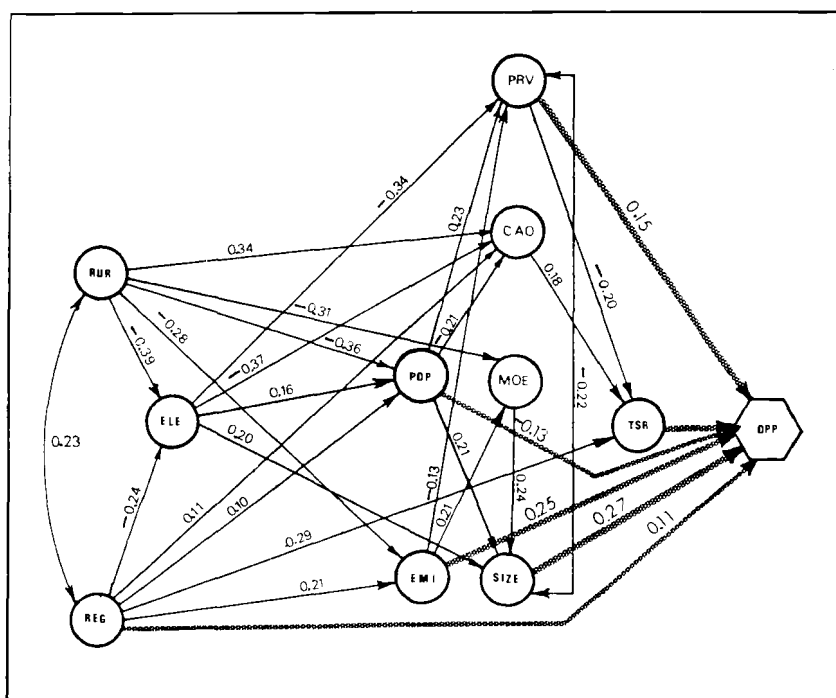
Fig. 8. Path model explaining opportunity of access to primary education.
(Refer to Table 17 for explanation of abbreviations.)

this variable is negatively related (− 0.13) to the private school variable and has a positive relationship (0.21) with the Ministry of Education school variable. This means that the emigration variable has an indirect effect on opportunity of access through the school type variable. While having direct effects on opportunity of access, the emigration variable is also influenced by exogenous variables, namely district type and geographic region. In the same way, the school size variable is directly affected by variables such as students' socioeconomic background and school type.

All of these findings correspond with the data presented in Table 18, which provides details on the directions of direct and indirect effects. Table 18 shows that the total effects of the school size variable upon the opportunity of access variable are the highest (0.28), followed by the emigration variable (0.27). The direct effect of school size is 0.27 and the indirect effect, via the teacher–student ratio variable, is 0.01. At the same time, it receives an effect of 0.07 from the Ministry of Education school variable, 0.06 from the population size variable, 0.06 from the access to electricity variable, and − 0.05 from the provincial school type variable. It is also noticeable that the effects of school type on opportunity of access, which have been transmitted through school size, are in different directions, i.e., Ministry of Education schools have positive effects, whereas the effect of provincial schools is negative.

The decomposition of effects with respect to the emigration variable

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Table 18. Total associations, total effects, and direct and indirect effects in the path model explaining opportunity of access to primary education.

Independent variable	Simple r	Total effects	Indirect effects via: ELE	PRV, POP, EMI	CAO, MOE	SIZE	TSR	Total indirect effects	Direct effects	Spurious effects
School located in rural district (RUR)	− 0.14	− 0.17	− 0.06	− 0.04	− 0.07	− 0.01	0.00	− 0.18	0.01	0.03
Geographic region where school is located (REG)	0.10	0.14	− 0.04	0.05	− 0.01	0.00	0.03	0.03	0.11[a]	− 0.04
Proportion of population with electricity (ELE)	0.14	0.15		0.01	0.01	0.06	0.00	0.08	0.07	− 0.01
Population size (POP)	0.14	− 0.06			0.01	0.06	0.00	0.07	− 0.13[a]	0.20
Extent of emigration from district (EMI)	0.29	0.27			0.04	− 0.01	− 0.01	0.02	0.25	0.02
Private school (PRV)	− 0.09	− 0.16				0.02	− 0.03	− 0.01	− 0.15	0.07
Provincial school (CAO)	− 0.14	− 0.15				− 0.05	0.02	− 0.03	− 0.12	0.01
Ministry of Education school (MOE)	0.27	− 0.12				0.07	0.00	0.07	0.05	0.15
Number of classrooms (SIZE)	0.31	0.28					0.01	0.01	0.27[a]	0.03
Student–teacher ratio (TSR)	0.09	0.10						0.00	0.10	− 0.01

[a]Significant at the 0.05 level.

reveals that the direct effect from this variable is 0.25, whereas 0.02 is an indirect effect. Most of the indirect effect is transmitted via the school type variable. The emigration variable itself is affected by two exogenous variables, geographic region and district type. The effect of these exogenous variables on the opportunity of access variable is quite different. The district type variable has a direct effect of 0.01 and an indirect effect of − 0.18 through the access to electricity and school type variables, whereas the geographic region variable has a direct effect of 0.11, with an indirect effect of 0.03 via the teacher–student ratio variable. This finding leads to the interpretation that schools in districts without electricity, with small populations, and with less district emigration have a low opportunity of access to primary school. Such schools also tend to be small in size.

School variables used in the model explaining opportunity of access to primary education are school type, school size, and teacher–student ratio. The direct effect of the teacher–student ratio on opportunity of access is only 0.10, which is not statistically significant.

Based on the preceding analyses, there is some correspondence between data from this study and the model hypothesized to explain opportunity of access to primary education. A comparison of the direct and indirect effects reveals that the direct effects have a greater influence on opportunity of access than the indirect effects, with the exception of the district type variable, which has greater indirect effects than direct effects. Our overall results imply that an increase in opportunity of access can be achieved by improving school characteristics and promoting economic development in poorer, more remote areas.

Path model explaining the educational wastage index

The educational wastage index used in this study is the ratio of actual input–output and ideal input–output. Thus, schools with a low educational wastage index are those in which the actual input–output is almost identical to the ideal value; in other words, they have considerable efficiency in their internal management. In this type of school, failures or dropouts rarely occur.

There is limited and insufficient information on variables affecting educational wastage because most of the previous research has focused on the extent of various types of wastage, such as wastage resulting from teachers' absence from the classroom, wastage due to students' failure, or wastage due to school administration. It was only 15 years ago that attention was directed toward the various factors causing educational wastage, beginning with Unesco's (1968) work, which formulated a way to estimate an educational wastage and school internal efficiency index.

In addition to school site and type, as suggested by preliminary research, there are other factors that may influence educational wastage. These factors are the qualifications of headmasters and grade 3 teachers and other variables directly related to the actual

wastage in the sample schools, such as absenteeism among grade 3 students and the time spent traveling to school. Figure 9 shows the hypothesized relationship between these variables and the educational wastage index.

This proposed model, which is based on the findings of previous research and theory (Foster 1965; Coleman 1966; Cummings 1980; Heyneman and Loxley 1983; Schiefelbein and Farrell 1984), suggests that schools in well-developed locations are mainly municipal and Ministry of Education schools. These schools also have headmasters and grade 3 teachers with good qualifications and considerable experience. The students live near the schools and spend little time traveling to them. Moreover, the rate of students' absence from school is low and the community usually has a positive attitude toward its school. The direct effects of school location and school type, however, are expected to be less than the indirect effects transmitted via the major intervening variable, namely days of absence from school.

In the proposed model explaining the educational wastage index, three variables related to the degree of community development are used, namely district type, geographic region (the northeast), and access to electricity, with district type and geographic region being the exogenous variables and access to electricity being an intervening variable. School type variables are dummy variables representing private schools, provincial schools, and schools under the authority of the Department of General Education, Ministry of Education. Variables related to headmasters and grade 3 teachers deal with the headmaster's experience and qualifications, and the teachers' experience, qualifications, and attitude toward students. The last series of intervening variables consists of the time spent traveling to school, the community's attitude toward school, and the number of days students are absent from school.

The proposed model takes into account neither the students' readiness and attitude nor their socioeconomic background because such variables focus on the individual student. Although these variables may
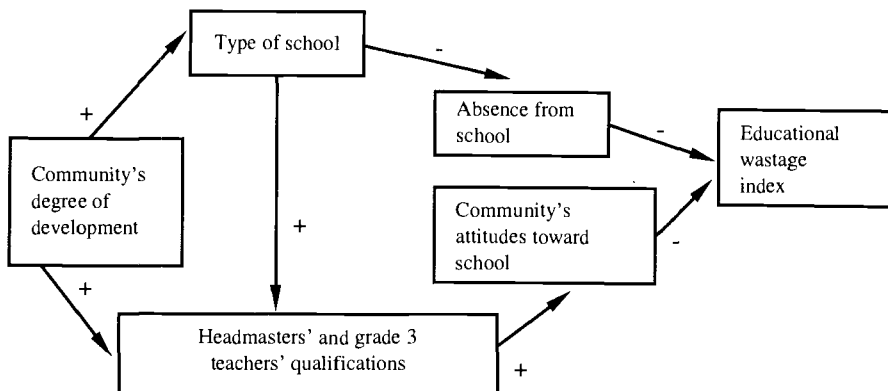
Fig. 9. Path model for the educational wastage index.

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have a direct influence on students' absence from school, their direct effect on the educational wastage index will be insignificant because the index is estimated from the school's overall internal efficiency, not from individual students' educational wastage nor the wastage of the students in any class in a particular year.

Means, standard deviations, and correlation coefficients of the 15 variables used in the proposed model are presented in Appendices 2 and 10. In general, the correlation coefficients between the educational wastage index and the other 14 variables in the model are rather low. The lowest are the correlation coefficients between the educational wastage index and district type (− 0.01) and the community's attitude toward school (0.01). The highest correlation coefficient occurs between the educational wastage index and the provincial school variable (0.24), followed by the headmaster's experience (0.22). The headmaster's experience also has a high correlation with school type. It is surprising that the number of days of absence from school, which directly reflects educational wastage, has a correlation coefficient of only 0.12.

All of the values presented in Table 19 derive from a regression analysis of the educational wastage index as a function of two exogenous variables with the addition of intervening variables one at a time, resulting in 11 equations. Equation 1 shows that the two exogenous variables can explain 2% of the variance in the educational wastage index, whereas equation 11 shows that all of the variables in the model can account for only 13% of the variance. In other words, there is a low correspondence between the proposed model and the existing empirical data, which may be explained in terms of the limited nature of the variables in the model, as the educational wastage index is intended to measure the efficiency of the whole system of primary education. Thus, the index also includes the variance within each primary grade level as well as the variance between all of the primary grade levels, whereas the variables used to explain the educational wastage index, in this case, are based only on information from grade 3. Thus, these variables are limited in terms of explaining he phenomenon of educational wastage or primary school efficiency. They are useful, however, as one component of the composite index of efficiency in primary education. The relationship among the four indices of efficiency are analyzed later in this chapter.

Although the correspondence between the model and existing empirical data is low, the model can still significantly explain relationships among key variables related to primary school efficiency. Equations 1 and 2 show that the direct effects of geographic region on the educational wastage index are − 0.14 and − 0.12, respectively. This means that northeastern schools have the lowest educational wastage compared with other regions and that the effect of the geographic region on the educational wastage index decreases when intervening variables are added to the equations. This means that geographic regions manifest their effects indirectly through intervening variables. The intervening variables that have significant direct effects on the educational wastage index are school type (provincial), students'

Table 19. Beta coefficients in regression equations explaining the educational wastage index.

Independent variable	Regression equation number										
	1	2	3	4	5	6	7	8	9	10	11
School located in rural district (RUR)	0.02	0.05	0.09	0.09	0.09	0.08	0.08	0.08	0.07	0.07	0.05
Geographic region where school is located (REG)	−0.14[a]	−0.12[a]	−0.10	−0.09	−0.10	−0.10	−0.10	−0.10	−0.09	−0.09	−0.06
Proportion of population with electricity (ELE)			0.06	−0.04	−0.03	−0.01	−0.01	−0.01	−0.01	−0.02	0.00
Private school (PRV)			0.13	0.05	0.03	0.02	0.02	0.02	−0.01	−0.01	0.01
Provincial school (CAO)			−0.17[a]	−0.17[a]	−0.18[a]	−0.18[a]	−0.18[a]	−0.18[a]	−0.20[a]	−0.21[a]	−0.23[a]
Ministry of Education school (MOE)			−0.12	−0.12	−0.10	−0.10	−0.10	−0.10	−0.11	−0.11	−0.10
Headmaster's experience (HEXP)				−0.10	−0.13	−0.12	−0.12	−0.12	−0.12	−0.13	−0.12[a]
Headmaster's qualifications (HQUA)					−0.10	−0.10	−0.09	−0.09	−0.09	−0.10	−0.10
Teacher's experience (TEXP)						−0.05	−0.04	−0.05	−0.04	−0.05	−0.05
Teacher's qualifications (TQUA)							−0.01	−0.01	0.00	−0.01	−0.01
Time spent by students going to school (TIM)								0.00	0.00	0.00	−0.02
Teacher's attitude toward school (TATT)									0.11	0.10	0.12[a]
Community attitudes toward school (CAT)										0.08	0.07
Days of absence from school (ABS)											0.13[a]
R	0.13	0.14	0.28	0.29	0.31	0.31	0.31	0.31	0.33	0.33	0.36
R^2	0.02	0.02	0.08	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.13
R^2 change	0.02	0.00	0.06	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.02
F	3.54	2.70	5.73	5.24	5.04	4.57	4.11	3.73	3.81	3.74	13.07

Note: The dependent variable is the wastage ratio (WAS).
[a]Significant at the 0.05 level.

absence from school, headmaster's experience, and grade 3 teachers' attitude toward students. Thus, exogenous variables have indirect effects on the educational wastage index through the four intervening variables mentioned.

Table 20 and Fig. 10 illustrate the significant relationships among variables in the model by presenting 13 regression equations to show significant direct effects of the independent variables on the dependent variables. Table 20 presents the results of Alwin and Hauser's (1975) decomposition of the direct and indirect effects of independent variables on the educational wastage index.

A study of the effects deriving from the headmaster's variables in Table 21 indicates that the headmaster's experience has a total effect of -0.10 (-0.12 direct effects and 0.02 indirect effects) on the educational wastage index. The direct effect is sufficiently large that it confirms its relationship with the educational wastage index. It is noticeable that its direction is negative, which means that schools with headmasters that have considerable experience (based on years of government service) also have a low educational wastage index.

In Fig. 10, an examination of all of the arrows leading directly to the educational wastage index reveals that there are only four variables, namely provincial schools, days of absence, headmaster's experience, and grade 3 teachers' attitude toward students, that have significant direct effects on the educational wastage index. Of the three variables related to school type, only the provincial school variable is directly related to the educational wastage index. However, the private school variable has direct effects on several intervening variables, namely the headmaster variable, the grade 3 teacher variable, and the community's attitude toward school variable. Thus, the expectation that private schools also have indirect effects on the educational wastage index is confirmed by the data presented in Table 21.

A study of the provincial school variable in Fig. 10 indicates that this variable is influenced by the two exogenous variables and is related to the electricity supply variable. In turn, it has an indirect effect through the grade 3 teacher variable on the teachers' attitude toward students variable. In this way, it indirectly affects the educational wastage index. Table 21 confirms this finding as geographic region and electricity supply have total effects of -0.14 and 0.06, respectively, on the educational wastage index, with -0.06 and 0.00 being direct effects and -0.08 and 0.06 being indirect effects. The indirect effects are transmitted mainly via school type and absence from school variables.

In conclusion, although the proposed model explaining the educational wastage index has limited correspondence with existing empirical data, it can still be used to explain the educational wastage phenomenon. Significant variables in the explanation of educational wastage are school type (provincial), headmaster's experience, teachers' attitude toward students, and students' absence from school. Improvements in these four factors would result in reducing the

Table 20. Significant direct effects of independent variables in the path model explaining the educational wastage index.

Independent variable	Dependent variable												
	ELE	PRV	CAO	MOE	HEXP	HQUA	TEXP	TQUA	TIM	TATT	CAT	ABS	WAS
School located in rural district (RUR)	−0.39	−0.10	0.41	−0.36			−0.17	−0.18		0.15			
Geographic region where school is located (REG)	−0.24		0.09						−0.16			−0.23	
Proportion of population with electricity (ELE)		0.34	−0.40		−0.12	−0.18						−0.17	
Private school (PRV)					−0.73		−0.28	−0.12		0.15	−0.19		
Provincial school (CAO)								−0.21					−0.23
Ministry of Education school (MOE)						0.23							
Headmaster's experience (HEXP)													−0.12
Headmaster's qualifications (HQUA)													
Teacher's experience (TEXP)													
Teacher's qualifications (TQUA)										−0.11			
Time spent by students going to school (TIM)												0.16	
Teacher's attitude toward school (TATT)											−0.13		0.12
Community attitudes toward school (CAT)												0.13	
Days of absence from school (ABS)													0.13
R	0.51	0.40	0.73	0.36	0.70	0.33	0.29	0.39	0.16	0.25	0.19	0.35	0.36
R^2	0.26	0.16	0.53	0.13	0.49	0.11	0.08	0.15	0.03	0.06	0.04	0.12	0.13
F	68.57	37.38	149.66	59.35	186.93	23.44	17.54	24.12	11.10	8.57	14.57	10.77	13.07
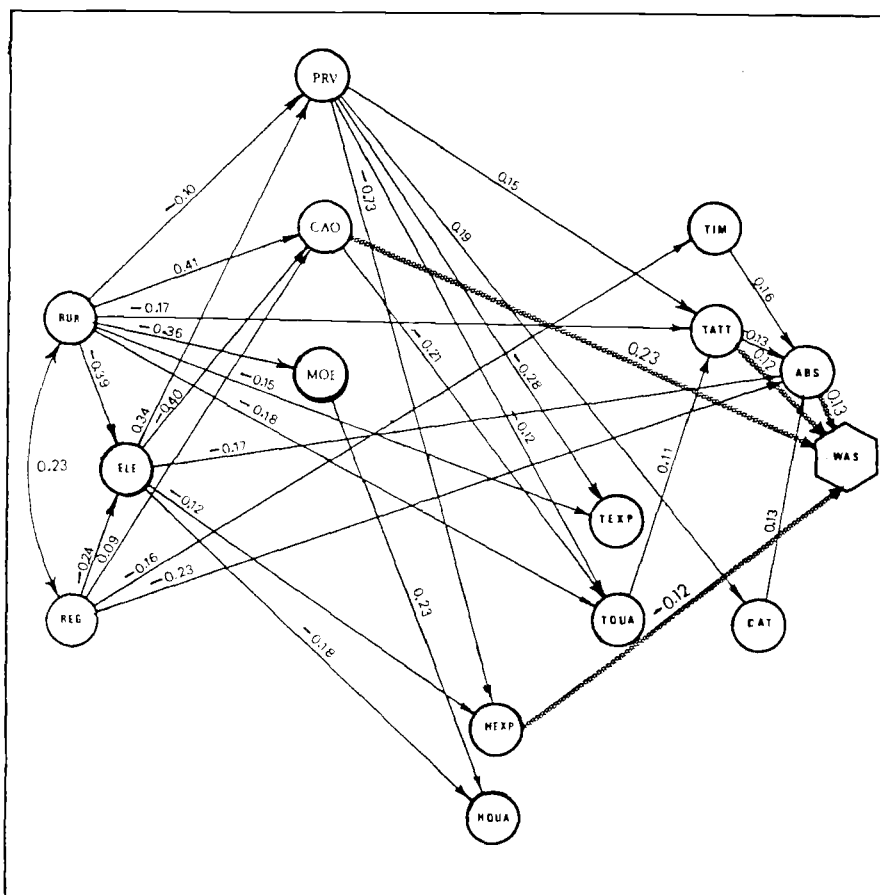
Fig. 10. Path model explaining the educational wastage index. (Refer to Table 20 for explanation of abbreviations.)

educational wastage index, thus enhancing internal efficiency in primary education.

Path model explaining school–community relations

The American Association of School Administration defines school–community relations as mutual cooperation and development in educational management to achieve optimal efficiency (Kindred et al. 1976). In this study, this relation is treated as one of the essential indices of efficiency in primary education. Thus, efficient schools should be operated in such a manner that there is considerable interaction between the school and the community with respect to decision-making and mutual operational cooperation, such as the provision of financial support and human resources.

The path model explaining school–community relations (Fig. 11) indicates that the relations between variables are all in one direction. The majority of parents in well-developed areas have a high socio-

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Table 21. Total associations, total effects, and direct and indirect effects in the path model explaining the educational wastage index.

Independent variable	Simple r	Total effects	ELE	PRV, CAO, MOE	HEXP	HQUA	TEXP	TQUA	TIM	TATT	CAT	ABS	Total indirect effects	Direct effects	Spurious effects
												Indirect effects via:			
School located in rural district (RUR)	− 0.01	0.02	− 0.03	− 0.04	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.02	− 0.03	0.05	− 0.03
Geographic region where school is located (REG)	− 0.13	− 0.14	− 0.02	− 0.02	− 0.01	0.01	0.00	0.00	0.00	− 0.01	0.00	− 0.03	− 0.08	− 0.06	0.01
Proportion of population with electricity (ELE)	0.08	0.06		0.10	− 0.01	− 0.02	0.00	0.00	0.00	0.00	0.01	− 0.02	0.06	0.00	0.02
Private school (PRV)	0.24	0.13			0.08	0.02	0.01	0.00	0.00	0.03	0.00	− 0.02	0.12	0.01	0.11
Provincial school (CAO)	− 0.16	− 0.17			0.00	0.03	0.00	0.00	0.00	0.03	0.01	− 0.01	0.06	− 0.23	0.01
Ministry of Education school (MOE)	− 0.12	− 0.12			0.00	− 0.02	0.00	0.00	0.00	0.01	0.00	− 0.01	− 0.02	− 0.10	0.00
Headmaster's experience (HEXP)	− 0.22	− 0.10				0.03	− 0.01	0.00	0.00	0.00	0.01	− 0.01	0.02	− 0.12	− 0.12
Headmaster's qualifications (HQUA)	− 0.07	− 0.10					0.00	− 0.01	0.00	0.00	0.01	0.00	0.00	− 0.10	0.03
Teacher's experience (TEXP)	− 0.12	− 0.05						− 0.01	0.01	− 0.01	0.01	0.00	0.00	0.05	− 0.07
Teacher's qualifications (TQUA)	− 0.08	− 0.01							0.00	− 0.01	0.01	0.00	0.00	− 0.01	− 0.07
Time spent by students going to school (TIM)	0.03	0.00								0.00	0.00	0.02	0.02	− 0.02	0.03
Teacher's attitude toward school (TATT)	0.14	0.11									0.01	− 0.02	− 0.01	0.12	0.03
Community attitudes toward school (CAT)	0.01	0.08										0.01	0.01	0.07	− 0.07
Days of absence from school (ABS)	0.12	0.13											0.00	0.13	0.01

economic standing and can afford to send their children to nonprovincial schools that have highly qualified headmasters who have the potential to establish school–community relations. The nature of school–community cooperation is the last intervening variable that is hypothesized to be directly related to school–community relations.

Research variables used in this model are two exogenous variables that reflect the nature of development within a community, namely district type and geographic region (northeast), and students' socioeconomic background, which is measured in terms of preschool education and the regularity of having pocket money for school. The school variable consists of all of the dummy variables related to school type (provincial, private, and Ministry of Education schools); the headmaster variables are the headmaster's experience and qualifications. Variables related to school characteristics consist of distance between the village and the school, travel time to school, and opportunity of access to secondary education. The last group of intervening variables consists of the number of teachers residing in the community and the extent of community cooperation as it relates to school activities. We expect all of the intervening variables to have greater direct effects than indirect effects and we expect the exogenous variables to have greater indirect effects than direct effects.

Means, standard deviations, and correlation coefficients among these variables are presented in Appendices 2 and 10. The correlation coefficients among the school–community variable and the 13 independent variables in the model are remarkably high, the highest being that related to the private school variable (– 0.45), followed by the headmaster's experience (0.37) and the community's participation in school activities (0.36), respectively, whereas the lowest is the village–school distance variable (– 0.02).

The next stage involves a regression analysis of school–community relations as a function of two exogenous variables, with the addition of intervening variables one at a time. This results in nine equations (Table 22). Equation 1 indicates that the two exogenous variables can explain 4.9% of the variance in school–community relations, whereas all of the other variables in the model can explain as much as 36.8% of the
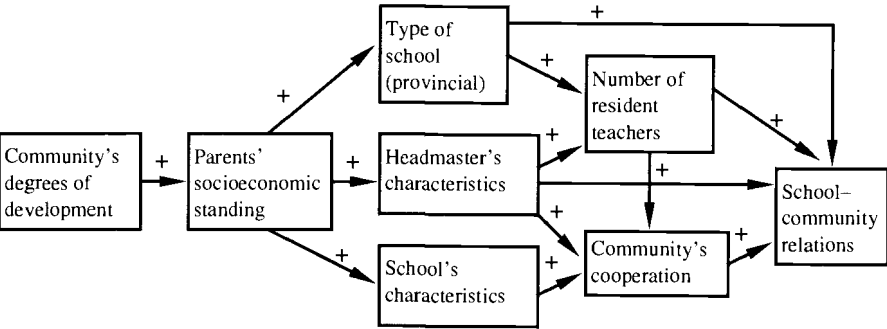
Fig. 11. Path model for school–community relations.

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variance in the dependent variable. Equation 9 indicates that the direct effects of the exogenous variables in this model are rather low. The hypothesized path model, however, corresponds closely with empirical findings, which means that this model of school–community relations has much more explanatory power than that explaining the educational wastage index.

The beta coefficients of exogenous variables in equation 1 are significant, whereas in equation 9 they are insignificant, their size decreasing from 0.17 and 0.11 in equation 1 to 0.07 and 0.04 in equation 9. The decreasing values mean that the indirect effects of these variables on school–community relations are greater than the direct effects.

The beta coefficients in equation 9 indicate that there are six variables in this model that have significant direct effects on school–community relations, namely private school type (– 0.32), community's participation in school activities (0.29), percentage of students continuing on to secondary schools (0.21), provincial school type (0.09), number of teachers residing in the community (0.09), and travel time to school (– 0.09). It is also interesting to note that when variables are added to the regression equations, the amount of variation accounted for in explaining school–community relations increases the most when the school type variable is added (equation 4).

The next phase of analysis involves 13 regression equations showing significant direct effects of independent variables on the dependent variable in the model. The findings are presented in Table 23 and Fig. 12. Table 24 presents the results after the application of Alwin and Hauser's (1975) decomposition analysis.

The notable variables in Table 23 and Fig. 12 are the headmaster's qualifications and the village–school distance. In Fig. 12, no arrows derive from the headmaster's qualifications variable, whereas none point toward the village–school distance variable. This means that the headmaster's qualifications variable has no significant direct effects on the other variables in the model and that the latter can explain none of the variance in the village–school distance variable. This may result from the fact that it is possible to use the headmaster's experience variable and the students' continuing on to secondary schools variable alone to satisfactorily explain all of the other phenomena concerning primary school efficiency with respect to school–community relations. The data presented in Table 24 support the data presented in Table 22 indicating that there are six variables that have significant direct effects on school–community relations, namely private school type, community participation in school activities, opportunity of access to secondary schools, provincial school type, number of teachers residing in the community, and travel time to school.

In conclusion, the proposed model explaining the variance in school–community relations corresponds closely with the empirical data. The variable with the highest total and direct effects on the dependent variable is the private school type. District type, students' socioeconomic

Table 22. Beta coefficients in regression equations explaining school–community relations.

Independent variable	Regression equation number								
	1	2	3	4	5	6	7	8	9
School located in rural district (RUR)	0.17[a]	0.13[a]	0.09	0.11	0.11	0.10	0.08	0.08	0.07
Geographic region where school is located (REG)	0.11[a]	0.05	0.07	0.08	0.06	0.05	0.05	0.03	0.04
Socioeconomic status (in terms of regulary of having pocket money for school) (SES)		−0.12[a]	−0.03	0.03	0.04	−0.01	−0.05	−0.06	−0.02
Percentage of students with preschool education (PRE)			−0.22[a]	0.03	0.02	0.01	−0.01	−0.04	−0.02
Private school (PRV)				−0.46[a]	−0.45[a]	−0.33[a]	−0.31[a]	−0.32[a]	−0.32[a]
Provincial school (CAO)				−0.05	−0.04	−0.03	0.07	0.07	0.09
Ministry of Education school (MOE)				0.00	0.00	−0.02	−0.03	−0.06	−0.03
Distance from village to school (DIS)					0.01	0.03	0.01	0.02	0.01
Time spent by students going to school (TIM)					−0.09[a]	−0.09[a]	−0.11[a]	−0.10[a]	−0.09[a]
Headmaster's experience (HEXP)						0.15[a]	0.12[a]	0.12[a]	0.08
Headmaster's qualifications (HQUA)						−0.11[a]	0.08	0.06	0.06
Percentage of primary school graduates continuing on to secondary school (CON)							0.26[a]	0.24[a]	0.21[a]
Number of teachers residing in community (LIVE)								0.13[a]	0.09[a]
Community's cooperation in school's extracurricular activities (COOP)									0.29[a]
R	0.22	0.24	0.31	0.46	0.47	0.49	0.53	0.54	0.61
R^2	0.05	0.06	0.09	0.21	0.22	0.24	0.29	0.30	0.37
R^2 change	0.05	0.01	0.03	0.12	0.01	0.02	0.05	0.01	0.07
F	10.19	7.94	10.23	15.08	12.25	10.92	12.84	12.46	15.98

Note: The dependent variable is community–school relations (REL).
[a]Significant at the 0.05 level.

Table 23. Significant direct effects of independent variables in the path model explaining school–community relations.

Independent variable	Dependent variable												
	SES	PRE	PRV	CAO	MOE	DIS	TIM	HEXP	HQUA	CON	LIVE	COOP	REL
School located in rural district (RUR)	− 0.36	− 0.15		− 0.34	− 0.31								
Geographic region where school is located (REG)	− 0.48						− 0.16						
Socioeconomic status (in terms of regularity of having pocket money for school) (SES)		0.39	0.15	− 0.35	0.11				0.11	0.21	0.20	− 0.18	
Percentage of students with preschool education (PRE)			0.56	− 0.34				0.16			0.25		− 0.32
Private school (PRV)								− 0.83					− 0.32
Provincial school (CAO)										− 0.30	− 0.14		0.09
Ministry of Education school (MOE)									0.21	0.14	0.28		
Distance from village to school (DIS)									− 0.11				
Time spent by students going to school (TIM)													− 0.09
Headmaster's experience (HEXP)												0.13	
Headmaster's qualifications (HQUA)													
Percentage of primary school graduates continuing on to secondary school (CON)													0.21
Number of teachers residing in community (LIVE)													0.09
Community's cooperation in school's extracurricular activities (COOP)													0.29
R	0.66	0.47	0.65	0.81	0.37		0.16	0.71	0.35	0.52	0.51	0.23	0.61
R^2	0.43	0.22	0.42	0.65	0.14		0.03	0.50	0.13	0.27	0.26	0.05	0.37
F	151.59	56.41	143.80	245.05	32.11		11.10	134.17	18.91	47.83	45.52	11.30	15.98

Table 24. Total associations, total effects, and direct and indirect effects in the path model explaining school–community relations.

| Independent variable	Simple r	Total effects	Indirect effects via:								Total indirect effects	Direct effects	Spurious effects
			SES	PRE	PRV, CAO, MOE	DIS, TIM	HEXP, HQUA	CON	LIVE	COOP			
School located in rural district (RUR)	0.19	0.17	0.04	0.04	− 0.02	0.00	0.01	0.02	0.00	0.01	0.10	0.07	0.02
Geographic region where school is located (REG)	0.15	0.11	0.06	− 0.02	− 0.01	0.02	0.01	0.00	0.02	− 0.01	0.07	0.04	0.04
Socioeconomic status (in terms of regularity of having pocket money for school) (SES)	− 0.21	− 0.21		− 0.09	− 0.06	− 0.01	0.05	0.04	0.01	− 0.04	− 0.10	− 0.02	− 0.09
Percentage of students with preschool education (PRE)	− 0.27	− 0.22			− 0.25	0.01	0.01	0.02	0.03	− 0.02	− 0.20	− 0.02	− 0.05
Private school (PRV)	− 0.45	− 0.46				− 0.01	− 0.12	− 0.02	0.01	0.00	− 0.14	− 0.32[a]	0.01
Provincial school (CAO)	0.29	− 0.05				− 0.01	− 0.01	− 0.10	0.00	− 0.02	− 0.14	0.09[a]	0.34
Ministry of Education school (MOE)	0.08	0.00				0.00	0.02	0.01	0.03	− 0.03	0.03	− 0.03	− 0.08
Distance from village to school (DIS)	− 0.02	0.01					− 0.02	0.02	− 0.01	0.01	0.00	0.01	− 0.03
Time spent by students going to school (TIM)	− 0.13	− 0.09					0.00	0.02	− 0.01	− 0.01	0.00	− 0.09[a]	− 0.04
Headmaster's experience (HEXP)	0.37	0.15						0.03	0.00	0.04	0.07	0.08	0.22
Headmaster's qualifications (HQUA)	0.06	0.11						0.03	0.02	0.00	0.05	0.06	− 0.05
Percentage of primary school graduates continuing on to secondary school (CON)	0.10	0.26							0.05	0.00	0.05	0.21[a]	− 0.16
Number of teachers residing in community (LIVE)	0.05	0.13								0.04	0.04	0.09[a]	− 0.08
Community's cooperation in school's extracurricular activities (COOP)	0.37	0.28									0.00	0.28[a]	0.09

[a]Significant at the 0.05 level.
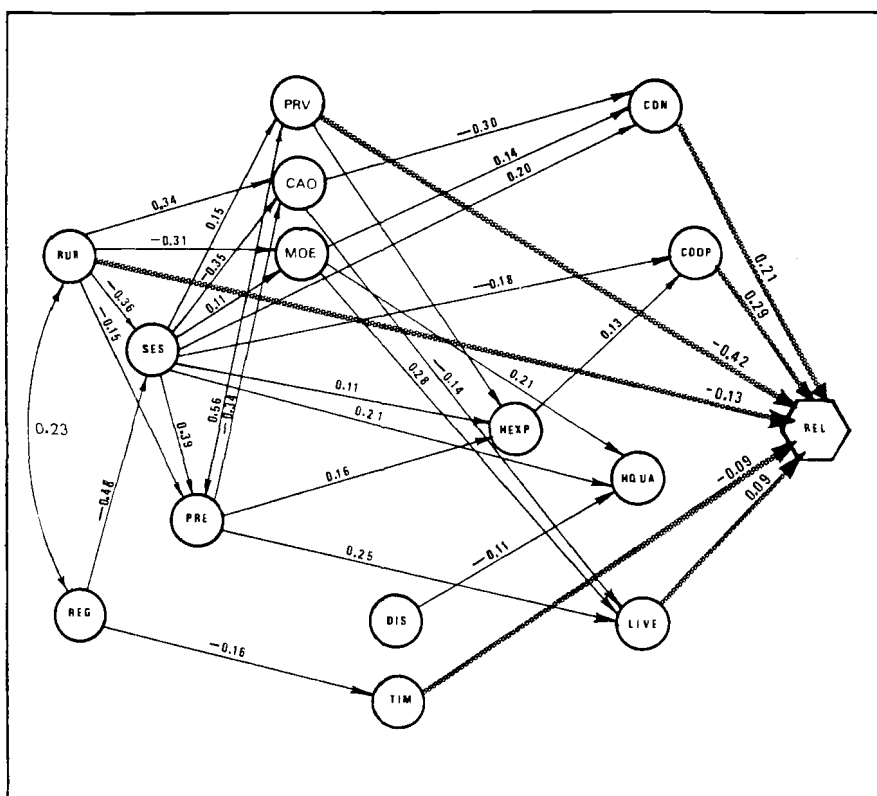
Fig. 12. Path model explaining school–community relations. (Refer to Table 23 for explanation of abbreviations.)

background, and headmaster variables have only moderate direct and indirect effects, whereas the number of teachers residing in the community and the community's participation in school activities have high direct effects on this important dimension of primary school efficiency.

Path model explaining the composite efficiency index

in the early stage of this analysis, the composite efficiency index variable was constructed from four efficiency indices used to measure four aspects of efficiency in primary education simultaneously. Now that they have been integrated into one composite index, the question of the relations between each of the four indices and the composite index arises and whether the effects of each are direct or indirect and at what level. Path analysis is used in this case primarily as a tool to analyze the construct validity of the composite efficiency index and to enhance our understanding of the manner in which the four components combine to make up the index.

In the model used in the following analysis, opportunity of access to primary education is the exogenous variable; school–community
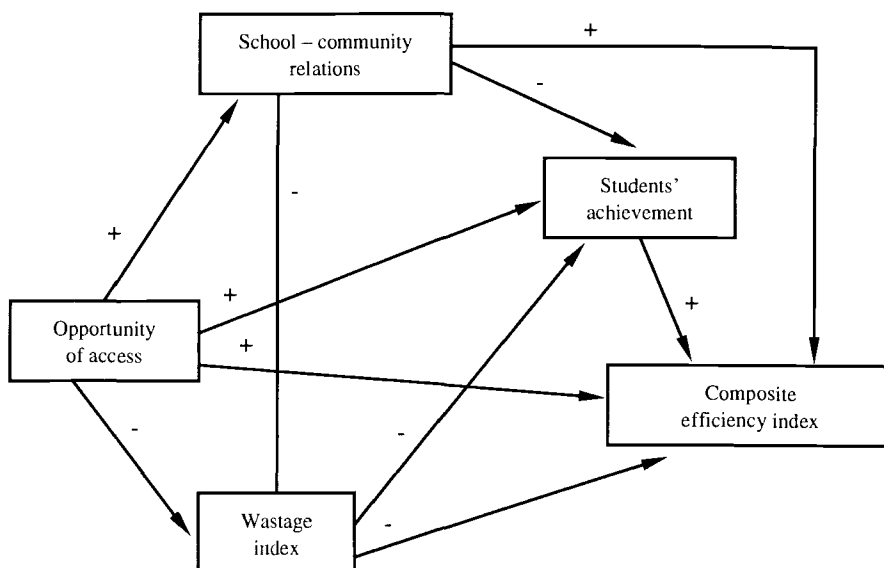
Fig. 13. Path model for the composite efficiency index.

Table 25. Means, standard deviations, and correlation coefficients among variables in the model explaining the composite efficiency index (CEI).

Variable	OPP	REL	WAS	ACH	CEI
Opportunity of access to primary education (OPP)	1.00				
Community–school relations (REL)	0.12	1.00			
Wastage ratio (WAS)	– 0.10	– 0.13	1.00		
Total achievement (ACH)	0.10	– 0.24	– 0.02	1.00	
Efficiency composite index (NY)	0.54	0.48	– 0.35	0.56	1.00
$\bar{X}$	0.05	9.64	1.31	103.46	50.00
SD	0.11	4.22	0.35	16.32	1.00

Note: SD, standard deviation.

Table 26. Beta coefficients in regression equations explaining the composite efficiency index.

	Regression equation number			
Independent variable	1	2	3	4
Opportunity of access to primary education (OPP)	0.54[a]	0.48[a]	0.46[a]	0.38[a]
Community–school relations (REL)		0.42[a]	0.39[a]	0.56[a]
Wastage ratio (WAS)			– 0.26[a]	– 0.23[a]
Total achievement (ACH)				0.65[a]
R	0.54	0.68	0.72	0.96
R^2	0.29	0.46	0.52	0.92
R^2 change	0.29	0.17	0.06	0.40
F	159.90	168.05	145.26	1 101.35

Note: The dependent variable is the composite efficiency index.
[a]Significant at the 0.05 level.

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Table 27. Significant direct effects of independent variables in the path model explaining the composite efficiency index (CEI).

|	Dependent variable			
Independent variable	REL	WAS	ACH	CEI
Opportunity of access to primary education (OPP)	0.12		0.13	0.38
Community–school relations (REL)		– 0.13	– 0.25	0.56
Wastage ratio (WAS)				– 0.23
Total achievement (ACH)				0.65
R	0.12	0.13	0.27	0.96
R^2	0.02	0.02	0.07	0.92
F	6.30	6.52	15.60	1 101.35
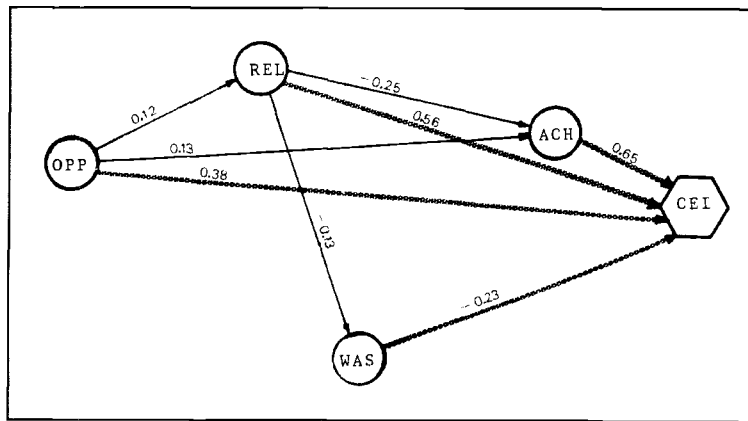
Fig. 14. Path diagram of the composite efficiency index based on the between-school model. (Refer to Table 27 for explanation of abbreviations.)

relations, educational wastage, and students' achievement are the intervening variables; and the composite efficiency index is the dependent variable. Figure 13 illustrates the path model used.

Table 25 shows the relations between the variables in the model explaining the composite efficiency index. The directions of the relations correspond with the proposed model in all respects, with the correlations between the composite efficiency index and the independent variables ranging from – 0.35 to 0.56.

Judging from the increased value of R^2 in Table 26, it seems that students' achievement can best explain the variance in the composite efficiency index as it accounts for 39.3% of the total variance, with opportunity of access to primary education accounting for 28.7%, school–community relations accounting for 17.2%, and the educational wastage index accounting for 6.5%.

Information from Table 27, Fig. 14, and Table 28 leads us to four conclusions. First, students' achievement is the variable with the greatest total effect on the composite efficiency index (0.65, all of which

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Table 28. Total associations, total effects, and direct and indirect effects in the path model explaining the composite efficiency index.

Independent variable	Simple r	Total effects	Indirect effects via:			Total indirect effects	Direct effects	Spurious effects
			REL	WAS	ACH			
Opportunity of access to primary education (OPP)	0.54	0.54	0.06	0.02	0.08	0.16	0.38	0.00
Community–school relations (REL)	0.48	0.42		0.03	− 0.17	− 0.14	0.56	0.06
Wastage ratio (WAS)	− 0.35	− 0.26			− 0.03	− 0.03	− 0.23	− 0.09
Total achievement (ACH	0.56	0.65				0.00	0.65	− 0.09

is a direct effect). In fact, its total effect is greater than its simple correlation coefficient. This variable, in turn, receives effects of − 0.17 from school–community relations, 0.08 from opportunity of access to primary education, and − 0.03 from the educational wastage index.

Second, opportunity of access to primary education has a total effect of 0.54 on the composite efficiency index, of which 0.38 is a direct effect and 0.16 is an indirect effect, most of which is transmitted via students' achievement and school–community relations.

Third, school–community relations has an effect of 0.42 on the composite efficiency index, of which 0.56 is a direct effect and − 0.14 is an indirect effect transmitted through students' achievement. The effect pattern of this variable is quite interesting in that it has a positive direct effect and a negative indirect effect, i.e., some schools with poor school–community relations have high students' achievement scores and also a high composite efficiency index. These tend to be schools located in urban areas.

Fourth, the educational wastage index has an effect of − 0.26 on the composite efficiency index, of which − 0.23 is a direct effect and − 0.03 is an indirect effect transmitted through the students' achievement variable.

CONCLUSIONS AND RECOMMENDATIONS

Students' achievement

An analysis of students' cognitive and noncognitive achievement scores shows that the average noncognitive score is 71.2% and the average cognitive score is 50.1%, with 57.2% being the average total score. There is less disparity among students' noncognitive scores than among their cognitive scores.

Students attending schools located in major districts have higher cognitive, noncognitive, and total scores than those attending schools located in minor districts. There is also less disparity in achievement among students attending schools located in major districts.

Students in Bangkok and the central region have the highest achievement scores (cognitive, noncognitive, and total scores), with students from the central region having the highest cognitive achievement scores and students from Bangkok having the highest total achievement scores. Students in the northeastern region, on the other hand, have the lowest scores.

Students attending Ministry of Education schools and private schools have higher scores than students attending other types of schools. The Ministry of Education schools have the highest cognitive achievement scores, whereas private schools have the highest noncognitive achievement scores. Provincial schools have the lowest scores in all respects.

Students in educational regions 1, 6, and 12 have the highest cognitive, noncognitive, and total achievement scores, with students in educational region 1 (central) having the highest cognitive scores and students in region 12 (east) having the highest noncognitive scores. The lowest achievement scores occurred among students in educational regions 9, 10, and 11 in the northeast, with students in region 9 having the lowest noncognitive achievement scores and students in region 10 having the lowest cognitive and total achievement scores.

Access to primary education

On average, one primary school can take in or serve only 5% of the school-age population in a district. Schools located in major districts can take in 6% of the school-age population, which is twice the percentage that can be served by schools located in minor districts. The average

number of students taken in by one school in the northeastern region is 6% (the highest percentage). The average number of students taken in by one school in the central region, on the other hand, is only 3% (the lowest percentage).

When the data are analyzed by type of school, Ministry of Education schools take in the greatest number of primary students (13% on average). Private and provincial schools, on the other hand, take in the lowest average numbers of primary students. Based upon regions, educational region 10 has the greatest capacity to provide service to primary school children (11%), whereas educational regions 9 and 12 provide service to only 2% of the school-age population in these regions.

Educational wastage in primary schools

The educational wastage index in major-district schools (1.32) is roughly the same as that in minor-district schools (1.31). Bangkok schools have the highest educational wastage index, followed by schools located in the southern, northern, and central regions respectively. The lowest educational wastage index is found in schools in the northeastern region.

The highest educational wastage index occurs among private schools. Provincial and Ministry of Education schools have the lowest educational wastage index, which means that these schools enable students to finish their programs after the minimal time prescribed by the curriculum.

Educational regions 1 (central), 3 (south), and 8 (north) have greater educational wastage indices than other regions, with educational regions 12 (eastern) and 9 and 10 (northeastern) having fairly low educational wastage indices. Region 10, in fact, has the lowest educational wastage index.

School–community relations

Schools located in minor districts have better school–community relations than those located in major districts. Schools in the northern, northeastern, and southern regions have better school–community relations than those in the central region and in Bangkok. Schools in Bangkok, in fact, have a rating that is lower than the national average. This is typical of an urban society, which frequently has an adverse effect on school–community relations.

Provincial and municipal schools, which are located mainly within the provinces, have fairly good school–community relations. Provincial schools, in particular, have the best school–community relations. Private schools, however, have the poorest school–community relations of any of the school types.

Schools located in educational region 8 (north) have the best school–community relations, followed by schools in educational

regions 9 (northeastern) and 3 (south). The poorest relations occur in schools located in region 1 (Bangkok).

Disparity in the composite efficiency index

Our study of the different factors related to primary school efficiency reveals that there are disparities among different geographic regions and among different types of schools under the responsibility of several government departments. The advantages and disadvantages of factors vary considerably. Provincial schools, for instance, are at a disadvantage with respect to students' achievement and opportunity of access to primary education, but they have an advantage over other school types in terms of reducing educational wastage. Provincial schools also have better school–community relations. Ministry of Education schools, on the other hand, excel with respect to students' achievement, opportunity of access to primary education, and internal efficiency, and their school–community relations are above average. Private schools, however, have reasonably good students' achievement scores, but they can offer only limited access.

To provide a broad perspective on these issues, it may be helpful to look at the different dimensions of efficiency simultaneously. This can be accomplished by combining the four dimensions of efficiency into a single composite efficiency index. This index is converted to a standard score having an average of 50 and a standard deviation of 10. In this way, it is possible to measure and compare primary school efficiency. Any school with a composite efficiency index of less than 50 can be classified as having an efficiency level lower than that of the national average and is, therefore, in need of improvement. An analysis of the disparity in the composite efficiency index among primary schools yields the following results:

(1) On average, schools located in major districts are more efficient than those located in minor districts, the index, in fact, being higher than the national average. The efficiency index of schools located in minor districts, on the other hand, is slightly lower than the national average.

(2) Primary schools in Bangkok have the highest efficiency index, followed by schools in the central and northern regions. Schools in the southern and northeastern regions have a composite index that is lower than the national average, with schools in the northeastern region having the lowest index. There is also a fairly wide disparity in efficiency among schools in the northeast.

(3) Ministry of Education schools have the highest composite efficiency index, followed by Bangkok schools and municipal schools, all of which have scores above the national average. Private and provincial schools, however, have efficiency indices that are lower than the national average, with provincial schools having the lowest efficiency.

(4) Although Ministry of Education schools have the highest

composite efficiency index, they also have the greatest internal disparity compared with other school types. The highest composite index for this school type is 104, which is twice the national average. Bangkok schools, on the other hand, have the least variation in school efficiency.

(5) Educational region 6 (central) has the highest composite efficiency index, followed by regions 1 (Bangkok), 7 and 8 (north), and 12 (east). All of these regions have composite indices that are higher than the national average. Schools in need of improvement occur in regions 3 (south) and 9, 10, and 11 (northeast), all of which have composite efficiency indices that are less than the national average, with region 9 having the lowest efficiency index in all respects.

(6) Of all the existing disparities in efficiency among primary schools, the greatest is the disparity among different types of schools. Other major factors underlying disparities are the school districts, educational region, and geographic region in that order.

Characteristics of schools with high and low efficiencies

This study indicates that approximately 35% of the disparity in primary school efficiency can be explained in terms of differences in school district, geographic region, school type, and educational region. Thus, the remaining 65% should result from internal differences within each district, geographic region, school type, and educational region. To explain this internal variance, it is necessary to look at data on school characteristics and students' socioeconomic background as well as the community environment surrounding the schools. A careful look at the 10 schools with the highest and lowest efficiencies yields following results:

(1) On average, primary schools with high efficiency indices are large schools with four to five times as many classrooms and students as those schools with low efficiency indices. They are also situated in well-developed areas near major districts with good postal services. The students have various means of transportation to school. Schools with high efficiency indices are held in high regard by the community compared with schools with low efficiency indices.

(2) Schools with high efficiency indices have a greater number of students who continue on to secondary school. They are also better equipped and their student–teacher ratios are greater, as might be expected in larger schools.

(3) On average, headmasters in schools with high efficiency indices have more experience than headmasters in schools with low efficiency indices. Similarly, the teachers have more experience, a greater teaching load, and spend more time marking students' homework. In schools with high efficiency indices, more of the teachers reside within the community than for schools with low efficiency indices.

(4) Schools with high efficiency indices are usually situated in large communities that are supplied with electricity, whereas half of the communities in which schools with low efficiency indices are located do not have access to electricity. Communities with efficient schools also have higher rates of emigration and immigration. School—community cooperation is good and residents have better attitudes toward schools in areas with more efficient schools.

(5) The majority of students attending schools with high efficiency indices have had preschool education. Their parents are also better educated and have professions other than farming. These students are better off and receive regular pocket money for school in contrast with those students attending schools with low efficiency indices. Their days of absence from school are fewer and they do more homework than students attending schools with low efficiency indices. There is also a lower rate of failure among the more efficient schools.

Roles and effects of major variables

Path analysis is employed to study the factors underlying primary school efficiency as it facilitates an examination of the relationship between major educational inputs and outcomes, and suggests areas for possible improvement. Findings from the path model explaining each dimension of primary school efficiency as well as total efficiency, as measured by the composite efficiency index, can be summarized as follows:

(1) An analysis of the path model explaining students' achievement (cognitive and noncognitive) indicates that students' socioeconomic background, measured in terms of the regularity of having pocket money for school, has a total effect of 0.61, with 0.39 being direct effects and 0.22 being indirect effects, followed by the school district (− 0.33) and geographic region (− 0.40) in which the schools are situated, especially the northeastern region. Both of these variables have lower direct effects than indirect effects in the model. Policy-related variables are preschool education, students' readiness and attitude toward school, and school size, all of which have moderate effects on students' achievement; the direct effects of these variables are, in fact, higher than the indirect effects. The school type and the community's attitude toward school variables have fairly low total effects, most of which are direct effects.

(2) An analysis of the model explaining opportunity of access to primary education indicates that the school size variable has the greatest total effect (0.28), most of which is a direct effect, followed by the emigration variable, which has a total effect of 0.27, 0.25 of which is a direct effect, and the school district and school type (private school) variables, both of which have moderately sized adverse effects. The lowest total effect is that exerted by the village population size, which has greater direct effects than indirect effects.

(3) An analysis of the model explaining educational wastage in

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primary schools indicates that school type (provincial) has the greatest effect, with a total effect of − 0.17, − 0.23 of which is a direct effect and 0.06 of which is an indirect effect. The private school variable has a total effect of 0.13, most of which is indirect. Geographic region (northeast) has a total effect of − 0.14, − 0.06 of which is a direct effect and − 0.08 of which is an indirect effect. Other variables relevant to future policy formulations are headmaster's experience, teachers' attitude toward students, the community's attitude toward school, and students' days of absence from school. All of these variables have a moderate total effect on the educational wastage index, with most of the effects being direct.

(4) An analysis of the model explaining school–community relations indicates that school type (private) has a total effect of − 0.46, − 0.32 of which is a direct effect and − 0.14 of which is an indirect effect transmitted via the headmaster variable. This is followed by the community's participation in school activities, which has a direct effect of 0.28; school quality (in terms of the number of students continuing on to secondary schools), which has a total effect of 0.26; preschool education, which has a total effect of − 0.22; headmaster's experience and qualifications, which have total effects of 0.15 and 0.11, respectively; school district, which has a total effect of 0.17; and the number of teachers residing in the community, with a total effect of 0.13, most of which is direct.

(5) An analysis of the model explaining the composite efficiency index indicates that students' achievement, opportunity of access to primary education, and school–community relations are the variables that contribute most to the composite efficiency index. Their direct effects are greater than their indirect effects. The primary school educational wastage index has the least effect on the composite efficiency index. In this model examining the elements of the composite efficiency index, opportunity of access to primary education has no significant direct relationship with the educational wastage index.

Figure 15 summarizes the major variables that have significant direct effects on primary school efficiency. Three of the outside blocks are identical because our results indicate that schools in Thailand's northeast have lower achievement, greater wastage, and less opportunity of access than schools in other regions.

Improvements to decrease disparities

Students' achievement

There is a need to improve students' achievement in schools located in minor districts; in schools located in the northeast, north, and south; in provincial schools; and in schools located in educational regions 3, 7, 8, 9, 10, and 11.

The model explaining students' achievement clearly indicates that there are limitations to increasing students' achievement in the short
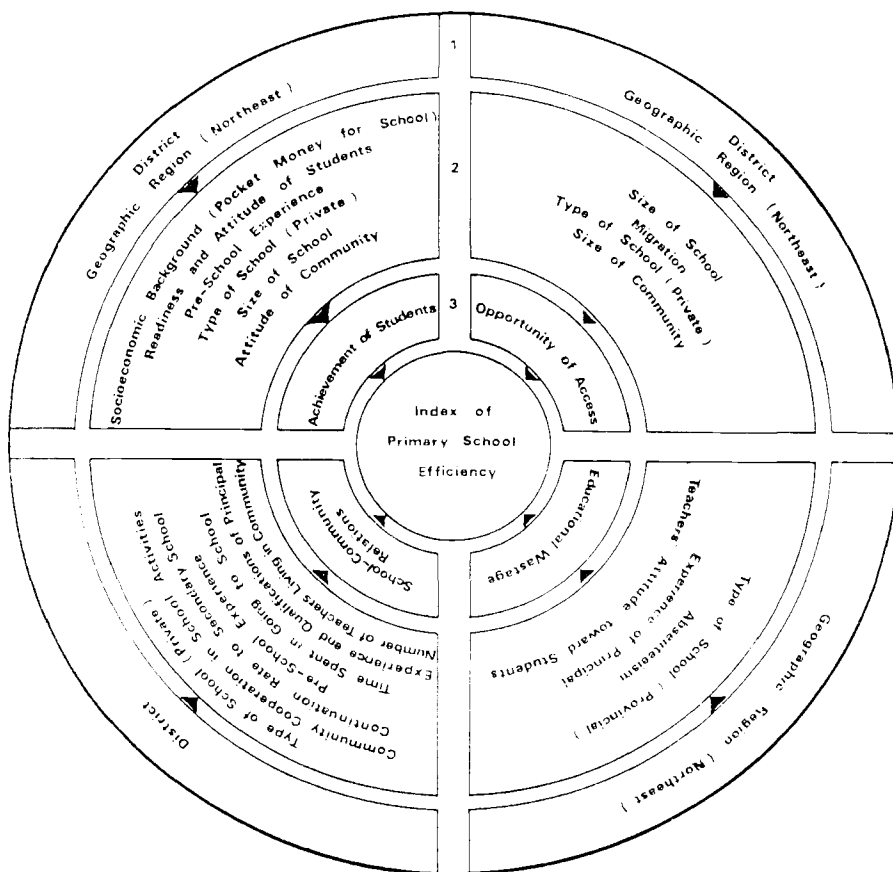
Fig. 15. Determinants of primary school efficiency. (1, exogenous variables; 2, intervening variables; 3, indicators of efficiency.)

run because students' achievement depends so much on the student's socioeconomic background and on the degree of community development. To solve this problem, educational policy-makers have two alternatives: to wait for socioeconomic conditions within the country to improve or to provide compensatory education to needy students who are at a disadvantage. Consideration should be given toward improving certain variables that may be influenced by primary school management, namely preschool education, students' readiness and attitude toward school, school size, and the community's attitude toward school.

Preschool education

The experience of attending kindergarten improves students' achievement. This finding corresponds with the results of studies conducted by the Office of the National Education Commission (NEC 1977). What the country needs is a policy supporting the establishment of centres for preschool education, such as child-care centres,

kindergarten schools, or infant classes in primary schools. These centres should be widespread, particularly in rural and slum areas. The encouragement and assistance of the private sector, charitable societies, and local government sectors is also needed to provide preschool education.

Students' readiness and attitude toward school

Psychological studies have shown that students' readiness and positive learning attitudes can contribute toward improving achievement. Thus, teachers should be encouraged to create a lively and creative atmosphere in the classroom, one in which the students are encouraged to develop to their full potential and where effective learning takes place simultaneously with cognitive learning. In fact, our analysis of the regression equations of variables related to students' noncognitive achievement shows that students' readiness and attitudes are more important and have greater total effects on students' noncognitive achievement than even the students' socioeconomic background. Thus, improving students' readiness and attitude toward school will likely raise the noncognitive achievement scores of the students as well.

School size

Students attending large schools have higher achievement scores than those attending smaller schools because larger schools are at an advantage in terms of having better teaching equipment, better facilities, and more highly qualified staff. Such schools are also situated in well-developed areas, which means that the students come from families with a good socioeconomic standing. To overcome this disparity, special assistance should be provided to smaller schools in terms of increasing the number of highly qualified teachers and providing more teaching equipment. In other words, these small schools should be given a larger budget (Holsinger and Cowell 1985). In addition, small schools located in areas where there are good transportation facilities could be merged into one larger school. As a related policy, the school cluster approach should be rigorously implemented (MOE 1983).

Community's attitude toward school

A good relationship between a school and its community can result in higher students' achievement. The headmaster, as the school administrator, has an important role to play in fostering this relationship. Thus, the headmaster's role must be emphasized as a means of improving students' achievement scores.

Access to primary education

There is a need to improve the opportunity of access to primary education or the service provided to the primary school age population in minor districts; in the central, northern, and southern regions; in private and provincial schools; and in schools located in educational regions 3, 8, 9, and 12.

Most of the factors related to opportunity of access to primary education are unrelated to educational policy-making. In fact, schools located in well-developed areas with high rates of migration tend to be large and there are rarely any provincial schools in such areas. Therefore, primary school populations in these areas have greater opportunity of access to education. One way of improving efficiency in primary schools in terms of increasing their service capacity or increasing the opportunity of access to school is to increase school size by merging small schools. This could also improve the quality of schools in terms of teachers' qualifications, the availability of teaching equipment, and better school buildings. Under such conditions, provincial and private schools could have greater holding power and could improve the community's attitude toward schools.

With respect to improving the opportunity of access to primary education, there is also a need to consider students with physical, emotional, and social handicaps. These children include those that are crippled mentally or physically, those living in slums and congested areas (Sumitr 1978), and those speaking different languages or from different cultural backgrounds. Although this research has not studied the problems of these children explicitly, our methodology for calculating opportunity of access to primary education has covered this important but neglected population.

Another point to consider relates to the poor correspondence between the model explaining opportunity of access to primary education and the empirical data. This indicates that our knowledge and understanding of opportunity of access to primary education is rather limited and that further studies are necessary to obtain a better explanation of this phenomenon. As well, a more refined micro measure of opportunity of access is needed.

Educational wastage in primary schools

There is a need to decrease the educational wastage or increase the internal efficiency of private schools and schools located in major districts, in Bangkok, and in educational regions 1, 3, and 8.

Variables relevant to the model explaining educational wastage in primary schools are school type (provincial and private), headmaster's experience, teachers' attitude toward students, and students' days of absence. A comparison of wastage among different school types indicates that provincial schools have a low wastage index, whereas private schools have the highest index. The other variables related to educational wastage can be influenced by educational policy-making and their improvement may affect educational wastage as outlined below.

Headmaster's experience

Headmasters with considerable government service can manage schools with lower educational wastage and resulting higher efficiency.

This type of headmaster can control school administration and encourage the steady progression of children through the curriculum, which can result in an optimal number of students completing primary school within the time frame proposed by the curriculum. It is noticeable that headmaster's qualifications are less important than experience in terms of producing this type of efficiency within the schools. Further studies dealing with the behaviour, policies, and administration of headmasters of schools with high efficiency may reveal the desirable qualities of a headmaster.

However, this study revealed that the high educational wastage index among private schools resulted from indirect effects via the headmaster's experience variable. The relationship between private schools and headmaster's experience is highly negative ($r = 0.69$), which indicates that headmasters of private schools have insufficient experience. One means of rectifying this situation would be to establish higher standards for the selection of headmasters in private schools, thereby reducing educational wastage. This might also serve to discourage or even eliminate some poorer quality, profit-oriented private schools.

Teachers' attitude toward students

If students are to graduate from primary school within the time frame proposed by the curriculum, there is a need for appropriate administrative control on the part of the headmaster and an appropriate attitude on the part of the teachers. Teachers need to be close to students and a positive attitude toward their pupils encourages the students' desire to learn and enables them to perform well at school. Thus, it is essential that this positive attitude toward teaching and toward students be stressed at all teachers' training colleges. Also, to the extent possible, teacher education should be limited to those genuinely interested in pursuing a teaching career.

Days of absence

This variable has a direct effect on the educational wastage index. Thus, to decrease wastage, it is necessary to look at the cause of the student's absence from school. In this study, it was found that days of absence is affected by the degree of community development. To deal with the problem of absenteeism, it is important to provide extra homework or remedial teaching for those students who have to miss school because of their responsibilities as part of the family labour force.

School–community relations

There is a need to improve school–community relations in major districts, in Bangkok, in the central region, in private schools, and in educational regions 1, 4, and 12.

This study indicates that urbanism has an adverse effect on school–community relations. In fact, schools located in well-developed areas, and attended by students from good socioeconomic backgrounds

and with preschool education, usually have poor relationships with their community. This is not surprising because many children in urban areas, particularly in Bangkok, do not attend neighbourhood schools.

Several variables affect school–community relations, such as headmaster's experience and qualifications, the quality of the school, and the gap between the school and its teachers on the one hand and the community's participation in school activities on the other. All of these variables need to be considered in any attempt to improve school–community relations, which is one way of increasing primary school efficiency.

Headmaster's qualifications and experience

This variable seems to have a considerable effect, both directly and indirectly, on school–community relations, especially the headmaster's experience, which has a negative correlation with private schools, implying that headmasters in private schools have insufficient experience. Greater experience among headmasters or emphasis on the role that a headmaster should play in increasing school–community relations could improve the situation with respect to private schools. The government might also consider adopting tighter regulations concerning the qualifications of headmasters of private schools.

Percentage of students continuing on to secondary schools

This variable reflects the academic standards of each primary school and has a significant direct effect on school–community relations. This study indicates that a school's academic standards and reputation contribute to better school–community relations. A school's academic standards may be improved in the following ways:

(1) Schools should have the necessary equipment, instructional devices, textbooks, and external reading material required by the school syllabus.

(2) The government should encourage the use and development of technological innovations in education.

(3) There is a need to improve teachers' skills, not only with respect to their academic qualifications but also with respect to their ability to apply what they have learned in the classroom situation. Teachers should also be distributed widely, especially in the remote and underdeveloped districts of the country.

(4) There is a need to improve the in-service training system for both teachers and school administrators.

Number of teachers residing in the community

This factor appears to be important in fostering better school–community relations. Living within the community in which their school is located makes teachers feel that they belong to and are an integral part of the local community. Providing teachers with secure

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housing with appropriate facilities within the community should help to strengthen school–community relations.

Students' travel time to school

This variable reflects the proximity of the community to the school site. The relationship between this variable and school–community relations is negative, indicating that some schools are located too far from the community and that it takes the students a considerable amount of time to travel to school either because of the distance or because of poor transportation facilities. This, in turn, results in poor school–community relations. Schools experiencing this problem are generally Bangkok schools, private schools, and schools under the authority of the Department of General Education, which are usually situated in highly developed and large communities. The adoption of a neighbourhood school policy, particularly in urban areas, would facilitate the development of school–community relations.

Community participation in school activities

Schools with a high level of community cooperation naturally have better school–community relations. In fact, this variable, which has considerable direct and indirect effects on school–community relations, should be considered when determining future educational policy for primary schools. Such a policy should stress this new role seriously and allow, or even encourage, the community to take a more active part in school activities. Directives to school administrators should include this role among their priorities.

Increasing the composite efficiency index

At present, there is great disparity in the efficiency of primary education as indicated by the composite efficiency index, which comprises students' achievement, opportunity of access to primary education, the educational wastage index, and school–community relations. The disparity results from school, student, and community influences that are complexly interrelated and may work for or against efficiency in primary schools to various degrees. Improvements in these factors would increase national efficiency as well as decrease the current disparity in efficiency among schools in different parts of Thailand.

A study of total efficiency in primary education based upon the composite efficiency index indicates that improvements are particularly needed in provincial and private schools and those schools located in minor districts, in the northeastern and southern regions, and in educational regions 3, 9, 10, and 11.

The composite index of efficiency in education can be increased by improving inputs that affect the components of efficiency. Factors needing improvements are students' achievement, opportunity of access to primary education, and school–community relations. Analysis of the

model explaining the composite efficiency has shown that these factors are key elements of the educational efficiency index. Improving these factors will not only help primary schools with specific problems inhibiting efficiency but will also improve the overall national efficiency of primary schools.

With respect to improving primary school efficiency on a national scale, the question of priorities naturally arises. Among the inputs affecting efficiency, namely the school, the student, and the community, which input can help bring about the greatest improvement? To create equality in education, is it better to give extra help to the schools (with respect to school size, expenditures per student, the student–teacher ratio, the headmaster's experience, school–community distance), to the students (with respect to opportunity for preschool education, a reduction in failures, students' readiness and attitude toward school), or to the community (with respect to the population's income, community cooperation, the community's attitude toward school)? Which of these areas has the highest priority? Obviously, some problems can be solved more easily and readily than others. Analysis of these problems yields the following recommendations:

(1) Increasing inputs to reduce disparities in school, student, and community influences will increase the efficiency of primary schools.

(2) Reducing disparities among schools or adjusting school inputs will bring about greater improvements in the efficiency of minor district primary schools than improvements to other aspects.

(3) Adjusting school inputs will increase the efficiency of schools located in the northern region, whereas adjusting student and community inputs will have a greater impact on efficiency in schools located in the northeastern and southern regions.

(4) Adjusting community inputs will increase efficiency in private schools, whereas adjusting all of the inputs — school, student, and community, especially student and school inputs — will increase efficiency in provincial schools.

(5) Adjusting school inputs is the best means to reduce the gap in primary school efficiency among different types of schools.

PART II

QUALITATIVE ANALYSIS OF RURAL PRIMARY SCHOOLS

BACKGROUND

Significance of the problem

There have been several studies carried out on the efficiency and management of primary education in Thailand (NEC 1977; MOE 1979). These consisted of surveys or static studies of primary schools at a particular point in time. Often, problems were studied in terms of predetermined variables and researchers were unable to examine all of the interactions among the variables. The findings and conclusions were often based on static variable indicators, such as achievement scores. This kind of approach prevents us from perceiving the actual teaching–learning process in the classrooms because of limited survey and observational time. Thus, most conclusions concerning the quality of primary education in Thailand to date have been based on surveys of students' achievement.

It was felt that a field study might be used to complement quantitative research on the quality of education. Observations could be made over a longer period of time on what was going on inside and outside the classroom. Such an approach can provide a better understanding of the natural and dynamic factors affecting the quality of education in terms of the efficiency and effectiveness of the educational system. Through direct field observations, it is possible to see causal factors interact and to develop a deeper understanding of the relationships among factors or variables. It was also felt that this method might suggest more definite guidelines for solving the problems associated with primary schools and for improving controllable factors directly related to the learning–teaching process.

Objectives

The general objective of this study was to examine the quality and relevance of rural schools in Thailand in terms of their settings and conditions. The primary aim was to understand rather than evaluate the phenomena.

Our specific objectives were to ascertain which factors influence the quality of education in rural schools in Thailand, to study the actual role and functions of rural schools and to compare them with the expected role and functions as specified by law and as stated by educators, and to describe the actual teaching–learning process with respect to the subjects in the four basic curricular blocks.

It is expected that the findings of this study will provide a better understanding of factors affecting the quality of education and that it will provide new hypotheses relevant to future educational studies; propose guidelines for future educational management and administration, both at the macro level (Ministry of Education) and the micro level (classroom); propose new approaches to policy and planning in primary school education; and provide a comprehensive picture of the actual extent of curriculum implementation in the classroom.

Methodology

Selection of schools

Four small schools, located in the central and northeastern parts of Thailand, were selected for case studies. The schools were chosen based upon the following criteria:

(1) They were small because previous research has confirmed that small schools are usually less efficient.

(2) Pairs of schools were selected, with one school intentionally being of poorer quality than its counterpart. The *Classification of School Standards* (MOE 1976) was used to facilitate the selection procedure. The selection also required that the paired schools be located in a similar environment, with roughly the same amounts of educational inputs to minimize extraneous variables as well as to improve internal validity.

(3) It was decided that the second pair of schools should be situated in a different geographic region and should serve as a replication, the lack of which is a common problem in anthropological research. The varied settings also increase the explanatory power and general applicability of the study.

(4) The schools selected were convenient for the researchers in terms of transportation, communications, available housing facilities, and personal safety because the researchers had to live in the community for a year and a half while data were collected.

Data collection and research instruments

Data were collected over a period of 12 months (April 1980–March 1981). During this time, field researchers lived among the villagers, teachers and students and recorded observations of activities that took place within and outside school. The study period was chosen to coincide with the cycle of agricultural activities carried out by the people in the villages so that the interaction between educational variables and the social and cultural setting outside the school could be observed. Although 1 year had been allocated to collect data, it was necessary to return to the schools three more times to confirm certain

information and to collect additional data to complete the study. Thus, data collection was not complete until December 1981.

Data was collected principally through direct observation. The researchers lived in the community, serving as teachers' assistants while conducting informal interviews with key individuals, such as headmasters, teachers, students, parents, and community leaders. Other data were gleaned from documents and the schools' statistical records. Cognitive and noncognitive achievement tests were used to measure grade 3 students' achievement scores to allow quantitative comparisons to be made among schools. Parents' socioeconomic background was also determined. Interviews were conducted to ascertain parents' educational levels during the latter part of the data collection period after a good rapport had been established between the researchers and the residents of the community.

Data analysis

Analyses were actually made on a continuous basis because all of the information collected during the field study had to be interpreted and classified. The researchers then met at the Office of the National Education Commission where each researcher presented a summary of the data collected. The interpretations of the data, the analysis, and the conclusions were then used to establish tentative hypotheses. A summary report covering the four schools studied was then prepared and presented to the project subcommittee, which consisted of key staff members from all of the government offices concerned. The subcommittee then met to discuss problems and suggest courses of action for the next phase of study.

THE VILLAGES AND THE SCHOOLS

Descriptive ethnographic data on the four research sites are presented to reflect the context essential for understanding school quality. As mentioned in the preceding chapter, the study was conducted in two provinces, one in the central region and the other in the northeast. The paired schools in the central region are Rung Pithaya, located in Klong Yao village, and Nong Bua, located in Nong Bua village; both are in the same district. The paired schools in the northeast region are Sra Kaew and Huay Haeng, located in Sra Kaew and Huay Haeng villages, respectively.[3]

Central region

The villages of Klong Yao and Nong Bua are located near Bangkok, the capital of Thailand. This is an agricultural area, but in some parts of the province the government has established industrial zones. Thus, the province is made up of a mixture of farms and factories, especially in the area near the two villages being studied.

Klong Yao literally means "long canal" and Nong Bua means "lotus pond." The two villages are situated in a major irrigation area. This district has many long irrigation canals that were dug about 100 years ago when Thailand wanted to increase her rice exports. As a result, villages have abundant land for growing rice and a vigorous local economy. The villages are linked to the provincial centre by a 9 km asphalt road. Another 17 km separate Nong Bua from the district centre, with Klong Yao lying 2 km beyond.

Klong Yao village and Rung Pithaya school

Klong Yao comprises 74 households. The population is 714, of which 234 are children less than 12 years of age. The average annual income of each household is THB 55 100 and the average annual expenditure is THB 51 750 (in July 1988, 25 Thai baht [THB] = 1 United States dollar [USD]). Almost all of the villagers are farmers who grow rice on rented land. Even though they can grow two crops each year, much of their income goes toward paying rental fees and debt interest. Many families

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[3]The names of persons and places used in this study have been changed to preserve the anonymity of the participants.

have obtained credit to purchase implements for production. Proximity to urban areas, which introduce new technology such as tractors, fertilizers, and chemical products, has increased the cost of agricultural production.

In general, villagers' living conditions are not bad. Each family can earn a living; own modest consumer goods, such as radios; and take a bus to town occasionally. The road to the village deteriorates during the rainy season and teachers and students may have to walk to school because neither buses nor bicycles can be used when the road becomes too muddy.

The formal leaders of the community, i.e., the head of the village and of the *tambol* (collection of villages), are not well respected among the villagers. The former head of the *tambol*, however, Kamnan Mu, is extremely popular and well respected. Kamnan Mu plays an important role in supporting Rung Pithaya. The acting headmistress of the school, Khruu Rachanee, is Kamnan Mu's daughter-in-law.

Rung Pithaya was founded in 1942 on 4 ha of land donated by a villager. The present school building, consisting of three classrooms, was constructed in 1974. Later, villagers donated money to construct three more classrooms, bringing the total to one classroom for each grade (grades 1–6). On the first floor of the school, a library was set up by using part of the teachers' room. This library is frequently visited by students.

In 1980, when this study began, Rung Pithaya received THB 202 440 from the government's annual budget and THB 10 121 from villagers' donations. Most of the money received from the government went toward paying teachers' salaries. Khruu Rachanee used the donations to purchase teaching materials and office supplies, and for building maintenance.

In 1980, 152 students were enrolled in grades 1–6. A preschool class of 32 children, similar to a day-care centre, was also established in response to local needs. This class shared space and its teacher with the grade 1 students.

Rung Pithaya has seven teachers (six females and one male). The teachers have a good working relationship because they are similar in age (under 30). Most of the teachers have a higher certificate in education. Two are taking part in an in-service training program, studying for a bachelor of arts degree. More than half of the teachers live outside of the village, which results in additional time and expenses for commuting to school each day.

Khruu Rachanee assumed her position as acting headmistress in 1980. She had been a teacher at Rung Pithaya for 10 years. At the age of 29, she was working toward her bachelor of arts degree while administering the school and teaching grade 6. Because of her good human relations and her status as Kamnan Mu's daughter-in-law, the villagers and teachers would like her to become permanent headmistress of Rung Pithaya.

Nong Bua village and school

Nong Bua is a large village comprising four hamlets, 140 households, and a population of 970, of which about 256 (26%) are children less than 12 years of age. Most of the villagers are related. The hamlet in which the village temple, Nong Bua school, and the village health-care building are situated constitutes the centre of the community.

As at Klong Yao, most of the villagers are farmers. Their families, i.e., parents and children, provide the labour. Children from the age of 8 or 9 help their parents in the home and on the farm. Rice is the main crop grown and incomes are sufficient to cover debt interest and farm expenses, such as costs associated with fertilizers, insecticides, and renting tractors. In 1980, a disease affected the rice crop, resulting in extremely low yields. In addition, villagers are fond of gambling as a recreational pastime. Consequently, villagers' economic conditions are poor.

Although Nong Bua is close to urban areas and modern life-styles, villagers still maintain traditional beliefs. These beliefs are mainly related to agricultural customs, such as the rites of welcoming and thanking the Goddess of Rice. Traditional beliefs are also concerned with health and diseases. When villagers are not well, some prefer to be cured by Buddhist monks or folk therapists through traditional processes despite the existence of a health-care centre within the village.

Village leaders are not popular. The former abbot of Nong Bua temple was well respected, but the present abbot has been criticized for his conduct, and even his chastity has been questioned. The villagers boycotted him by going to another temple and by refusing to help with temple activities. Because Nong Bua school is situated within the temple compound, the villagers' reactions have a definite impact on the school.

Nong Bua school, founded in 1934, was the first primary school in the district. Until 1958, the school used the open-air buildings (*sala*) of the temple as classrooms. Currently, the school has two buildings apart from the classrooms. The headmaster has arranged a multipurpose room that serves as a teachers' room, a library, and a first-aid corner.

In 1980, the school had 143 students enrolled in grades 1–6 and a preschool centre, which was established by the School Educational Council and the Subdistrict Development Committee. The school received THB 334 305 from the government's budget, which was used mainly to pay teachers' salaries. Other sources of funding were subdistrict subsidies and donations, which amounted to THB 13 997. These funds were used to purchase teaching materials. Actually, the school has considerable teaching materials, such as radios with cassettes, maps, globes, microscopes, and other laboratory instruments; however, the materials are not used adequately. On the other hand, equipment for physical education classes is always needed.

Khruu Somchart is the present headmaster. At 38 years of age, he has been the headmaster of the school for 15 years. He has a higher

certificate in education and is now working toward his bachelor of arts degree. Khruu Somchart is solemn. The conflict between the abbot of Nong Bua temple and the villagers places him in an awkward situation. To protect the interests of the school, he tries to reconcile the two sides. This role causes him to appear indecisive among the villagers. His aloofness and solemnity prevent him from revealing his good intentions to the public.

Apart from the headmaster, there are seven teachers in the school (two males and five females). Among them, three have a certificate in education, one has a higher certificate in education, two have a diploma, and one has a bachelor of arts degree. Only two of the teachers are more than 30 years of age and have more than 10 years of teaching experience.

Northeast region

The second pair of schools is located in two subdistricts of a province in northeastern Thailand. The area is a plateau where the land is dry and the fertility is low. During the summer, villagers have to walk for miles to fetch water from small ponds in other villages. Despite the drought, however, their major occupation is rice farming and cash crops. The crops are rainfed, and when the land becomes too dry to grow crops, villagers will seasonally migrate to provinces in the central plain to become hired labour, leaving the village to the elders, children, and women.

The community, in general, is made up of a cluster of houses situated near each other or along the village road. Schools and health centres are scattered in each subdistrict. Electricity is becoming available within the areas but piped water is still not available. The district centre is 84 km from the provincial centre. The village of Huay Haeng is 4 km beyond the district centre and Sra Kaew is another 4 km beyond that.

Sra Kaew village and school

Sra Kaew is a small community of 110 households, with a population of 615, of which 266 (43%) are children less than 14 years of age. The average household has seven members, two in school and four in the labour force.

As in most areas of the northeast, the soil is arid and salty. Usually, villagers locate paddy fields near their houses and plant their crops about 5 km away. Electricity was installed in late 1981, but there are still no waterworks. The major water source is Kud Sawai, a pond north of the village. During the summer, the water in Kud Sawai tends to be salty and impure. Nonetheless, villagers use it. Residents worked together to dig another pond in the village to solve the problem of insufficient water supplies.

In 1981, the average annual income of a family in Sra Kaew was THB 28 070 and average expenditures amounted to THB 21 140. The

income is mainly from farming (70%), with most of the expenditures going toward maintaining the household and operating the farm. Educational expenditures account for only 5% of the total expenses. Villagers are poor and extremely cautious when it comes to spending their money. A sizeable amount of money, however, is spent on alcohol. On the other hand, their food consists of rice and sauces. In cases of illness, villagers prefer traditional and supernatural therapy. Only in serious cases will individuals go to a hospital. Buying dangerous medicines from unauthorized shops is a common practice.

Regarding interaction with other communities, a minibus runs twice a day between the village and the district centre (including the marketplace). Private means of transportation include bicycles and walking. Villagers go to town only two or three times each month because there are some small shops within the village. They do not need to buy many goods because they are self-supporting, growing their own vegetables and crops.

The head of the subdistrict is less popular than the head of the village, Phuyai Mangkhang, who is a true leader. He dared to persuade and lead the villagers in many activities, such as the construction of a school, road, and bridge within the village. Maha Yai, the brother-in-law of Phuyai Mangkhang, is also a highly respected leader. As a former Buddhist priest, he encouraged people to make donations for the construction of the village temple, which is now half completed. Villagers are extremely proud of the temple, which they expect to be the biggest in the district.

Sra Kaew school was founded in 1955 and at that time was located in the temple. In 1965, the school received funds to construct its own building with eight classrooms. The school is situated in a hamlet that is not the centre of the village. As a result, children from other hamlets have to walk quite a long way to the school. The school consists of a building for classrooms, a teachers' house, and toilets. The grade 6 area is divided into a classroom, a book corner, a first-aid corner, and a teachers' room.

In 1980, Sra Kaew school received THB 290 464 to cover its operating expenses. It also received THB 4 830 in donations and from income generated by the school. This money was used to purchase equipment for the school and to pay for building maintenance.

There are two classes for each grade from 1 to 4, and only one class for grades 5 and 6. In 1980, student enrollment stood at 271. A preschool class of 10 children is also part of the grade 1 classroom.

During the year under study, Sra Kaew had two headmasters, Khruu Prasop, who retired in October, and Khruu Somchai. Khruu Prasop, a native of Sra Kaew village, had been headmaster of the school for 5 years. Khruu Somchai, 27 years of age, is from the central part of the country. He has a diploma in education and is continuing his studies toward obtaining a degree. Since becoming headmaster, Khruu Somchai resides at the district market during the week and returns to his home in another district on the weekend. Khruu Somchai is well-off, owning

land and a tractor. Most of the other teachers in Sra Kaew school are under 25 years of age and have 3 years of teaching experience. Their monthly salary ranges between THB 2 400 and 4 800. There are seven male teachers and one female. Most of them have a certificate in education or a higher certificate in education. Five of the teachers live in the village. In addition, five of them are continuing their studies.

Huay Haeng village and school

Huay Haeng village is surrounded by paddy and crop fields. It has 180 households and a population of 832, of which 480 are children less than 14 years of age. The houses are two-story wooden structures, with open space on the ground floor to keep farm equipment and to raise animals (mostly pigs and chickens).

Neither electricity nor piped water were available within the village in 1980. People used kerosene lamps for lighting. There are three ponds, but only one can be used for drinking. Water in the other two ponds is stagnant or dries up. When the remaining pond dries up, villagers walk 7–8 km to fetch water from other villages. A shortage of water is a major problem in the area.

As at Sra Kaew, the villagers are mostly farmers, but because the soil is so infertile, some villagers have become migrant workers. They are employed, for example, on tapioca farms, and for rice transplanting and harvesting. Most villagers in Huay Haeng, therefore, work as rice farmers, crop farmers, or farm employees.

The main sources of income are from farm production and employment. Income from farming is used to pay debts and to invest in the next farming cycle, whereas income from employment is used primarily for household expenditures. The average annual income of a household is THB 22 630, of which 70% is farm income. The average expenditures of a household total THB 20 110. Villagers have to struggle to earn a living, although they also spend money on alcohol. Villagers' nutritional practices and those followed during times of illness are similar to those observed in Sra Kaew. Means of transportation are also the same. Within the village, there are three television sets; transistor radios, on the other hand, can be found in every household.

Formal local leaders, such as the subdistrict chief and the village leader, are well known but are not popular. The role of the village leader focuses on relief activities and other traditional customs. No informal leadership is apparent. The school headmaster and most teachers live outside of the village, thus lacking intimacy with the villagers. Those who reside within the village are junior teachers who are occupied with housework. The abbot of the village temple is old and sick, and rarely joins community gatherings.

The people in the area follow traditional beliefs and values. When there is a drought, they gather together in the heart of the village and hold a ceremony to extend the village's life. The ceremony is intended to summon rain and simultaneously strengthen morale. Villagers prefer to

bring their children to school for the first time on a Thursday because Thursday is the teachers' day. They believe that the children will be industrious and smart during their school days if they conform to this tradition.

Huay Haeng school was formerly a private school located in the temple. It became a government school in 1937. The chief abbot of the district and the district chief donated some money and asked for funding from the villagers to establish a permanent school building in 1952. It was not until 1954, however, through a subsidy from the province, that the school building was completed and ready to hold classes. The school is located in the heart of the village. It has three buildings arranged in the shape of an "L," a teacher's house, and three toilets. There is no school library and the first-aid corner is located within the teachers' room.

Huay Haeng school received THB 265 175 to cover its operating costs in 1980. The remainder of its budget came from the subdistrict council, from donations, and from a small income amounting to THB 3337. The school has some learning materials, but they are insufficient. Textbooks are inadequate and are often delivered late. Other equipment is not used, especially the globe, maps, and measuring instruments. Sports equipment is used extensively but is inadequate, whereas musical instruments received by the school are Western instruments, which no one knows how to play. Teaching equipment made by the teachers is rare.

Enrollment at the school totals 276. In 1980, there were eight teachers (six females and two males). The headmaster, Khruu Praneet, is 52 years of age and is a native of Huay Haeng. He has a diploma in education and has been the headmaster of the school for 6 years. He acts as the secretary of the subdistrict council, an administrative body responsible for job creation in rural areas and other rural development activities. Khruu Praneet considers his work at the district level as his major responsibilities. Therefore, he has less time to fulfill his school responsibility. Most of the teachers at the school are natives of the area and they hold diplomas or certificates in education. Their ages range from 25 to 58 and their teaching experience ranges from 1 to 8 years. The average income of the teachers ranges from THB 2 400 to 4 800. Only four of the eight teachers reside within the village.

FACTORS AFFECTING THE QUALITY OF RURAL PRIMARY EDUCATION

The teaching–learning process in rural primary schools still emphasizes the basic skills. Thus, students' achievement scores in these skills are representative of an important dimension of quality. In this study, attention was also directed toward other qualities, such as character formation and the students' ability to apply knowledge with respect to their life-styles and careers. As a result of time limitations, however, these two aspects have not been covered sufficiently.

Factors that affect the quality of education (here referring to students' learning achievement) are the educational administrative system, headmasters, teachers, the teaching–learning process, parents and students, and the school and community. In this chapter, detailed descriptions of each factor are presented, emphasizing the mechanisms by which they interrelate rather than their measured values. These descriptions are intended to provide an understanding of the multidimensional and in-depth characteristics of school phenomena in two rural areas of Thailand. Although some factors may not vary much from school to school, they actually affect the quality of schooling in important ways.

The administrative system

Research has shown that quality in education is a result of high standards in terms of relevant factors in the educational administrative system, namely supervision and monitoring, budget allocations, and adequacy of teaching materials. Table 29 summarizes measures of these variables for the four schools studied.

Supervision and monitoring

Inadequate arrangements for supervision and monitoring

In the Ministry of Education's 1977 regulations, 10 supervisory duties were specified. These may be divided into three categories, namely academic duties, in-service training, and educational standards control. Academic duties are the primary and most essential responsibility. They consist of giving teachers pedagogical and academic advice, carrying out research projects, developing instructional

Table 29. Some basic administrative data on the four schools studied.

	Central region schools		Northeast region schools	
	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Number of supervisory visits	2	2	1	—
Nongovernmental budget (THB)[a]	13 154	13 297	4 830	3 337
Nongovernmental budget per student (THB)	86.5	93.0	17.8	12.1
Date of delivery of course books to schools	July	July	October	July

[a]Includes some school income, e.g., food sold to pupils. Thus, figures are higher than those in previous chapter.

materials, preparing teachers' manuals and instructions, and providing suggestions for evaluation procedures.

The regulations were inadequate, however, in that they contained no specifications to help supervisors cope with the changes in the new curriculum; yet they continued to be used for 3 years after the enactment of the new curriculum in 1978. It was not until 1981 that new regulations were issued by the Ministry of Education that included details related to implementation measures to be taken in accordance with the new curricular principles and content. Thus, 3 years lapsed after the introduction of the new curriculum before any measures were taken with respect to supervision and monitoring. These functions are now the responsibility of the newly founded Office of the National Primary Education Commission (ONPEC), which comes under the authority of the Ministry of Education.

Irregular and inefficient supervision and monitoring

Empirical data from the four schools studied revealed that supervision was not in accordance with the aims and objectives of the new curriculum, nor was it regular. School records over the past 20 years indicate that Huay Haeng school received only one supervisory visit from the province before 1980. In addition, the records show only one example of district supervision in Sra Kaew school in 1980. This could mean either that the schools neglected to report other supervisory visits or that there had been no additional visits to report.

It seems that schools located in the central provinces, with better communication facilities, received more frequent supervision, i.e., two or three times a year (Table 29). A look at detailed records, however, revealed that supervision consisted simply of checking to ensure that all of the schools' records were in order, with no mention of any academic advisory sessions being held. According to Nong Bua school records, a supervisor had criticized a teacher's methodology during one visit, but had given no advice for improvements. Despite the school's frequent requests for supervision regarding teaching methods, guidelines for student observation, and objective evaluation, no response was received

from the supervisory units, which, in turn, excused themselves on the grounds of a lack of funds.

Urgent consideration should be given to the potential of district supervisory units to provide academic assistance to teachers, especially in terms of implementing the current progressive curriculum. Another problem found was that schools were usually given advance notice of any visit from the supervisory units, which seemed to defeat the purpose of the visits. The school's internal academic supervision, which also affects this problem, is considered later in the discussion on the headmaster's role.

Insufficient specification of duties and responsibilities related to supervision and monitoring

Although the Ministry of Education's regulations for supervision (1977 and 1981) have specified that these tasks are the responsibility of the supervisory units, supervisors have a tendency to regard themselves as being responsible for academic supervision only, especially with respect to rural education, which, until 3 years ago, came under the authority of the Provincial Administrative Organizations (PAOs) of the Ministry of Interior. Under the Ministry of Education, the supervisors had no real authority over the actual monitoring. The PAO, on the other hand, believed or considered monitoring to be the job of the supervisory units and neglected this aspect in the provincial administration's control of schools. Thus, no one was responsible for monitoring the curriculum until the primary education system was reorganized in 1980 and ONPEC was established as part of the Ministry of Education, with all rural schools coming under its responsibility. ONPEC set up its own Supervision Division. However, it is still too early to conclude how much this change will affect the monitoring and academic supervision of rural schools. ONPEC's current policy is to assign a more important role to school clusters with respect to providing academic supervision and school monitoring.

Budget allocations

A study by a subcommittee investigating primary education budget allocations mentioned that in the past, there were certain inequalities in budget allocations for primary education. The study went on to suggest that more equitable allocations could be achieved by using educational needs indices for all provinces (Farner 1972–1974; Fry and Rung 1982). Thus, the budget for primary schools may be distributed more widely in the future, thereby meeting the nation's needs. However, certain points should be noted regarding budget allocations in the past.

Government allocations

In the past, the budget allocated for each expense category did not correspond with the amounts needed to provide the activities advocated or specified by the syllabus. A look at expenditures for primary education between 1977 and 1981, as classified by the expense

Table 30. Budget allocations for primary education (1977–1981).

Expenditure categories	Budget allocations (million THB)				
	1977	1978	1979	1980	1981
Total	8 691.26	9 096.10	9 993.90	12 594.02	15 507.41
Operating costs	6 202.39	6 874.48	7 586.35	9 523.77	12 495.85
Salaries	5 121.13	5 769.19	6 371.21	8 076.75	10 746.90
Special hires, regular	175.56	203.98	225.51	292.19	393.34
Special hires, temporary	9.92	13.22	13.61	16.13	7.62
Remuneration, other	85.11	92.34	82.11	67.38	86.75
Incurred expenses	26.87	35.06	68.11	102.73	87.97
Light equipment expenses	72.03	68.89	73.54	108.46	137.15
Overhead expenses				5.40	1.93
Subsidies	27.27	30.90	31.99	39.88	60.56
Miscellaneous expenses	684.50	660.90	720.27	814.85	973.63
Capital costs	2 488.87	2 221.62	2 407.55	3 070.25	3 011.56
Heavy equipment	135.89	149.31	185.76	233.44	300.37
Land and construction	2 352.98	2 072.31	2 221.79	2 836.81	2 711.18

Source: NEC (1982).

categories presented in Table 30, revealed that 75% of the total budget was spent on recurrent costs, 80% of which were regular salaries, leaving only 20% for other management and development costs. Data obtained from the schools studied showed that this proportion is changing for the worse, with as much as 96% being spent on teachers' and administrators' salaries (Table 30).

Only two other categories of expenditure, namely equipment expenses and miscellaneous expenses, were available to the schools to improve academic quality. However, equipment expenses were used mainly to produce school forms and documents for administrative routines and not to purchase teaching materials and equipment. Thus, the only funds available for any new developments in the teaching–learning area lay in the miscellaneous expenses category, which went toward purchasing teaching materials as specified by the new curriculum, course books, and school stationery for needy children. The miscellaneous budget amounted only to about 10% of the recurrent and management budgets, and changed very little after implementation of the new curriculum. As a result, teachers continue to use the traditional lecturing method because of a lack of funds for teaching equipment and materials for new activities. It is unfortunate that so much (more than THB 8 billion annually) is spent on teachers' salaries, yet they are not provided with equipment that will enable them to teach more effectively.

Another discrepancy that was discovered during the year that this study was carried out was that on a nationwide basis, the teacher–student ratio was 1:23, yet in the four schools studied, there were not enough teachers. This implies that the teachers were not distributed systematically in accordance with local needs. Even if resources are allocated equitably among provinces (Fry and Rung 1982), allocations among districts, school clusters, and individual schools within a province may not be equal.

Nongovernmental sources

The normal practice among schools is to find a source of income, other than that provided by the government, that can be used to cover daily expenses or activities that are approved by the headmaster. There are several sources of such income: the largest is donations from the public, such as from the temples to which the schools belong, school committees, teachers, and the local community; a small income is collected as rent from the people who are responsible for selling the children their lunches or from organizations using the school's premises; and proceeds are obtained from school fairs.

The size of this nongovernmental budget varies depending upon the socioeconomic background and conditions of the community. Huay Haeng and Sra Kaew schools, located in the barren land of the northeastern region, received only THB 3 000–5 000 annually from such sources (Table 29), whereas Nong Bua and Rung Pithaya schools received more than THB 13 000.

It would be interesting to know how this income was spent. Information obtained from the schools indicated that expenditures fell into six categories, namely office expenses, teaching materials, sports equipment and games, musical instruments, building and maintenance, and miscellaneous items that were urgently needed, but for which the schools had no ready cash available from their government funds.

Under office expenses, items purchased were stencils, staplers, blackboard erasers, thinner, paper and poster colours, and seeds that had been inadequately provided by the government or not provided at all.

Sports equipment, games, and musical instruments were never provided in sufficient numbers. Those in the schools' possession were used extensively and soon wore out. Often, the schools could not afford to replace all of the equipment every year, even using nongovernmental income, and it was common to see children using whatever equipment they could find for their sports and entertaining themselves. At Huay Haeng school, for example, two games were popular — jumping over a long string of elastic bands and throwing rubber shoes (used in place of rubber rings).

Building maintenance was an essential expense, usually requiring a large budget, but the government tended to turn down any request for maintenance funding. Thus, in many rural schools it is common to find an old, deserted building, abandoned because it was not maintained, and a new building under construction, being built because the headmaster managed to obtain funds for new construction but not for repairs. When small repairs are needed, the headmaster must turn to the nongovernmental budget to buy materials and call upon the school janitor, the teachers, or himself to provide the labour. Maintenance expenses also included funding for building toilets, water tanks, pavement, and land leveling.

Miscellaneous expenses included such small items as travel,

entertainment, refreshments for official visitors to schools, and
newspaper subscriptions.

Nongovernmental income constituted a significant sum as shown in
Table 29: the largest nongovernment fund at Nong Bua school was
THB 93 per student, at Rung Pithaya school it was THB 86.5 per
student, whereas at Sra Kaew and Huay Haeng schools the amount was
just over THB 10 per student.

Teaching materials

According to the teachers at Huay Haeng school, teaching materials
can be classified into three groups: those officially provided by the school
(through the government budget), those provided or prepared by the
teachers, and those that the school required the students to supply.
Only those materials provided by the school will be discussed here
because this is regarded as one of the major services of the educational
administrative system.

Delays in delivering teaching materials for the new curriculum

Three years after the introduction of the new curriculum, many
teachers were still not receiving essential teaching material, such as
teachers' manuals, lesson plans, course books, and recommended
supplementary reading materials, in time to prepare for the beginning
of each semester. As a result, teachers had to follow the old curriculum.

Information obtained in 1981 indicated that this problem had been
solved, but the delay in delivering course books that were to be loaned to
needy students still existed. This forced some students to buy their own
books or to try to follow lessons without the aid of the books.

Not only was the delivery of crucial teaching materials delayed but
the delivery of other supplies, such as pencils, exercise books, and school
uniforms for needy students, was delayed as well. Nong Bua school
received their annual supply of school uniforms for needy students
2 months after the beginning of the first term and did not receive
stationery and notebooks until the middle of the second term. In such a
situation, the financial burden was shifted onto parents who could not
afford it because schooling for their children already meant extra
expenses as well as the loss of the income generated as a result of the
child's labour at home. Many children went through the whole term
with neither stationery nor books. At Huay Haeng school, the
headmaster forgot to bring some teaching materials from his home,
which was some distance from the school. As a result, the materials
never reached the school.

Discrepancies between official and private teaching media and materials

In accordance with the new curriculum, the Department of
Curriculum and Educational Techniques had prepared lesson plans,

teachers' manuals, course books, and supplementary reading materials. The Ministry of Education, on the other hand, also wanted to encourage private publishers to submit their books for any particular course in the new syllabus to the ministerial screening committee and, if approved, the books could be used as alternatives to those prescribed by the Department of Curriculum and Educational Techniques.

This was a good policy in that it encouraged competition and gave teachers a wider selection of materials from which to choose. In practice, however, it was not the teachers who were allowed to make the choice. Instead, this responsibility was given to the Provincial Education Committee. Freedom of choice would have been a good policy in a situation where every party concerned, i.e., the teachers, the provincial authority, and the publishers, was familiar with the existing curriculum and syllabus, but this was not the case with the new curriculum in Thailand. In fact, introducing this policy at such an early stage resulted in confusion, which often turned into chaos.

Private publishers, more often than not, failed to provide lesson plans and teachers' manuals along with the course books because producing these items is not profitable. In provinces where the Provincial Education Committee had chosen private publishers' course books, teachers were unable to make the best use of the books because the accompanying manuals and lesson plans produced by the Ministry of Education were usually unrelated. The most serious problem was a lack of recommended measures for evaluating each lesson, a compulsory component of the new syllabus. Thus, teachers facing these problems tended to follow the old curriculum that they knew well enough to make the necessary modifications. Another point, often ignored by the provincial authority, was that the privately produced publications were often higher priced than those prepared by the ministry.

Often, there was a delay on the part of the Provincial Education Committee in informing the schools of the choices they had made. Schools usually prescribe the course books to be used the following year at the end of the third semester because it is not always possible to contact students during the long vacation. To leave such an announcement until the beginning of the first semester would run the risk of the books being out of stock or out of print.

In many cases, however, the schools were not informed of the choice until the beginning of the first semester. The headmasters were often forced to make their own decisions so that students would have their books on time. This was the case in the four schools studied, where the headmasters, unable to wait any longer, decided to use the ministerial course books on the grounds that they corresponded closely with the syllabus, only to be informed 3 months later that the provincial authority had decided on course books prepared by a private publisher. The headmasters then faced a situation where they could not renege on their decision to use the ministerial course books because most parents had already acquired them. Yet, the course books sent by the provincial authority to be loaned to needed children were useless because they were different from those being used by the other children. Thus, needy

children who were unable to borrow the appropriate books were forced to buy the ministerial course books, an ironic case of a good policy being mishandled.

Supplies of irrelevant teaching materials

In 1978, some teaching materials provided by the United Nations Children's Fund (UNICEF) were inappropriate, e.g., tambourines, drums, and animal rubber seals. The schools could make use of the drums, but did not know what to do with the tambourines because no one in the schools could play them. Also, no one knew what to do with the rubber seals. These items have been safely stored.

At Huay Haeng school, the headmaster wanted the children to learn to play the xylophone, but neither the instruments nor a teacher were available. To circumvent the problem, the headmaster devised a plan whereby the janitor at one of the secondary schools in the same district would bring his xylophone to teach the children at Huay Haeng school and, in return, the headmaster would give lessons in photography and the making of fireworks at the secondary school.

Inadequate supplies of learning materials and uniforms for needy children

One wonders why learning materials for needy children were never provided in sufficient quantities even though they were on loan only during the school year. In the case of Rung Pithaya school, the books that were supposed to be on loan were given away. Thus, none were available for distribution to the students the following year.

Another problem related to Thai language course books, which were also supposed to be on loan to students. The nature of the exercises contained in these books, however, required students to write on the pages, making the books useless for subsequent borrowers. A similar problem occurred at Huay Haeng school when teachers failed to read the instructions accompanying the arithmetic course books and allowed students to do the exercises in these books instead of in the workbooks provided. When the books were returned at the end of the semester, they were usually in deplorable condition. Scribbling on pages and torn pages were features of the returned books.

Not all children described as needy on the teacher's list received learning materials in the schools under study. With respect to school uniforms, it was found that most of the uniforms supplied did not fit the children.

The situation reflects the wastage caused by negligence and poor management of this form of subsidy. It also produces an adverse effect on some needy students who are ashamed to wear clothes that do not fit, thereby displaying their economic status before their peers. Many such cases were observed in Nong Bua school.

Inequality in the distribution of educational materials

Although it was government policy that books and uniforms should be distributed according to the needs in each area and province,

favouritism prevailed, resulting in some schools, whose headmasters were on good terms with the Provincial Education Committee, receiving more than their fair share. This was the case in Sra Kaew and Huay Haeng schools, where the headmasters were able to secure a surplus of teaching materials and a construction budget (which normally was extremely difficult to obtain) for their schools.

Other problems in the administrative system

District-level administration

Abuse of authority among district educational officials was widespread, adversely affecting schools within the district. One of the most common practices was to ask teachers to help the district administration with nonacademic work, with no consideration of the inconvenience that this might cause the school. Among the schools studied, this problem was experienced by Khruu Somsak of Rung Pithaya school, whose perhaps biased account should be given some scrutiny.

Khruu Somsak had been transferred to Rung Pithaya school to replace Khruu Decha, the exheadmaster, as a result of a conflict he had had with a district officer. Because the school is remote and away from major transportation facilities, Khruu Somsak avoided this inconvenience by seeking a temporary transfer from another district officer. Thus, he was listed as the head of Rung Pithaya school but was not present there. As the school could not function without a headmaster, it nominated Khruu Rachanee as acting headmaster, in addition to her regular work load as a grade 1 teacher. Because Khruu Rachanee had to attend numerous district educational meetings away from the school, she exchanged her class with Khruu Ramphaa, the grade 5 teacher. Khruu Ramphaa, therefore, had to teach grade 1, a job for which she had no training. Thus, all of these problems arose because a district officer was trying to punish Khruu Somsak.

Teachers' promotions

Often, teachers' annual promotions were based not on their teaching ability but on their social adaptability and human relationships. For this reason, some headmasters preferred to work outside of their schools, especially at the district office where their superintendents could take notice of them. This, of course, meant leaving their schools unattended, which often resulted in low morale among teachers who needed administrative and academic guidance.

These criteria for promotion also prevailed at the school level, and headmasters often rewarded those teachers who participated most in school activities and who had good relationships with other teachers. Thus, teachers who devoted themselves to teaching felt rather discouraged and saw less and less need to improve their teaching ability because it was not recognized by the headmaster.

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Conclusions

The main administrative factors affecting the quality of education are supervision, monitoring of the curriculum, budget allocations, and district administration and the interschool cluster policy.

With respect to supervision and monitoring, it is essential that supervisory procedures and job specifications be reconsidered. Budget allocation problems involved disproportionate allocations within some expenditure categories and the school's use of its nongovernmental budget. With respect to subsidies for instructional materials, an efficient way of delivering the materials, the relevance of the materials and equipment, the quantities of materials supplied, and the equity of distribution must be considered. In terms of administration at the district and interschool levels, the major problems involved abuse of authority among district officers and the lack of appropriate criteria upon which to base teachers' and headmasters' promotions.

Headmasters

The most important factor influencing the operation of a school is its headmaster. Table 31 summarizes the characteristics of the headmasters in the four schools studied. These characteristics were found to affect the quality of education in these schools.

Table 31. Characteristics of the headmasters in the four schools studied.

	Central region schools		Northeast region schools	
	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Age	29	38	27	52
Headmaster also teaches	Yes	Yes	Yes	No
Attendance rate (%)	83	80	45	50
Experience in in-service academic training	Yes	Yes	Yes	No
Qualifications	Higher certificate	Certificate	BA	Certificate
Concurrently secretary to village council	No	Yes	Yes	Yes
Relationship with staff	Good	Poor	Good	Poor
Relationship with parents	Poor	Good	Good	Poor
Years as headmaster	1	15	0.5	6
Number of headmasters during the past 5 years	4[a]	1	2	1

[a]Including an acting headmaster.

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Administration

Time devoted to the school

Insufficient time may be spent at the school because of other duties, some of which are job related. Headmasters attend district educational meetings, procure the budget for teachers' salaries, and attend interschool meetings. They also have many other responsibilities and duties, such as acting as secretary to the local council for village development and sitting on the committee for rural election and the administrative committee for interschool groups.

In our study, we found that the amount of time headmasters devoted to other jobs at the expense of school administration and organization varied considerably. Khruu Praneet, for example, headmaster of Huay Haeng school, spent the most time away from the school. According to school records, he was present at the school 103 out of 204 school days (in actual fact, his attendance was much less than officially recorded). Development of job opportunities takes a great deal of the headmaster's time (Supang 1981). A lack of close and regular supervision by the headmaster was found to affect the quality of primary school education.

Qualifications

Most headmasters come to their posts based upon their years of government service. Their only administrative training for the position is that acquired while working under former headmasters. No academic qualifications have been prescribed for this post and most headmasters coming into the position have made no conscious effort to obtain job-specific training. Some, such as Khruu Somchai at Sra Kaew school, had been acting headmasters before taking up their current position. A lack of academic training was found to be the factor that hindered headmasters most when trying to improve school quality because they were unable to provide academic advice to their teachers. This also prevented headmasters from effectively assigning teaching responsibilities to those who were qualified. The lack of academic training also hindered the development of measures for teaching–learning assessment and evaluation, which were almost nonexistent in most schools under study. It was found that headmasters who also taught were more qualified academically and those who regularly attended in-service teachers' training were in a better position to give advice to other teachers, as was the case at Rung Pithaya and Nong Bua schools.

The headmaster's major responsibilities were executive, academic, and administrative. Judging from the four schools studied, the headmasters were weakest in their academic responsibilities, tending instead to focus their attention on administrative duties, such as keeping records of teachers' and students' attendance and school equipment inventories. These jobs provided concrete evidence of their work and were often inspected by supervisors during school visits. Academic achievement, on the other hand, is more abstract and, thus,

was often overlooked by supervisors during school inspections and was neglected by the headmasters.

Long-term planning was almost nonexistent in the schools. The best examples were one-year plans that were usually restricted to building construction. It is understandable, however, why headmasters do not make long-term plans. Because all decisions related to funding and other sources of income are made at the district level, headmasters feel that they lack the power and means to realize any plan made in advance. In reality, it was observed that headmasters were incapable of making long-term plans even when they had the means to realize them. Instead, they concerned themselves with small, unrelated projects that were assigned to teachers on a random basis, with no provisions for formative nor summative evaluation. It was also discovered that staff meetings were held on an irregular basis without advance notification and that no minutes were taken at the meetings.

Supervision of programs

Most headmasters spent little time supervising the schools' programs. Monitoring was carried out simply to ensure that regulations were being followed. It consisted of ensuring that teachers were preparing lesson plans and keeping records of evaluations and procedures. Although such records were seldom based on what actually took place in the classroom, they were accepted at face value by the headmasters.

It was observed that a teacher at Huay Haeng school asked the headmaster to certify records of his work load and teaching achievements for the purpose of his academic promotion. The headmaster complied with the request while grumbling "I know that all he has written here are lies, but I have to turn a blind eye to them all. Otherwise, they won't get their promotion." Another aspect of this problem could be seen at Sra Kaew school, where teachers accused the headmaster of negligence because of his absence from the school and used this as an excuse for working inefficiently. During the period after the former headmaster had retired and before the newly appointed headmaster, Khruu Somchai took up the position, because he was working at the district education office, our record describes the situation at Sra Kaew school as follows:

On the last day of his term, the school organized a farewell party for the retired headmaster, Khruu Prasop. After this day, the school ran havoc for lack of an administrative head. No classes took place in the afternoon sessions. Higher primary school teachers sent their students to do some gardening and weeding unattended while they sat reading newspapers or cartoons, while those in the lower primary classes just sat talking in groups. When asked for reasons for not teaching, one answer was "How can one teach with just two teachers left at school?" Another answer was from Khruu Tin, "I don't want to do better than my neighbour." These statements reflected the teachers' lack of responsibility and self-discipline. Thus, the whole school ceased to function after the departure of its leaders. In the teachers' staff room,

we found children giggling and laughing in front of the staff room and went to inquire just to find three teachers snoozing away, and after some investigation, were informed that those teachers had spent the night before celebrating the Rural Education Day and were, thus, too sleepy and tired to teach.

Even under the close supervision of the headmaster, it would be difficult to overcome this level of irresponsibility and lack of self-discipline. Thus, it is questionable whether it is possible to increase the quality of education in Thailand's primary schools. Our study of headmasters revealed that many completed neglected supervising their teachers, concentrating instead on trying to raise funds for teaching materials, school buildings, and school equipment and trying to convince themselves that this would compensate for their lack of attention to their academic responsibilities. They seemed to overlook the point that these materials would be useless unless the teachers performed their job well.

Responsibility

Preference for nonacademic tasks

In rural schools, headmasters could remain in their positions until retirement. Some, who were not interested in their academic responsibilities, could maintain their positions by concentrating on other activities, some of which had nothing to do with the schools but came with the position, whereas others were routine administrative functions, such as attending interschool group test preparations, picking up teachers' salaries, attending district meetings, and procuring subsidized school materials.

Headmasters with a sense of responsibility usually regarded the school as their top priority and assigned nonacademic duties to other teachers or avoided them when allowed to do so. This was the case with Khruu Somchai (Sra Kaew school), who resigned as secretary to the village council, sending Khruu Poon to the meetings on his behalf.

Many headmasters, however, seemed to prefer these nonacademic jobs, finding them more interesting, more rewarding, and yielding more immediate results. Some of the rewards came in the form of personal or financial benefits, such as the remuneration paid at each meeting. Also at these meetings, headmasters came into contact with those who had the power to authorize promotions and privilege. It was noticeable that headmasters of this type rarely participated as chairpersons of the interschool group, which made heavy demands on their time, even though these group activities directly benefited the schools in terms of teaching, testing, evaluation, and learning activities. To them, these tasks offered no tangible or profitable returns.

Emphasis on immediate goals

Education is a long-term process that yields intangible and imperceptible results. Some headmasters were not interested in these long-term results and concentrated instead on the immediate annual

success rate among their students. To them, success meant all students passing their final examination at any cost.

In grade 6, all students are required to sit for an intergroup examination. It is so essential that students pass this examination that some headmasters, such as Khruu Prasop (Sra Kaew school), instructed teachers administering the examination to tell students the answers to questions that they could not answer on their own. Prior to becoming headmaster, Khruu Prasop had taught grade 1, in which it is essential that students develop positive learning attitudes. It was found that this group of students was illiterate in grades 4 and 5, which meant that teachers had not yet corrected a problem that had begun in grade 1. Khruu Prasop was aware of the situation, but did nothing to improve it.

Another factor that compounded this type of situation was the district policy to give double promotions to headmasters if their students did not fail any of the examinations. Such a system tends only to encourage dishonesty and corruption among headmasters.

Human relationships

Being the sole authority in a school often leads headmasters, such as Khruu Somchai and Khruu Prasop (Sra Kaew school) and Khruu Praneet (Huay Haeng school) to be dogmatic, verging on tyrannical. Khruu Praneet, for instance, often held back information on opportunities for teachers to further their studies because he was afraid that his teachers would miss work at school. Khruu Prasop, on the other hand, taking no heed of teachers' protests, suddenly ordered that the Waaj Khruu ceremony (during which students pay their respects to teachers) be held because he had seen his nephew leaving home one day with candles and joss sticks on his way to the private school in the district. Khruu Somchai insisted on putting the rubbish burner in front of the school without informing the teachers of his reasons, which were to remind teachers and students to keep the school clean. As a result, the teachers resented his actions.

Headmasters' relationships with students were no better. They usually did not know their students nor the nature of their problems. Often, headmasters tried to resolve problems when it was already too late, as illustrated by teachers helping students during examination sessions. As part of this study, students were asked to write about their headmasters. The reports received showed signs of intimidation and detachment. The one exception was Rung Pithaya school, where students praised acting headmaster Khruu Rachanee:

We like Khruu Rachanee because she is a very good teacher. She makes things easy to understand. She dresses well. She is kind and not very strict. She also speaks politely and can sing.

Favouritism

Often, promotions did not always go to the most deserving teachers as headmasters used personal criteria in judging who was to be

promoted. Reports were received from all schools suggesting subjective discrimination in promotions.

Khruu Praneet (Huay Haeng school) and Khruu Prasop (Sra Kaew school) were heavily criticized on these grounds. According to teachers, Khruu Somchai (Sra Kaew school) received a double promotion as a lackey to Khruu Prasop even though his teaching performance was rather poor. Khruu Praneet penalized Khruu Chomchai by not asking for her promotion on the grounds that she had taken off more days than were allowed under the regulations, yet in the same year, Khruu Surachai had also taken more leave than normally allowed and still received a promotion. Teachers at the school postulated that because Khruu Chomchai had openly and strongly opposed the headmaster, who, in fact, was extremely inefficient, she was not promoted, whereas Khruu Surachai escaped the same penalty because he was a close friend of the headmaster.

Subjective and unjust promotions inevitably lower morale among teachers and discourage them from devoting themselves to their jobs as school administrators do not recognize this kind of achievement. Devotion to teaching, in fact, often resulted in creating envy among colleagues as well as resentment by the headmaster.

Personal characteristics

Becoming a headmaster is the pinnacle of a rural school teacher's life. This widely accepted feeling among teachers reflects the importance of seniority as an important criterion for becoming a headmaster. However, this study indicates that headmasters ranged widely in age. Some were young teachers under 30 years of age, whereas others were approaching retirement.

It was also found that age is an important factor in determining the headmaster's efficiency. Younger headmasters were active and alert, with a greater sense of responsibility and greater enthusiasm for improving the quality of the school. They were also more open to teachers' recommendations and had better human relationships. Older headmasters, on the other hand, were more inert, less conscientious, and detached from both teachers and students and had a tendency to be more dictatorial. In other words, they were the so-called burned-out teachers, waiting to receive their pensions upon retiring.

Age was found to be one of the most important factors related to the success or failure of the new curriculum. The young tend to be more adaptable to changes. Khruu Prasop (Sra Kaew school), on the other hand, strongly opposed the implementation of the new curriculum without bothering to try to understand its philosophy and structural design.

This new form of change threatened those already lacking academic confidence. At one interschool education administrators' meeting at Sra Kaew school, its headmaster said "Let's burn the teachers' manuals since we can do a better job than with them." At the end of the first term

when the research team had moved into this school to collect data, Khruu Prasop gave the teachers instructions to prepare the final examination. He paid no attention to teachers who pointed out that according to the new curriculum, there was no need for end-of-term examinations because tests had been given regularly throughout the term to identify the students' weaknesses. The result was that end-of-term examinations were given anyway.

Previous teaching experience did not help make Khruu Prasop a good headmaster, although it probably helped him complete school records in a format that was acceptable to district supervisors and to know that student failure rates had to decrease at any cost if he were to receive a promotion. All of these practices, however, encouraged poor-quality education in his school.

In a way, it is unfair to criticize Khruu Prasop without considering what facilities were available to help him adapt to all of these changes. Based on our findings, the only training experience Khruu Prasop had was Woodbadge Boy Scout Training, the certificates for which were framed and displayed in his sitting room.

Holding a degree did not always mean that headmasters were better prepared academically for their position, but it certainly broadened their scope and helped them to keep in touch with changes in the field of education. In fact, a headmaster with a Bachelor of Education may know less about innovative techniques than a teacher who graduated with a certificate in teaching after implementation of the new curriculum. Better qualifications did, however, give headmasters more confidence and put them in a better position to give advice, both academic and nonacademic, to their staff. Thus, qualifications can contribute a great deal toward a headmaster's role in a school.

Khruu Decha, exheadmaster of Rung Pithaya school, had a degree and was, in the eyes of the teachers, the local people, and the researchers, a good headmaster, although his work did not surpass that of Khruu Nong, exheadmaster of Nong Bua school, who had only a higher certificate in education. Khruu Nong was highly respected by the teachers, the students, and the local people, so much so that he became legendary for being the teachers' model whenever a discussion involved the nature of a good headmaster.

Term in office

During the past 5 years, the headmaster at Nong Bua and Huay Haeng schools has remained the same, Sra Kaew school has had two headmasters, and Rung Pithaya school has had three headmasters (see Table 31). A change of administration is good for the school, but not on an annual basis.

Rung Pithaya school was developing and expanding under its first headmaster, Khruu Decha, who had laid down a firm foundation and would have made Rung Pithaya a good school had he stayed to finish what he had started. Huay Haeng school, on the other hand, had Khruu

Prasop as headmaster for 30 years. He was replaced by Khruu Praneet who had been in office for 7 years when this study was being conducted.

A long term in office tends to result in a lack of improvement and innovation. In addition, it encourages the headmaster to become dictatorial, as in the case of Khruu Prasop who, on the verge of reaching retirement, was confronted with a protest rally by the teachers in the school, which caused a great deal of bitterness and resentment.

Conclusions

Characteristics of headmasters that were found to affect the quality of education in schools were administrative style, which included time devoted to the school, desirable administrative qualities such as training in planning, administration, and supervision, and a sense of responsibility; human relationships with the teachers, students, and local community; age; experience; academic qualifications; and the duration of the term in office.

Teachers

Qualifications and experience

Teachers' characteristics that were found to affect the quality of education in schools are presented in Table 32. Thias and Carnoy (1969) found that teaching degrees among teachers do not correlate with high learning achievement among students. In fact, they may have an adverse effect on students' achievement. The explanation is that once teachers in small and remote primary schools obtain a degree, they seek transfers to better schools or to a secondary school offering better facilities and opportunities.

Among the teachers in the four schools studied who had obtained a Bachelor of Education through in-service courses held at the Teacher's Training College, nearly all had transferred or were requesting transfers. Khruu Decha, headmaster of Rung Pithaya school and who had a teaching degree, confirmed that the in-service degree obtained was not particularly useful to primary schools because the degree had no practicum as one of its requirements. He insisted that

At this primary level, a teacher (without a degree) can do their job well if they use all their potentiality. In actual fact, a teacher is using less than half of the academic training received at the Teacher's Training College in executing the job. The training there, in fact, varies little between the primary school and secondary school training.

He agreed with the researchers that teaching experience (practicum) was more essential than academic training in subject content and that this was sadly lacking in the in-service degree, which placed more emphasis on cognitive skills. Most teachers, in fact, felt they could always better themselves academically in their free time if adequate

Table 32. Caracteristics of teachers in the four schools studied.

	Central region schools		Northeast region schools	
	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Number of teachers (including headmaster)	4	8	10	9
Ratio of teachers' qualifications (certificate:higher certificate: diploma:degree)	0:1:5:0	3:1:3:1	4:4:2:0	2:2:5:0
Ratio of teachers over 30 years of age	0	1:3	1:10	1:1.8
Ratio of teachers with more than 10 years teaching experience	0	1:3	1:10	1:3
Ratio of male:female teachers	1:5	1:1.6	1:0.1	1:2
Ratio of single:married teachers	1:5	1:1	1:1	1:8
Ratio of teachers with preference for teaching job	1:2	0	1:10	1:9
Degree of teachers' sense of responsibility	High	High	Fair	Poor
One teacher per classroom over the year	Yes[a]	Yes	No	Yes
Ratio of teachers with another concurrent job	1:6	1:8	1:10	1:3
Average actual teaching time (% of allocated time)	90	94	86	91
Number of teachers leaving the school during the past 5 years (1975–1980)	4	5	6	1
Teachers' morale	Quite high	Quite high	Poor	Poor
Ratio of teachers residing within the community	1:2	1:1.6	1:2	1:2.3
Ratio of teachers furthering their education	1:3	1:2.7	1:2	0
Teachers' economic situation	In debt	Higher expenditures than income	In debt	Higher expenditures

[a]The headmaster was also a form teacher.

information sources were provided. The teachers and researchers also agreed that teachers are good because of their perseverance, sense of responsibility, and potential, as opposed to their degree qualifications.

Age and gender

There was no direct correlation between teachers' age and students' achievement, although older teachers tended to be less active. However, it was observed that relationships and coordination among teachers were better in schools in which teachers tended to be similar in age. Sra

Kaew school was such a case, its staff consisting mostly of young male teachers ranging in age between 22 and 28. Rung Pithaya school was found to be a better school than Nong Bua. At Rung Pithaya, the teachers tended to be younger, whereas at Nong Bua the teachers had higher academic qualifications. Thus, it may be concluded that teachers who had less than 10 years of teaching experience were more enthusiastic than older teachers.

It should be noted, however, that this research was being conducted during a transition period when the new curriculum was being implemented, which meant that older teachers could no longer use the experience they had gained under the old curriculum. This, in fact, might have been the real reason for their problems, rather than their age differences.

With respect to gender, married female teachers with children under 5 years of age were the most inefficient because of their dual responsibilities as mothers. These teachers tended to miss classes, however, or were forced to bring their infants into the classroom because they could not afford to employ a wet nurse while they were working. This common practice inevitably affected and interfered with students' learning.

Motivation and attitudes

Motivation and attitude are highly relevant to a teacher's behaviour and quality. A study of teachers' personal records showed that the majority had no particular desire to become teachers and that they had a rather negative attitude toward the career they had chosen.

At Rung Pithaya school, only Khruu Kallaya had become a teacher because she liked children and thought that this profession might suit her temperament. It was found that the parents agreed with the researcher's conclusion that she was the best teacher in the school. In comparing Khruu Kallaya with less efficient teachers in the same school, there were no significant differences in terms of family, socioeconomic background, teaching experience, or academic qualifications. The only difference seemed to be related to devotion, ethics, and personal character.

At Nong Bua school, 40-year-old Khruu Sak was found to be a good and responsible teacher. He was also the only teacher who had chosen his career out of preference over his previous job at the district irrigation office. His reason for trying to do his job well was, in his own words, "It is better to live with people's respect than with their curses."

It was observed that those who became teachers immediately after completing their teaching qualifications had not become teachers out of preference, which reflects a serious failure among the Teachers' Training Colleges. Preference was found only among those teachers who had shifted to a teaching career.

Sense of responsibility

Regardless of age, academic qualifications, or attitudes toward their teaching career, the key element that affected teachers' efficiency was their sense of responsibility. Table 32 indicates that teachers in the central region, which was more developed and was under closer surveillance from the central administration centre, had a greater sense of responsibility than those in the northeastern region.

Students' learning achievement in these two regions also revealed a good correlation between the two, i.e., students attending Rung Pithaya and Nong Bua schools obtained the highest achievement scores, whereas the lowest scores were obtained by students attending Huay Haeng and Sra Kaew schools. This finding seemed to support the conclusion that the increased sense of responsibility was a result of closer supervision from the authorities, which was often neglected in remote areas of the country, causing teachers to feel less conscientious about their responsibilities.

However, teachers' morale, which affected their devotion to the job, adds another dimension to the question. At Rung Pithaya school, the teachers did not choose their careers out of preference and they did not have any great teaching skills, but they did feel responsible for their classes. Thus, upon arriving late one day, a teacher stated "My legs shook and I felt like fainting but I had to teach as I was already an hour late and the students had already wasted one hour of their lessons. Never mind, I can rest when they do their exercises." There were no cases recorded of teachers falling asleep in the staff room at Rung Pithaya or Nong Bua schools, although several instances were recorded at Sra Kaew school. Similarly, there were no records of teachers getting drunk or moonlighting in any of the schools except Huay Haeng school in the northeast.

Job specifications

A teacher is a civil servant who has to meet certain specifications.

Responsibilities

As a rule, a teacher in a rural school is responsible for one class as the form teacher who takes care of teaching all subjects. Teachers with specific subject training are found only in the higher primary school grades. Thus, teachers were normally required to teach all of the subjects in lower primary school regardless of whether they had any previous training. It was noticeable, however, that most of the newly appointed teachers who had higher certificates of education tended to specialize in one subject. As a result, these teachers were reluctant to teach all of the four experience areas associated with lower primary school.

In addition to their form responsibilities, teachers had to carry out other jobs assigned by the headmaster, such as supervising the sick

room and the library, accompanying students on school outings, performing guard duty, preparing paperwork related to school records, taking roll call, completing health cards and students' reports, preparing tests and other forms of assessment, participating in interschool group projects and extracurricular activities on religious or national occasions, planning lessons, preparing learning materials, preparing for remedial teaching, and investigating absenteeism among students. There were also other occasional tasks assigned by the central district office, such as monitoring parliamentary elections or entertaining important officials from Bangkok.

There are other responsibilities that fall into two categories: official duties as civil servants, such as supervising parliamentary elections, participating in or helping the district or province with official and religious activities, and attending lectures; and nonteaching school duties, such as completing forms for annual promotions, taking students for health inspections and vaccinations, attending staff meetings, and coaching students' athletic training. Altogether, these are rather heavy demands on any teacher — demands that are bound to take much of their time and thought away from their teaching, which will directly affect the quality of education for their students.

Skills

The most serious problem found was the teachers' lack of teaching skills and techniques. This was true even when the old curriculum was in use. This was a result of the teachers' lack of enthusiasm for improving their teaching techniques to make lessons more interesting for the students. Thus, no techniques other than lecturing and using the blackboard were implemented.

With the introduction of the new curriculum, the situation became worse because the teachers had not grasped the concepts therein well enough to apply it in their teaching. As mentioned earlier, teachers had not been sufficiently oriented to the new curriculum, they did not have a firm understanding of its concepts, and they did not have the methodology with which to implement it.

Out of despair, teachers found ways to cope. The older teachers rejected the new curriculum and continued teaching according to the old curriculum and following the old method of lecturing. Thus, students of these teachers often received instruction in the Thai language and arithmetic and little else. Some younger teachers tried to learn about the new curriculum by reading teachers' manuals and lesson plans. Those who tried admitted that these supplementary materials were really useful and helped a great deal. Khruu Kallaya, for instance, believed that

> If properly implemented, the new curriculum will be really
> successful since, from what I have studied, all the materials have
> been prepared for the teachers, if only they could first understand
> the concept behind it. For instance, in the Thai language subject,
> there are word cards and many activities which the students have
> found to be of great fun. So did I.

However, most teachers were mystified by the modern teaching methods and became antagonistic, often finding faults with the new syllabus and with all of the manuals. As a result, the teachers rejected the new syllabus and manuals and used their past experience and teaching methods instead. Another problem involved the orientation, which usually did not cover all of the subjects to be taught at this level. In Khruu Somchai's report, he stated that

Some syllabi such as those for Thai language and arithmetic are good but I don't understand the other subjects. When we went for the orientation, we were forced to attend only one area of experience and I chose to attend the work habits area. It looked easy to teach with less demands on a teacher, just paper folding and modeling.

Some teachers understood only learning behaviour without really understanding the concept behind it because it was not put into practice in class. A lack of understanding of concepts often caused teachers to omit some content when they found that the example used to illustrate a concept did not apply to their school. Khruu Somvos, for instance, refused to teach the concept of self-discipline on the grounds that the examples given in the syllabus were crossing the street at the zebra crossing or at the traffic lights, neither of which existed in his village.

These small details were often a great obstacle, which prevented the curriculum from being fully implemented and specified targets from being achieved. Few educational administrators were conscious of these obstacles, however, because they took place at the classroom level and only close observation and discussions with the teachers would reveal the problem. Thus, prior to implementing the curriculum, it is essential that teachers understand the concepts underlying the subject matter. A thorough understanding of the concepts will enable teachers to use examples that are relevant to their students and the local environment when those given in the syllabus are inappropriate.

Time allocation

Normally, teachers are assigned various jobs. Some teachers manage to evade some of their responsibilities, however, as reflected in the amount of time they spend at school. In principle, teachers should spend 200 days at school during the academic year. However, Table 32 reveals that teachers at Huay Haeng school spent only 91% of their time at school, whereas at Nong Bua, Rung Pithaya, and Sra Kaew schools, teachers devoted 93.5, 90.1, and 86.4, respectively, of their time to the schools. This posed a question as to what the teachers did with the rest of their time.

In another interview, we found that more than half of the teachers at Nong Bua, Rung Pithaya, and Sra Kaew schools were taking in-service courses in the evening or on the weekend, which might account for the time they were away from the school. Taking an evening class meant that teachers had to allow themselves some time to get to the Teachers' Training College and it also meant terminating their teaching day

before the end of normal school hours. In such cases, teachers assigned work for students to complete unsupervised and then left for their courses. For their courses, teachers were required to write reports, do homework, and prepare for examinations. School time was used for all of these purposes.

Moonlighting was another activity that took teachers away from teaching. As well, chatting, reading newspapers, dozing, getting drunk, and child care all diverted time from teaching hours. One field researcher reported that "these phenomena were not infrequent and at least one incidence was recorded each day with the duration being quite long."

Such behaviour was not acceptable, however, and signs of resentment were often recorded. One teacher reported that "here, when the headmaster was away, most teachers left their classes and just sat chatting." At Sra Kaew school, a parent's comment was recorded as follows:

We should get rid of the classroom walls and have an open classroom like we did at the temple in the old days. Without the wall, anyone passing the school could see and this might have given them some qualms about not being in the classrooms with their students.

Even Rung Pithaya school, where teachers were present more often than at any of the other schools studied, was once called "massage school" because the former headmaster was notorious for asking students to give him a massage during school hours.

Teachers per classroom

National statistics have predicted a decrease in population growth (Cochrane 1979). This means that there will soon be an adequate number of primary school teachers and a decreasing ratio of students per teacher. This did not seem to apply to rural schools in remote areas, however, which failed to attract teachers. In fact, in rural schools, teachers frequently requested transfers to the provincial office or larger schools in major districts. They retained their position and received their salary from the rural schools, however, which prevented the school from employing other teachers.

Sometimes, rural teachers obtained official transfers, which left their positions vacant. There was still a time lapse, however, between a position becoming vacant and a new teacher being recruited. This left the school without the teachers it needed.

In most schools, there are records of male teachers becoming monks, female teachers taking maternity leave, or teachers attending in-service training or meetings. In schools in which the headmasters also taught, their nonteaching jobs at the district level caused them to be absent from their classes. Thus, a classroom without a teacher was a quite common sight during our research.

What was rather disquieting was that the people concerned seemed

to accept the situation and saw no need to seek remedies. Of the four schools studied, only two had an adequate number of teachers per class. In the third school, the headmaster also taught, which meant that she often left her class unattended when she was performing other duties. In the fourth school, where there were as many as 10 teachers, some classes were left unattended for reasons already discussed. One of the researchers recorded the following:

Now two weeks after the beginning of a new term, still, there were no regular classes, four teachers (out of 10) have not come back from the summer in-service training and when these four come back another four will leave to further their studies. In the absence of the four teachers, the rest of the teachers would help with their administrative school paperwork but not with their teaching load. Thus, there was no actual schooling for the children in the four classes.

The bureaucratic system

Teachers work in a bureaucratic system that often prevents them from fulfilling their roles. Teachers are government officials and schools are government organizations that have their own regulations and practices, which have prevented any integration between the school and its community.

An anthropological study of schools in the Philippines and in Thailand reported that schools were often criticized for "being overly authoritarian and bureaucratic and undemocratic in organization, authority structure, and pedagogy" (Singleton 1973). Our findings did not vary much from those of Singleton. The teachers' and school's resistance to any form of integration with the local community is an aspect that deserves careful reconsideration. In addition, ongoing attempts to impose the responsibility of rural development on schools should be reconsidered. Such an approach may not work and will certainly take more of the teachers' time away from their students (Nairn 1966). Because teachers are government officials, they would have no option but to take up these responsibilities if they were assigned to them. The result would be further neglect of their teaching responsibilities.

The bureaucracy has oriented and indoctrinated teachers to consider their role, as government officials, as receivers of policy and implementors of orders received from higher levels with no right of opinion or discretionary power. Interviews with headmasters revealed that none felt that they should oppose higher authorities, nor did they feel that the current system in any way inconvenienced their work. In addition, they felt that being given more freedom of choice and decision-making powers would only mean that they would have to come under more authorities.

When asked about teachers' freedom in developing the curriculum to make it more applicable to their community, headmasters indicated that they did not consider this to be part of their job, nor the job of the

teachers who were actually using and teaching the new curriculum. The idea had never occurred to them that they were essential components of curriculum development. Therefore, no academic initiative was taken by the teachers. A similar situation was recorded by Manalang (1981) in the Philippines:

> After numerous interviews and observations, I inferred that teachers were not really interested in curricular autonomy. Having been directed by the Ministry for years, they thought curricular reform was the business of the bureaucracy. Their role was to execute and obey only.

In addition to offering no initiative, teachers underestimated their teaching role, considering it to include only routine duties as described by Jackson (1968). It was immaterial to them whether the students gained anything from the educational process or not. There was no strong motivation to reduce ignorance or illiteracy among the population.

The bureaucratic responsibilities of teachers were notably nonacademic, being confined to routine administrative activities, such as completing forms and writing reports (usually fabricated), wearing school uniforms, making donations, and entertaining visiting government officials. Unfortunately, the bureaucratic system failed to penetrate the academic side because of the school system's inability to effectively monitor teachers' methodologies and evaluation procedures. Thus, the bureaucracy imposed control but had no positive impact on improving the quality of education in schools.

Morale

There seemed to be two groups of variables affecting teachers' morale and their performance. One group was directly influenced by the quality of the teachers and factors affecting their performance. The other group comprised their economic conditions, fringe benefits offered by the post, and the relationship between teachers and their colleagues, their headmasters, and the parents.

Economic situation

Teachers were employed under the same salary scale as other government officials. Superficially, therefore, there seemed to be no grounds for complaints of low income. Rural teachers, however, confronted two basic economic problems: insufficient income and social costs.

Rural school teachers normally came from families with poor economic background. Often, they found their income to be insufficient and extra income had to be earned. In urban districts, teachers could earn extra income by giving private lessons, but this was not the case with rural school teachers whose students were either too poor to pay for private lessons or saw no need for them. Although remedial teaching was considered part of the job, teachers received no remuneration for their efforts. Often, it was necessary for rural school teachers to take another job to increase their income (Table 32). The conflict of interest

brought on by holding another job must have affected the teacher's morale.

The second problem confronting rural teachers was having to pay high "social taxes" in comparison with the income they earned. Every month teachers were asked to make donations to educational, official, and social organizations to which they belonged. In addition, there were numerous official occasions throughout the year for which they were expected to make donations. Finally, because teachers were considered among the most respectable people in the community, donations were expected from them for social functions, such as weddings, ordination ceremonies, and funerals. The expected donation from a teacher ranged between THB 50 and 100. This was quite high in relation to the salary they received. As a result, their income did not cover their expenses and cases of teachers being in debt were not uncommon. These financial problems must have affected morale among teachers.

Upon close scrutiny, it was observed that factors other than financial insecurity affected teachers' morale. In one case, a teacher from a well-to-do family failed in her job, whereas two other teachers from poorer family backgrounds performed their jobs extremely well, the difference being a lack of a sense of responsibility on the part of the teacher who was a failure. Thus, although economic status affects teachers' morale to a certain extent, a teacher's sense of responsibility has a greater effect and may transcend economic insecurities.

Social and fringe benefits

There are three professions that receive social benefits from the government, namely doctors, police officers, and teachers. Benefits received by teachers, however, are the lowest, the argument being that teachers serve only one segment of the population (i.e., children), whereas the services of doctors and police officers extend to all segments of society.

Admittedly, the risks associated with medical and police services are higher and the working hours are much more irregular. What is often forgotten is that the services of doctors and police officers are provided only in times of crises, whereas teachers provide their services continuously. As well, the different services require different skills. Doctors and police officers require psychomotor skills and affection; teachers, on the other hand, require the skills of reasoning and of understanding the abstract as well as psychomotor skills and affection, which make their job particularly demanding. Yet, teachers in rural areas are not entitled to many social benefits offered to doctors and police officers, such as special remuneration for working in remote areas, house rent, accommodations, and travel expenses.

Housing

Usually, rural schools have housing facilities for teachers. In most cases, however, the number of houses available is not equal to the number of teachers needing accommodations. Also, many houses remain

unused. When teachers' houses were grouped together, a new teacher would take up residence if a space became available. If the vacant house was situated in a solitary location without neighbours, however, it was considered to be unsafe for the teacher, especially for single female teachers (who always outnumbered male teachers regardless of the school's location). A researcher recorded Khruu Ramphaa as stating

On her first arrival to school with Khruu Kesorn, the two single women teachers were staying in the only teachers' house available, asking one of the girl students to stay and keep them company in the house. This was frowned upon by the people in the village who accused the two teachers of discrimination for leaving the student to sleep on the verandah, asking her to do their laundry, and using the rainwater from the tanks for baths instead of bathing in the canal in front of the school. Thus, they were being criticized for not conforming to the people's way of life. Then, a man in the village with a criminal record of using violence started to court Khruu Ramphaa. Upon being told by the villagers that the normal practice there was for a man attracted by a woman to abduct her, both teachers felt unsafe and decided to take up residence in town and spent roughly two to two and a half hours each journey traveling to and from school.

Thus, it cannot always be concluded that teachers refused to stay at the school because they did not want to as there were legitimate reasons related to safety that affected their decision. Living far from the school affected the relationships between teachers and the community as well as their teaching. Thus, safe housing should be provided for teachers in rural schools.

Travel time

Not being a local resident and lacking housing facilities because of safety problems meant that some teachers had to live far from the school, sometimes even in a different district. This, in turn, meant extra transportation expenses, the normal bus fare being THB 5–10, which was high in relation to teachers' salaries. Furthermore, these teachers spent a considerable amount of time traveling to and from school. During the rainy season, the only means of transportation was walking.

This travel time, of course, could have been devoted to teaching. In addition, being away from the school meant that teachers did not have the time to build up relationships with students' parents. As indicated in Table 32, half of the teachers in the four schools studied live outside the local community, which meant expensive and exhausting daily travel. The usual result was that most of these teachers sought employment in schools that were nearer their homes as they often found the commuting discouraging.

Further education

Most teachers wanted to obtain higher qualifications for personal reasons rather than to improve the quality of education in primary schools. When teachers became more qualified, they often asked to be transferred to a school with better facilities and nearer major districts

or to a secondary school. In three of the schools studied, at least one teacher was on study leave (Table 31). Moreover, there is a current policy to motivate teachers to receive in-service training, which is organized by most Teachers' Training Colleges and leads to obtaining a degree. Provisions to take education leave have also been made available. Thus, any teacher who has been teaching for 2 years is entitled to take an in-service training course. This opportunity has raised teachers' morale and it was found that at schools where this opportunity was not available, as Huay Haeng school, teachers tended to be depressed and bore a grudge against the school.

Although in-service training has enabled teachers to improve their qualifications and has raised teachers' morale, there is some doubt as to whether it has affected the teaching–learning process within the schools. We found no evidence indicating that teachers who received in-service training were actually making use of their training in their classrooms. Moreover, it was observed that teachers taking in-service training would assign students work to do individually so that they could spend more time on their own studies.

Another point that should be mentioned is that our study of the existing training curriculum revealed that most of the courses offered placed more emphasis on the theory of teaching than on the methodology and practical application. Thus, the training was somewhat futile and irrelevant as most rural school teachers obtained their teaching certificate after attending evening classes that again did not involve a practicum as part of the course.

What teachers needed most under the new curriculum was professionally supervised guidance in teaching the new curriculum and an orientation to classroom teaching. Otherwise, in-service training simply fulfilled the teachers' personal needs for higher degrees, but did little to meet the real needs of the schools and the new curriculum.

Human relationships

Teachers establish relationships with the headmaster, colleagues, and parents. Usually, a bad relationship developed with the headmaster when the latter was reserved or was indefinite with respect to administration and decision-making, causing teachers to feel uncertain as to the best course of action to take in any situation. Moreover, it was found that some headmasters could not separate the personal from the working relationships and tended to show prejudice toward teachers with whom they had a personal grudge. Good relationships, on the other hands, resulted whenever headmasters showed that teachers could rely on them for sound academic or financial advice.

Good relationships were found among teachers of the same age group, e.g., among a team of "young teachers in debt" at Sra Kaew school or among a team of young female teachers at Rung Pithaya school. The teams worked in unison at the schools, e.g., staying late to coach students on sports, decorating the schools, and helping each other with their routine jobs when something unexpected occurred. The worst

relationships were found among teachers at Huay Haeng school, where teachers' ages ranged widely and most teachers were individualists. The headmaster's regular absence from school only served to widen the gap between the teachers, much to the detriment of the students.

Relationships between teachers and parents were poor in the four schools studied. Teacher–parent meetings were nonexistent, but one cannot blame the schools entirely for this. As mentioned earlier, the schools operated under the bureaucratic government system, which was completely separate from community ways of life. Unless a special occasion arose, people would rarely come into contact with government officials. However, the headmaster and teachers, not realizing that it was the bureaucratic system that prevented closer relationships from taking place, blamed the parents for this lack of cooperation. The headmaster and teachers, in the bureaucratic tradition, felt it was the parents' responsibility to approach the school, not their responsibility to approach the parents.

Where teachers lived outside the community, other forms of social relations that might have helped could not be established. Parents had very negative attitudes toward the teachers and believed them to be arrogant, class conscious, unreasonable, or irresponsible. When parents went to see the teacher, they had to sit on the floor while the teacher sat on a chair. Some of the punishment administered to students was considered to be excessive. In addition, parents cited many incidences of teachers being drunk while on duty or being irresponsible in their teaching. At any official or social function attended by both parents and teachers, it was observed that they tended to split into separate groups. Such negative attitudes made it difficult for teachers to be overly enthusiastic about their jobs.

Conclusions

Teachers' characteristics that were found to affect the quality of education in schools were (1) personal characteristics, which consisted of their qualifications and teaching experience, age and gender, attitude and motivation, and, most importantly, sense of responsibility; (2) job specifications and duties, which consisted of their responsibilities, their teaching skills, their time at school, the number of teachers per classroom, and the bureaucratic system within which a teacher had to work; and (3) morale, which consisted of their economic situation, social and fringe benefits of the position (e.g., housing and an opportunity for further education), and their relationships with the headmaster, colleagues, and parents.

The teaching–learning process and learning assessment

The teaching–learning process and learning assessment had direct effect on students' learning achievement, whereas the factors mentioned

Table 33. Learning environment of the four schools studied.

	Central region schools		Northeast region schools	
	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Actual teaching time (%)	83.8	90.9	74.0	71.6
Students' actual class time (%)	83.4	75.0	91.7	83.4
Teachers ask students to correct one another's homework	Yes	Yes	Yes	Yes
Student failure rate, 1980 (%)	0.7	7.9	16.0	10.0

earlier had only indirect effects. The components of the teaching–learning process and learning assessment are presented in Table 33.

Teachers' readiness

It was observed that most teachers were ill-equipped to teach and were not ready for the new curriculum because there had been insufficient orientation and syllabi, teachers' manuals, lesson plans, and course books had not been sent to the teachers in time to prepare for the beginning of the term. As a result, most teachers were unprepared and unsure of themselves.

Problems occurred not only because of inefficient orientation, but also because of teachers' inability to allocate sufficient time for planning lessons, which might have been a result of their heavy work load. It was found that most teachers spent only about 5 min preparing lesson plans immediately before a class was to begin. It was also found that many teachers made no lesson plans at all, relying on past teaching experience alone.

Lack of a lesson plan did not seem to pose a problem with respect to conveying the subject matter to the students, as students tended not to be overly inquisitive and did not ask questions that teachers could not answer. However, the classes that were observed were not very lively. Even worse was the fact that the teaching–learning process was not in step with the objectives outlined in the syllabi because teachers used their own understanding of the curriculum and their own objectives.

Concepts underlying the new curriculum

As already mentioned, in-service teacher training was not only lacking in comprehensiveness but was also poorly organized. Teachers continued to teach even though they had not yet grasped the underlying concepts behind the new curriculum, its objectives, its teaching methodology, nor the achievement expected of the children. At Rung Pithaya school, one teacher remarked, "I feel sorry for this lot of students who have to serve as guinea pigs for those educational

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experimenters." This comment reflected the attitude of many teachers toward the new curriculum. Teachers' ignorance and lack of understanding of the new curriculum forced them to establish their own objectives, methodology, and evaluation criteria, usually based on previous habits and practices under the old curriculum. For these teachers, evaluation in itself was useless as their only concern was that students "pass."

It was found that once teachers understood the essential and basic concepts behind the new curriculum, they were quite willing to devote themselves to improving their teaching by seriously studying the syllabi, manuals, and lesson plans. Moreover, they became aware that the guidelines contained therein could save them a great deal of work as all they needed to do was to follow the instructions provided. Most importantly, teachers soon became aware that under the new curriculum, the aim extended beyond ensuring that students were literate and beyond providing some knowledge of arithmetic computation, which were the limited objectives of the old curriculum.

Learning was an essential part of the new objectives, and both younger and older teachers agreed that learning under the new curriculum would be more beneficial to the students. In this regard, teachers seemed to have a favourable attitude toward the new curriculum.

Thus, teachers' understanding of the concepts in the new curriculum resulted in the following:

(1) Teachers criticized the applicability of the new curriculum. Khruu Tin, for instance, although enthusiastic, had not fully grasped the concepts behind what he was supposed to teach. As a result, he held onto old concepts despite new objectives. One researcher recorded the following observation:

Khruu Tin identified inapplicability to local conditions as one of the problems he had found in curriculum implementation. For instance, children here could not afford toothbrushes, nor did they have any toilets at home. Thus, he considered this part of the syllabi useless since the children would only revert to their normal practices once they went home or left the school. This remark, we have found, reflects his lack of understanding or his overlooking the basic objective, which is to teach the concept of the value of cleanliness and which allowed teachers to use any illustrations they deemed fit.

(2) Teachers skipped over content they deemed inappropriate. Khruu Somyos, for example, neglected to teach about discipline because the example described in the syllabus dealt with crossing a road at an intersection, which he considered to be inappropriate and irrelevant to rural life.

(3) In cases where teachers did not understand concepts, they were unable to explain the subject matter to students in a manner that they could understand.

(4) Some teachers wanted the district education office to adjust the national syllabi to make them directly applicable to local situations. This indicated a preference, on the part of some teachers, to have teaching materials provided for them in a form that was immediately usable as opposed to producing their own materials. This also reflected teachers' different levels of understanding of the new curriculum.

Teaching aims

Because teachers did not understand the new curriculum and were not properly prepared to teach under it, many established their own teaching aims. These aims rarely involved long-term objectives. Thus, a teacher at Rung Pithaya school, for instance, was content with "enabling my students to read and write and have some knowledge of simple arithmetic." In other cases, teachers established no specific targets in terms of students' achievement.

At Sra Kaew, the headmaster asked his staff to adjust students' marks to a pass score by giving them a bonus for their accumulated scores over the year. To Khruu Prasop, the aim here was not the students' knowledge but to show that his school had succeeded in teaching. The actual achievement on the part of the students was of no significance.

Receiving an education is a lengthy process, often under an unsupervised system. Thus, it is easy for irresponsible teachers to establish their own objectives and follow them without anyone outside the school being aware of these objectives. Once students graduate and it becomes obvious that they have not attained the goals set by the curriculum, it is impossible to determine who is at fault because the process has involved several individuals. Only the headmaster is in a position to ensure that the objectives of the curriculum are fulfilled.

Teaching methodology

Use of equipment

Most teachers used little equipment, claiming that they had neither the time nor the materials to prepare teaching instruments. Our findings revealed, however, that teachers were not interested in using even those materials that were readily available in the school, such as globes, science equipment, and picture cards. The new curriculum, on the other hand, expects teachers to use a considerable amount of teaching equipment. To this end, the administrative offices concerned have made an effort to provide a budget for equipment since 1982.

Information on school expenditures revealed that a large amount of the schools' nongovernmental budget was spent on teaching equipment. Thus, the problem seemed to be how to get teachers to use the equipment provided. It was found that teachers who were well prepared did make use of the equipment. The problem was that teachers were already hesitant to spend an appropriate amount of time preparing

their lessons. Therefore, to provide teaching instruments without attempting to change teachers' attitudes toward lesson planning would be futile. Another problem that was encountered involved long delays in delivering equipment to the schools.

Technique

Nearly all of the teachers in the schools studied use the traditional lecturing method with the aid of blackboards. This technique focuses mainly on the teacher. Teachers were confident in this method of teaching, which was easy, convenient, and required little preparation.

It was observed, however, that lecturing was not very stimulating and that when questions were asked, there was no prompting or encouragement for the students to attempt answers. Questions were phrased in such a way that the answers were in the questions themselves. If students were unable to answer questions, the teachers would provide the answers. Usually, questions required very simple yes or no responses, with very few involving any type of explanation. Although some teachers tried to follow the lesson plans provided and the teachers' manuals, they had difficulty remembering the details. In the end, they simply read the lesson, which was very uninspiring.

It was found that teachers' movement helped create a more lively atmosphere. The moderate verbal speed used by teachers in their explanations; their clear enunciation; their eye movements, which focused on individual students; and walking around in the classroom all helped retain the students' attention and interest. Students often complained about teachers who stayed at their table, spoke too fast, stammered, or focused their attention only on clever and attentive students.

Even more important than the physical techniques used in teaching was the teacher's ability to explain the abstract concepts of the curriculum in a manner that students could understand. This could be accomplished either by describing several examples of the concept and then asking students to draw a conclusion based upon the examples or by describing the concept, providing examples to illustrate the concept, and asking students to provide more examples to ensure that they understood the concept. In practice, it was found that many teachers were unable to use these approaches because they did not fully understand the concepts they were expected to teach due to inadequate orientation to the new curriculum.

It should be pointed out that one problem occurred because of the particular teaching methodology required at the grade 1 level. Because grade 1 students often have not developed coordinated hand movements, teachers often hold their hands and fingers while helping them to draw and write the letters of the alphabet. Because of this close contact, teachers sometimes picked up lice from students. At Huay Haeng school, one teacher asked to teach a higher grade after running into this problem. To avoid a similar problem, the new grade 1 teacher did not come into contact with the students, confining herself to using

the blackboard. The result of this approach was that several students were unable to write at the end of grade 1.

Psychology

Whether a classroom is lively or not depends a great deal on the teacher's use of psychology. Often, teachers were found to be temperamental while conducting a class. The word "stupid" was frequently used. At Huay Haeng school, Khruu Chomchai, in a conversation with one of her students, stated "Your parents must have been very stupid. Otherwise, they would not have begotten you." After frequent repetitions, she soon managed to make the students believe that they were really stupid. As a result, they were afraid to express an opinion or answer any of her questions. Thus, some teachers saw nothing wrong with becoming temperamental with students. Khruu Ramphaa (Rung Pithaya school) was quoted as saying

> Today I'll try not to lose my temper with the students. What I'll do is to put questions to only the clever students in order that I can feel that the students understand what I teach. If I ask the stupid ones and they can't answer, I'll only become angry.

Another problem related to a lack of teaching psychology was the use of corporal punishment. In three schools, parents formally complained of excessive corporal punishment. After investigating the problem, one teacher was transferred and the other two were cleared of any wrongdoing. The end result was that other teachers became reluctant to administer corporal punishment. At Nong Bua, the headmaster was so intimidated that he ordered teachers not to punish students. This created considerable problems for teachers of grades 5 and 6, whose students were disobedient and mocked the helpless young female teachers.

In most cases, teachers disregarded students' different family backgrounds, personal problems, and potential. Students were treated as a uniform group and no particular attention was paid to either problem children or those who were more talented.

Students' responsibilities

Work was not assigned to students in a systematic manner. Sometimes, teachers assigned reading or writing and then left the classroom. Most teachers used assignments as a labour-saving device and were not interested in the benefit the student would gain from the exercise. Often, assignments were given but were not checked to see, in fact, if they had been completed by the students.

Lesson content

In the four schools studied, it was found that arithmetic and the Thai language tended to be overemphasized. It is suspected that this is the case in most primary schools in Thailand. Our observations indicated

that teachers in grades 1, 2, and 3 spent more hours than allocated by the curriculum on these two subjects as shown below:

Grade	Allocated time (%)	Actual teaching time (%)
1	50.0	80.0
2	50.0	70.0
3	35.0	60.0

The teachers' explanation for this emphasis at Sra Kaew school was that "many parents keep complaining that their children cannot compute or read and write. Thus, we have decided to teach only arithmetic and the Thai language." It was also found that in the higher primary classes, which were still conducted following the old curriculum, teachers placed greater emphasis on subjects such as arithmetic, science, and English. However, there was little or no evaluative measures or feedback to determine the students' level of understanding. Other subjects, such as "duties, morals, and ethics," were hardly touched upon or were completely omitted from grade 4 subject matter.

With respect to methodology, it was interesting to note that in teaching the Thai language, the greatest emphasis was placed on reading skills and often it was found that students could not spell. In arithmetic, teachers seemed to be more concerned with giving students the "answers" without teaching them how to solve the problem. Interestingly, Shaeffer's (1979) research on rural primary schools in Java used the volume of children's voices while reading aloud as one criterion for evaluating the scale of classroom liveliness. Our findings add another dimension to those of Shaeffer. The children in the four schools studied did make considerable noise while reading aloud. However, this was only of benefit to their oral reading skills. Many joined in the noise making along with the other students. Writing, on the other hand, was a more demanding and more productive skill, which few students had acquired. After a session of oral reading, students were unable to describe the main idea of what they had been reading as they were concerned mainly with pronunciation. Very little silent reading was assigned in the four schools studied to develop students' comprehension skills.

Teaching time

Long-term classroom observations revealed that teachers did not use all of the time allocated to teaching. The data presented in Table 32 indicate that teachers spent between 71 and 92% of their time teaching. Teachers often left classes unattended. On other occasions, teachers might be present, but they were occupied with activities other than teaching, such as writing reports, reading magazines, baby-sitting, or even napping.

The time at which the school day ended was another indicator of

teaching time. Officially, the school day ended at 15:30 for lower primary classes. With respect to the schools studied, Nong Bua dismissed children at 14:00, Rung Pithaya and Huay Haeng let children out at 14:30, and Sra Kaew allowed children to go out at 15:00. At Huay Haeng school, teachers sometimes asked students to do odd jobs for them during teaching hours, such as baby-sitting, fetching the teacher's lunch, or filling the water tanks at teachers' houses without any qualms about causing them to miss their lessons. Our research indicated that the early closing of schools led to a reduction in students' class time (see Table 33).

Teaching–learning assessment

Assessment is one means of controlling and monitoring educational quality. Therefore, it is essential that the objectives set by the curriculum be assessed. The traditional way of assessing students' learning achievement is to administer a test at the end of each term and an annual test for each subject at the end of the academic year. This was changed in 1977 when the Ministry of Education enforced a new evaluation method for the new curriculum whereby regular assessments would be carried out throughout the term so that teachers could identify students in need of remedial work (Kamol 1977). Final testing at the end of the academic year only applied to grades 2, 4, and 6 under the new system to enable some form of national standard quality control to be established.

This new procedure, in principle, meant automatic yearly promotion for students, even though some students might not have fulfilled all of the objectives set by the curriculum. In such instances, schools were to provide remedial lessons for children over the vacation period or at the beginning of the next term until they achieved each objective. In practice, it was found that this measure did little to help increase the quality of education in Thailand because of teachers' lack of training in testing and evaluation procedures, the increased work load placed upon teachers, the time required to correct homework or exercises, the automatic promotion system, the examination system, and classroom conditions.

Lack of training in testing and evaluation procedures

Modern testing methods are quite alien to the majority of Thailand's teachers, who rely heavily on suggestions presented at ministerial orientation sessions and on the guidelines provided, which were never adequate. Although orientation sessions usually lasted 3–5 days, testing and evaluation were discussed only briefly. Thus, teachers had to depend on curriculum guidelines, teachers' manuals, and lesson plans.

In the four schools studied, it was observed that evaluations were very limited. Our analysis of guidelines and teachers' manuals, the sole sources of information on this topic, was disappointing in that they all lacked the operational details that teachers required.

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Increasing teachers' work load

To evaluate each objective individually would be extremely time consuming. In grade 1, for instance, there are 170 learning objectives. Thus, it is unrealistic to expect teachers to do this job well in addition to their normal teaching responsibilities.

In practice, teachers assume that students have achieved the objectives without administering any test. Without the tests, remedial work is meaningless and futile because teachers have no way of knowing which objectives students have failed to achieve and what problems there may be. Teachers know only vaguely that certain students are clever and advanced and that others are weak and slow. This method of testing, therefore, is beyond the teacher's capability. It is also unrealistic from the point of view that teachers, under their current work load and concern over covering the lessons and all of the objectives contained therein, have little time for slow students as they would hold back the entire class.

Correcting homework or exercises

Most teachers tried to save time and work by writing the answers to assignments on the blackboard and having students correct each other's homework or exercises. Thus, the emphasis was placed on providing the answers rather than on determining why students made mistakes.

At Rung Pithaya school, some teachers never corrected any homework, making sure only that the correct number of assignments had been turned in. An examination of some students' notebooks revealed numerous mistakes within assignments but no sign of the teacher having seen them. Without checking students' homework and exercises, it is impossible for teachers to assess students' learning achievement.

Automatic promotions

Without adequate testing and evaluation exercises, it is impossible to determine whether curriculum objectives are being met. Similarly, without knowing where problems exist and which objectives are not being met, remedial work is of no value. Under these circumstances, therefore, automatic promotion at the end of the academic year, as proposed by the new curriculum, is inadvisable.

Examinations

At the time this research was being conducted, examinations still played a major role in grades 2, 4, 5, and 6. There were two major examinations, those held at the end of the term and those held at the end of the year. The examination process consisted of making up the test, the actual examination session, and marking the papers.

It was found that teachers never allowed themselves enough time to prepare tests properly. It was also found that students had difficulty understanding the questions asked. With respect to the papers, four

steps were followed to ensure that students passed: (1) giving more weight to students' preexamination performance, (2) giving extra marks when marking the final papers, (3) providing students with answers during the examination session, and (4) raising the final examination scores. All of these steps could be necessary depending upon how poor the student's performance was.

All four schools studied placed more emphasis on preexamination performance and gave extra marks when marking the final papers. This practice, in fact, was regarded as being quite normal and had the headmasters' sanction as student promotion was used as an indicator of the school's educational quality and teachers and headmasters all benefited in terms of promotions for their achievements. Most parents were unaware of this practice or considered it to be within the school's rights. They only complained when their children left school and could neither read nor write. Parents knew little about their children's achievement because report cards were never sent to them. Teachers excused themselves for not providing report cards claiming that they lacked the time to prepare them. In 1980, failure rates at Rung Pithaya, Nong Bua, Sra Kaew, and Huay Haeng schools were 0.7, 7.9, 16.0, and 10.0%, respectively.

Classroom conditions

Some classrooms were found to be unfit for learning: lighting was inadequate; during the rainy season, some were flooded; and many were situated by main roads, where the dust and noise were quite disturbing. Even though headmasters realized that such conditions interfered with the teaching–learning process, they could do nothing to improve them because of a lack of funds.

Conclusions

Factors related to the teaching–learning process that affected students' learning achievement were the lack of teachers' readiness and understanding of teaching methodologies, the subject matter, assessment procedures, and adverse classroom conditions. Also affecting the teaching–learning process were problems related to understanding the concepts behind the new curriculum and teaching aims. Teaching methodology consisted of the use of equipment, teaching techniques, the use of psychology, and assignments given to students. Learning assessment consisted of curriculum realization in the classroom, teachers' work load with respect to making up tests and marking homework and exercises, assessing the achievement of objectives, automatic promotions, and examinations.

Parents and students

Variables concerning parents and students are presented in Table 34. The most important factor affecting students' learning achievement according to a 1974 study on the efficiency of Thailand's primary schools

is parents' economic standing (Leonor 1982). The study indicated that in 1974, parents' economic standing accounted for one third of the total effects on primary school efficiency. A second study conducted on the same topic in 1981 found this variable to have an even greater effect. Here, we will confine our discussion of parents' economic standing to new findings only.

Parents' ability to obtain learning materials for their children

Students whose parents could not afford necessary learning materials, such as pencils and exercise books, were at a disadvantage. This also hindered their learning achievement. As shown in Table 34, expenditures per student varied greatly from school to school.

Parents' investment in education

A survey of educational expenditures per student in proportion to total family expenditures (Table 34) reflected the burden parents had to bear for their children's education. Such information prevents reaching any premature conclusion that primary education in Thailand, although it is compulsory, is a "free" service provided by the government.

Parents' attitude toward education

Most parents saw no value in higher education, neither did they see their children's future career being any different than their own. They expected their children to become farmers like themselves (Holmes 1973). Parents adopting this attitude tended to provide little moral or material support to the children. Other factors affecting the parents' attitude toward their children's education were the parents' level of education, the number of children in the family, and the general economic outlook in the local community.

Table 34. Students' expenitures and absenteeism in the four schools studied.

	Central region schools		Northeast region schools	
	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Educational expenditures per student in proportion to total family expenditures (%)	3.4	5.3	3.2	5.1
Average educational expenditure per student (THB)	630	600	243	197
Percentage of students absent from school (annual average)	10.2	8.3	NA	10.1

Parents' occupation

The parents' occupation was another variable reflecting the parents' economic standing. However, we considered this variable separately because it also had effects that were not related to economic standing. Nearly all of the parents of students attending the four schools studied were farmers who required extra labour at certain times during the year. The younger children provided this extra labour by carrying out household chores, which allowed their mothers to help on the farm. The older children could work on the farm themselves.

We observed that in central province schools, students missed several days of school to work at home, even when their families were quite well-off, because of a lack of hired labour and because the traditional "communal harvesting" practice was dying out. In the northeast, families were too poor to hire additional labourers so children had to miss school to help out at home. This may explain the large percentage of so-called "dropouts" after grade 4 as by that time children were "big" enough to help on the farm. Most parents who had only 4 years of education felt that their children should have acquired all the education they needed by the time they finished grade 4.

Parents' recreational patterns

Drinking and gambling were the favourite pastimes of parents in the four school communities studied. Upon arriving at Nong Bua school, researchers found a package of playing cards scattered on the road in front of the school. The people there referred to their gambling as "going to get the nonformal education." This unintentionally set an example for children, who considered gambling as part of their everyday life. Cases of children missing school to accompany their parents to gambling sessions "to help out" as well as cases of children missing classes to gamble among themselves were observed.

Parents' attitude toward corporal punishment and their children's behaviour

Many overly protective parents resented any form of punishment at school even when their children deserved it. They would either protect their children or blame other people for any mishaps caused by their children. When a student stole something from Sra Kaew school, for example, the parent told the teacher that "it was only children's pranks." Many parents went into a rage when their children were punished. One parent went to Nong Bua school demanding to know what gave the school the right to whip a child. At the same school, another parent filed a formal complaint against a teacher to the district educational office, which resulted in the school changing its punishment policy. At Huay Haeng school, Khruu Surachai was also accused of punishing his students excessively. Parents' interference, which removed the teacher's authority in an undisciplined classroom, did little to increase students' learning achievement.

Students' homework assignments

Many students had no time to do homework because of their obligations at home. Many neglected their homework because there was no one to supervise and urge them to do it. Others had the time and parental guidance but could not do their homework because the only time available was at night and their parents could not afford lighting fuel. As homework was assigned to reinforce concepts learned at school, its neglect resulted in failure to understand and retain the ideas behind the concepts.

Students' absence from school

As mentioned earlier, student absenteeism (Table 33) was often a result of parents' need for labour, parents' underestimation of the importance of receiving an education, or students' lack of motivation or hatred of school. An interesting case what that of "Timlord," a grade 3 student at Huay Haeng school, who was absent from school. When a researcher went to bring him back to school, Timlord was found watching a transistor repairer in front of a shop in the village. The reason he gave for his absence was that "this is more fun than lessons at school." Timlord's attitude may lead us to reconsider how attractive and receptive schools are to their students.

Conclusions

Parent–student factors affecting students' achievement consisted of students' academic background and their readiness for primary school, their attention at and attitude toward school, their responsibility with respect to doing homework assignments, and their absence from school. Parent factors affecting students' achievement consisted of their ability to afford to invest in education and to supply their children with essential learning materials, their attitude toward education and their children's future careers, their occupations, their recreational patterns, and their attitude toward corporal punishment and authoritarian control of children. There are additional factors that were not confirmed in this study, but are suspected of affecting students' achievement. Many students, for example, could not afford lunch at school and many were nearsighted but were not wearing glasses.

School and community

The school and community seemed to have more indirect than direct effects on the quality of education. Key variables are presented in Table 35.

Urbanization

The two schools in the central region were located within more urbanized communities than those in the northeast.

Table 35. Variables concerning the school and community.

	Central region schools		Northeast region schools	
	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Distance from the school to the district office (km)	19	17	8	4
Electricity supply	Yes	Yes	No	No
Bus service to the village	Yes	Yes	No	No
Use of modern farming technology	Yes	Yes	None	None
School location	Central	Central	Not central	Central
Participation from school educational committee	Yes	Little	None	Yes
Donations to school in 1980 (THB)	10 121	10 297	—	750

Public facilities

Table 35 indicates that electricity had been available in the villages within which Nong Bua and Rung Pithaya schools were located for some time, whereas it had only recently become available in the village within which Sra Kaew school is located. It was found that the availability of electricity did have an impact on students' learning. Although it opened up the outside world for students through television, it also caused students to neglect their homework as they preferred to watch television.

Another important facility was the availability of public transportation. In the central region, there was bus service to the two schools studied throughout the year, except during some days of the rainy season when the roads were in poor condition. This was not the case for the two schools in the northeastern part of Thailand. There, both teachers and students often had to walk to school or use a rather expensive private pick-up service. Teachers who had official business with district offices had to provide their own transportation. The distances between schools and district offices in the northeast were less than those between schools and district offices in the central region. Yet, teachers in the central region spent less time traveling to district offices. During periods of heavy rain, however, student absenteeism was greater in central region schools than in northeast region schools.

Industrial areas

Nong Bua and Rung Pithaya schools were closer to industrial areas that had a considerable demand for skilled labour. This provided an incentive for obtaining an education because factories only hired those people who had finished primary or secondary school. This persuaded parents, who had originally considered taking their children out of school after 4 years, to change their attitude toward further education for their children.

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Use of modern technology

In villages where there was widespread use of labour-saving machines for plowing and harvesting, child labour was less in demand. This was beneficial to children's schooling, as was found in the case of Nong Bua and Rung Pithaya schools where students attended classes regularly. It was also observed that under these circumstances, parents sent their children to school even before the normal entry age.

School location

Schools situated directly in the middle of a village seemed to have better relationships with their local community. Several cooperative activities were noted, for instance, between the community and Huay Haeng school, which was situated near the village chief's house. The school covered an extensive area and people used it as a bypass to secure water from the temple lake. The school was a focal point for gatherings to celebrate special occasions. This was not the case, however, with Sra Kaew school, which was located at the edge of the village. Students attending this school came from three villages nearby. In each case, people in the three villages wanted the school to be located in their particular village so that their children would not have to walk some 3 km to school. As a result, there was little cooperation on the part of the parents and the rate of students' absenteeism was high.

Community leaders

The Thai name for rural schools is "Prachabaan school," which means "under the people's patronage." The origin of this name reflects the schools' dependence on community leaders. If the leaders are active, cooperative, and give moral and material support to the school, this could bring prosperity as well as positive attitudes from the local community. In the village of Huay Haeng, for example, a wealthy village leader, who was related to the village chief, was a close friend of Khruu Praneet, headmaster of Huay Haeng school. This encouraged the community to establish good relations and to cooperate with the school.

It is premature, however, to conclude that good relationships between a school and the community per se can bring about high students' achievement. Despite good relationships between Huay Haeng school and the local community, for instance, students' achievement scores were the lowest of the four schools studied. In contrast, community relationships with Sra Kaew school were not as close and only a few teachers had close connections with people in the village. In spite of this, the students' achievement scores were higher than those of Huay Haeng school.

Educational committees

In 1975, the Ministry of Education established the educational committee, which was responsible for giving advice on a school's

management and operations. It was observed that the committee's role had become increasingly prominent. If functioning systematically, the committee could benefit a school considerably. The committee was usually made up of community leaders or those who actively participated in school activities. Thus, the committee had an important role to play, analogous to that of community leaders. The committee, in fact, was better balanced because it consisted of noncommunity leaders as well and, thus, could create the feeling that the school belonged to everyone in the community.

Rung Pithaya school's educational committee, for instance, had 18 members and a president, who was a former village headman. At committee meetings, there were usually two opinions on any topic discussed — that of Kamnan Mee, the president, and his followers, and that of those members who were not part of Kamnan Mee's clique. With this balanced view always present, decisions were made in the school's overall interest, which prevented any single-interest group from taking advantage of the school. The fact that the students of Rung Pithaya school obtained the highest achievement scores may, in part, be a reflection of the work of the educational committee as it monitored the management of the school, which could have had an indirect effect on the school's quality. The committee's role, however, was purely administrative and nonacademic.

Conflicts of interest

Although conflicts of interest, such as that mentioned above with respect to the educational committee, can help create efficient school management, other kinds of conflict can adversely affect a school, such as long-term internal conflicts among groups within the same community. The abbot at Nong Bua Temple, for instance, was in conflict with village community leaders who were also members of the educational committee. As a result, the school suffered from a lack of support from the local community. The school's development became stunted and it could not benefit from its committee's advice. In addition, the headmaster ordered his staff to refrain from administering corporal punishment to students for fear of offending the people. The conflict was continual and had a long-term adverse effect on the school.

School–community cooperation

Donations from the community

One indicator of school–community cooperation was the extent of donations made to the school. In areas where parents were poor, donations came in the form of free labour or services to the school. In more prosperous areas, people preferred giving cash donations. Table 34 shows clearly that schools in the central region received greater donations in terms of funds or free labour, than the schools in the northeast.

Participation in social activities

Occasionally, the school arranged activities in which the local community was invited to participate. These activities, for the most part, were held to establish closer ties between the school and the community. Examples of such activities included the Children's Fair on Children's Day or religious celebrations that were held at the school or at the temple where the school was located.

Community participation at these events ranged widely depending upon the relationship among the people, the school, and the community leaders. It was difficult to arrange activities of this sort at Nong Bua school, for instance, because of the continual internal conflict mentioned earlier. At Huay Haeng school, on the other hand, cooperation was much better because the school was centrally located and it received good support from community leaders.

Sense of belonging

When people were asked what they would do if they saw someone pulling down the school fence, they generally showed little sign of caring. When they were asked their opinion on moving their school to the next village, however, people were unanimous in their protest. Thus, our assumption was that this sense of belonging to and involvement with the school was rather artificial.

People felt that the school belonged to them only in the sense that it was symbolic of their village's significance and that to lose the school would damage their pride and belittle their importance. They did not care enough for the school, however, to become fully involved, physically and morally, with its activities. Yet, this sense of belonging and involvement is essential for a school to develop and progress.

Conclusions

Factors related to the school and community that affected the quality of education in rural schools consisted of urbanization, school location in relation to the village, the role of community leaders and members of the educational committee, and cooperation with and assistance to schools.

Urbanization involved public facilities (i.e., public transportation and the availability of electricity), proximity to industrial areas, and the use of modern technology in agriculture. The roles of community leaders and members of the educational committee frequently involved conflicts within the community. Cooperation with the school included donations to the school, participation in social activities, and the community's sense of belonging to and being involved with the school.

It was noticeable that only urbanization had a positive effect on students' achievement. All of the other variables (except donations) affected the quality of education in rural schools indirectly, and the effect may not have been positive. In fact, the impact of

school–community relationships was indirect and often had an adverse effect on students' learning achievement.

Students' learning achievement

All six factors mentioned hitherto affected students' achievement, which is the major indicator of the quality of rural schooling used in this study. In this section, the learning achievement scores of students in the four schools studied are compared using the year-end assessment of the schools and the researchers' assessment.

Students' achievement based on the schools' assessment

To determine students' achievement, the results of the schools' 1981 final examinations were used. In terms of students' failure rate, Rung Pithaya school was the lowest (0.7%), with only one student failing the examination and having to stay in the same class next year. The failure rates at Nong Bua, Huay Haeng, and Sra Kaew schools were 7.9, 10.0, and 12.1%, respectively. Comparing the failure rates may not be very meaningful, however, because the schools' tests were not standardized and because the teachers were aware of our study, which made them more conscious of their teaching and assessment, especially during the examination sessions.

There was some discrepancy between the results in 1981 and those in the previous year. In grades 4 and 6, in particular, there was a higher rate of failure in the year under study. It is possible that in the past, schools have been anxious to have all students in these two grades pass, but since coming under observation, schools have been administering tests more rigorously and have provided less assistance than normal to the students.

In comparing the failure ratio among the four schools, it was found that the ratio stayed proportionally the same as the year before, with slight differences at Huay Haeng and Sra Kaew schools. These proportional ratios may, in fact, be better indicators of the quality of education than the actual failure rate.

Researchers' assessment of students' learning achievement

To obtain a more reliable assessment of students' learning achievement researchers made an observational assessment and administered a standardized test.

Observational assessment

Assessments were made of students' work by examining their workbooks. It was found that students usually had the correct answers

in arithmetic even though the calculation process was frequently wrong. Upon checking further, it was found that many students did not know how they arrived at the answers. At Rung Pithaya school, a grade 3 student had borrowed an old exercise book from a former grade 3 student to copy all of the assignments for the teacher, without understanding what he was doing. Often, students could do arithmetic problems that did not have a descriptive part, which reflected their inability to read.

In their Thai class, students at Huay Haeng school wrote poorly. Their essays had no introduction, they were full of spelling mistakes, and their sentence structure did not make sense. Similar problems were found in all classes except grade 6. The same situation occurred at Sra Kaew school, where some grade 6 students could neither read nor write. At Rung Pithaya school, grade 6 students were much better in Thai. Their essays read quite well and had only a few spelling errors. Students attending Nong Bua school performed at a similar level as those attending Rung Pithaya school.

At Huay Haeng school, some students in grades 4, 5, and 6 used the same exercise book for every subject, which made our assessment difficult. Some students in grades 1, 2, and 3 keep no notebooks at all; hence, there was nothing to assess.

In terms of preferences, clever students preferred arithmetic as they felt that this subject made them think. At Nong Bua school, most students preferred arts (drawing and painting) and sculpture.

On the whole, students' achievement in the four schools varied from class to class, each of which was composed of students with mixed ability. Most classes had few excellent students and a large number of slightly lower than average students. One group of students in grade 6 performed poorly because they could neither read nor write at all. These students could only have reached grade 6 with their teachers' help.

Use of a standardized test

In general, students attending Rung Pithaya and Sra Kaew schools performed better than those attending Huay Haeng school when researchers administered a standardized test to grade 3 students. The test consisted of two subjects, namely a cognitive achievement test on arithmetic and the Thai language.

Out of a total score of 120 for the cognitive achievement test, grade 3 students at Rung Pithaya school obtained the highest scores (averaging 87.2), followed by students at Nong Bua (averaging 78.0), Sra Kaew (averaging 70.3), and Huay Haeng schools (averaging 65.5). The national average was 81.6. In terms of inequalities within schools, the best and lowest coefficient of variation occurred at Rung Pithaya school (27.8), followed by Sra Kaew (27.9), Huay Haeng (32.6), and Nong Bua schools (33.6). The national coefficient of variation was 34.4. Taken in pairs, the range of students' ability at Rung Pithaya school was narrower than that at Nong Bua school and the range at Sra Kaew school was narrower than that at Huay Haeng school. This means that

students at Rung Pithaya and Sra Kaew schools are more homogeneous than students at the other pair of schools. The fact that students' achievement scores in three of the four schools studied are lower than the national average (Rung Pithaya school being the exception) confirms the conclusion from earlier research that rural schools are usually less efficient (NEC 1977).

Students' ability to apply their knowledge

The ability to apply the knowledge they have obtained in school to their everyday life would be a direct indication of the quality and relevance of the schooling students have received. No noteworthy differences were observed, however, among students from the four schools studied with respect to applying the knowledge they acquired at school. It was noted, however, that some subjects were more useful than others.

The most useful subject was clearly the Thai language. Students used their knowledge of Thai to read newspapers, cartoons, and children's stories, which were available in their villages. They would also write down the words of popular songs that they heard on the radio (a popular activity among upper primary school students) and write to friends who lived in different provinces. Some students used their knowledge of arithmetic when they were sent to buy something. At Nong Bua school, however, children usually let the merchant do the calculations and just accepted the change given, which resulted in the following type of comment from parents: "Can't you do simple arithmetic? What have they been teaching you at school?" In general, students used their knowledge of arithmetic very little in terms of helping with their parents' business. It was not until children grew up and began farming on their own that they used their knowledge of arithmetic to determine (farm) rent costs and harvest selling prices.

Students revealed that they did make some use of other subjects, such as the introduction of fertilizer to and methods of watering their kitchen garden, dental hygiene, making fruit juice, and preserving food at home. Other acquired knowledge was not readily applicable, e.g., knowing that they should see a doctor when they became ill was of little value as there were no doctors within their geographic area. One only saw a doctor, therefore, for serious problems because of the long traveling distances involved.

No conscious efforts had been made to develop good attitudes and character. Yet, students exhibited positive attitudes toward farming as a career and indicated that they much preferred rural to urban life. It was not possible, however, to determine whether this attitude was developed in school or whether it was a result of their external environment. One change that was immediately apparent among students who had completed school was that they were more acquainted with middle-class social habits, e.g., they dressed more carefully, knew how to behave and were more polite, seemed to have more friends, and had developed the habit of using a toilet.

On the whole, students made little use of the knowledge they obtained from school. It appeared that the Thai language and character formation were the two subject areas that were the most beneficial to students.

Discussion and conclusions

In this study, the quality of education has been evaluated using students' learning achievement as a dependent variable and six other factors as independent variables. The six factors were the educational administrative system, the headmasters' competency, teachers' capability and commitment, the community, the parents and students, and the teaching–learning process and evaluation. All of these factors seemed to affect students' learning achievement.

The educational administrative system consisted of supervision and monitoring (specification of supervisory duties, its effectiveness, and a definite division of the job specifications among those offices concerned), budget allocations (in proportion to the amount and nature of activities prescribed by the syllabus and the school's use of its nongovernmental budget), teaching materials (delivery, correspondence between textbooks produced by private publishers and the teachers' manuals and lesson plans provided by the Ministry of Education, adequacy of teaching media on loan to needy students, and equality with respect to the distribution of subsidized materials to schools), and educational administration at the district and school cluster levels (district educational officers' role and criteria used to determine teachers' promotions).

The headmasters' competency consisted of variables related to administration (days of attendance at school, efficiency in teaching skills and supervising and monitoring school staff, and sense of responsibility with respect to job assignments and working principles), human relationships (nature of the relationships and criteria used to determine teachers' promotions), age, experience and qualifications, and duration of tenure as headmaster.

Teachers' capability and commitment consisted of personal characteristics (qualifications, teaching experience, age, gender, reason for job preference, and sense of responsibility), the teachers' burden and the nature of the work involved (job responsibility, teaching skill, time allocation, one teacher per classroom, and teachers working in the government bureaucratic system), morale (economic status and fringe benefits in terms of housing, distance from the school, and opportunity for further studies), and human relationships.

The community factor consisted of variables related to urbanization (public facilities, such as the availability of electricity, bus services, roads, and industrial areas, and the use of modern technology in farming), school location, the role of community leaders and the school council of education, conflicts within the community, and cooperation with the school (donations and free labour, participation in social

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activities, and a sense of belonging to and being involved with the school).

The parents and students factor consisted of the educational costs borne by parents (acquisition of learning materials for children and the investment in education), parents' attitude toward education and their children's future career, the parents' occupation, parents' patterns of recreational pastimes, parents' sense of security and family involvement, parents' attitude toward corporal punishment at school and the use of supervisory control over the children's behaviour, students' homework obligations, and students' absence from school.

The teaching–learning process and evaluation consisted of teachers' readiness and grasp of concepts underlying the curriculum, teaching methodology (use of teaching materials, teaching techniques, use of psychology, and homework assignments), syllabus content, time allocated to teaching, evaluation methods (test administration, teachers' burden in evaluation, homework and exercise correction, automatic promotion, and examination), and the physical environment of the classroom.

Figure 16 shows how these six factors affected the quality of education in the schools studied. The educational administrative system had a direct effect on the headmasters' competency, the teachers' capability and commitment, and the teaching–learning process and evaluation. It also had an indirect effect on the community factor. On the other hand, the headmasters' competency had a direct effect on the teachers' capability and commitment, on the teaching–learning process and evaluation, and on the community factor, whereas it had an indirect effect on the parents–students factor.

Thus, the most important factor appears to be the teaching–learning process and evaluation, which was the only factor that had a direct effect on students' learning achievement, whereas all of the other factors had indirect effects via this important factor.

The study design called for pairing schools based on the assumption that one school was of better quality than the other. Our findings revealed that for the two pairs studied, Rung Pithaya was a better school than Nong Bua and Sra Kaew was a better school than Huay Haeng as shown by their average students' achievement scores (Table 36). The coefficient of variation of the achievement scores also confirmed that students at Rung Pithaya and Sra Kaew schools were more homogeneous than students at Nong Bua and Huay Haeng schools.

Table 37 provides a summary of data on the key factors affecting school outcomes. It indicates clearly that both school and community variables have a strong impact.

Of the six factors already mentioned, the effects of the educational administrative system varied little among the four schools, except, perhaps, with respect to the nongovernmental budget and administration at the district and school cluster levels. The other five factors were more significant in showing differences between each pair
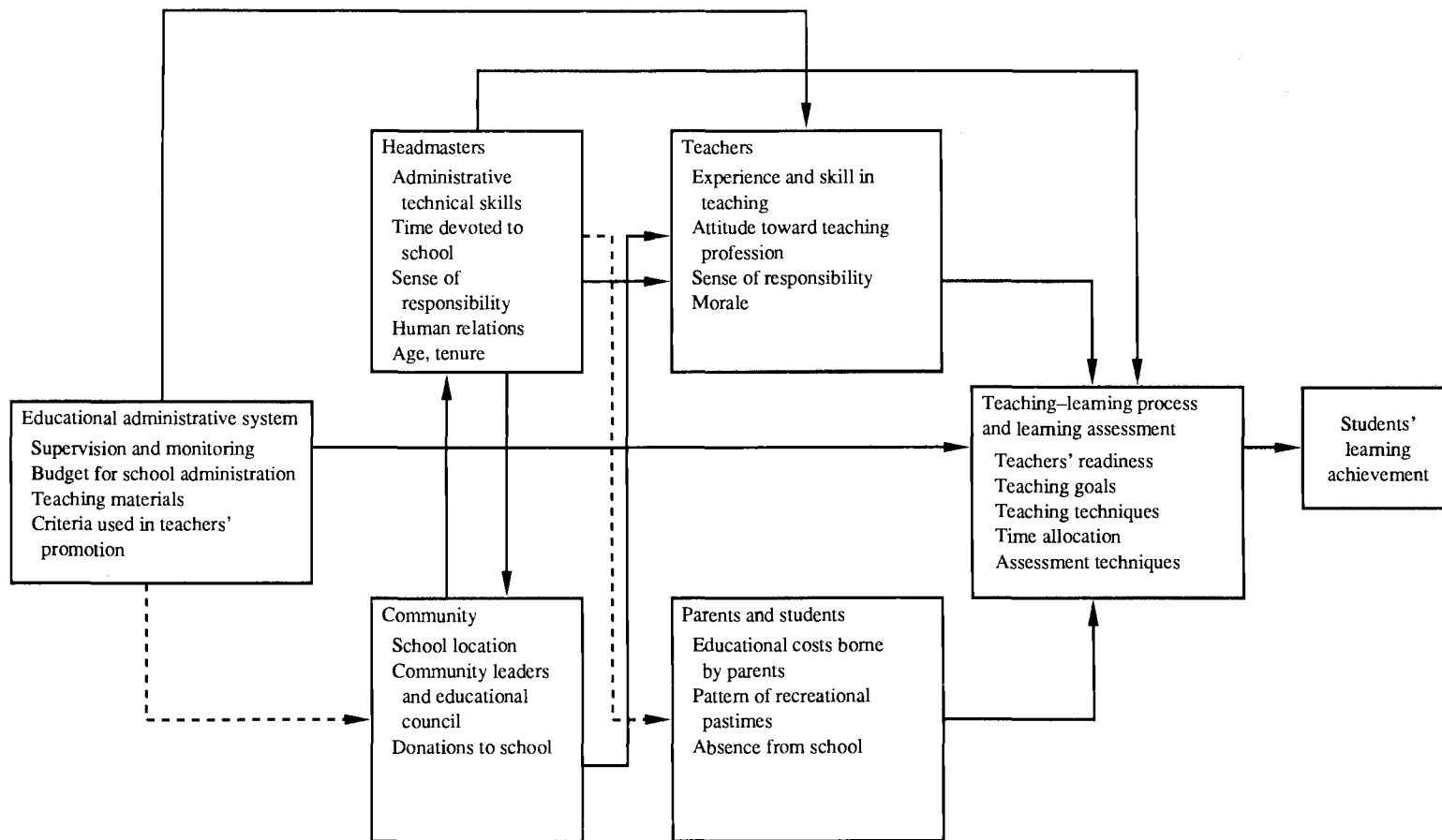
Fig. 16. Relationships among factors affecting students' learning achievement (dashed lines represent an indirect effect; solid lines, a direct effect).

Table 36. Comparison of factors affecting students' achievement scores
in the paired schools studied.

Factors	First pair		Second pair	
	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Educational administrative system (relations between school administrators and district educational administrators)		X		X
Headmasters	X		X	
Teachers		X	X	
Teaching–learning process and learning assessment	X		X^a	
Parents and students	X			X
School community	X			X

Note: X indicates the better quality school with respect to a given factor.
[a] Teaching–learning process only.

of schools, as well as revealing the decreasing quality of education from the best school (Rung Pithaya) to the worst (Huay Haeng).

With regard to the headmaster factor, both the former and present headmasters at Rung Pithaya school were enthusiastic, academically qualified, and possessed a great sense of responsibility. The headmaster of Nong Bua school was equally qualified, but was inert and had a poor relationship with the teachers and the community.

The age range of teachers at Rung Pithaya school was lower than the age range of the teachers at Nong Bua school and although they spent less time teaching, they possessed more teaching skills. On the other hand, teachers at Nong Bua school had more teaching experience and were more devoted, as reflected by their teaching time. Thus, the teacher factor at Nong Bua school was more positive than at Rung Pithaya school.

There was little difference in the teaching–learning process between the schools, but because the teachers at Nong Bua school were older, they tended to use old teaching methods, were not prepared for classes, and made no use of the teaching materials provided. In addition, their evaluation of students may not have been extensive. This may have accounted for its slightly inferior quality.

There was no difference between the two schools in terms of the parents–students factor. Although the economic standing of parents of Nong Bua school students was better, they also gambled and drank heavily, which may have reduced their interest in investing in their children's education. In this sociocultural respect, Rung Pithaya school was better.

Nong Bua village also suffered from community problems. Long-term

Table 37. Summary of data on school and community factors affecting achievement
outcomes in the four schools studied.

	Rung Pithaya	Nong Bua	Sra Kaew	Huay Haeng
Outcome measures				
Total cognitive scores (%)	54.5	48.2	43.9	40.9
Failure rate (%)	0.7	7.9	16.0	10.0
Key explanatory factors				
Geographic region	Central	Central	Northeast	Northeast
Number of supervisory visits	2	2	1	0
Nongovernmental budget per student (THB)	93.0	86.5	15.0	12.1
Headmaster's attendance rate at school (%)	83	80	45	42
Actual teaching time (%)	83.8	90.9	74.0	71.6
Ratio of teachers residing in community	0.63	0.50	0.50	0.43
Teachers' morale	Quite high	Quite high	Poor	Poor
Degree of teachers' sense of responsibility	High	High	Fair	Poor
Electricity available	Yes	Yes	No[a]	No
Bus service to the village	Yes	Yes	No	No
Use of modern farming technology	Yes	Yes	No	No
Key explanatory variables				
Teachers' readiness for class	Yes	No	Yes	No
Acquisition of needed materials by parents	Yes	No	Yes	No

[a]Became available in 1981.

conflict within the village affected the parents' factor, which, in turn,
affected the quality of education at Nong Bua school, the development of
which became paralyzed as a result of internal conflicts. The effect of
these factors on school quality was reflected by the higher achievement
score of the students from Rung Pithaya school.

In comparing the second pair, all six factors could help explain the
difference in quality between Sra Kaew and Huay Haeng schools. The
former headmaster at Sra Kaew school may have lacked in quality, but
he was devoted to the school, whereas the headmaster at Huay Haeng
school was detached almost to the point of deserting the school, taking
up another full-time job and leaving the school without a leader and
without guidance.

The teacher factor showed that younger teachers and those who were
single contributed to the quality of Sra Kaew school because they were
better prepared to devote themselves to the school and they were more
alert. Younger teachers were also more adaptable to changes and were
more open to improvements in teaching methodologies and using

teaching materials. Teachers at Huay Haeng school, in contrast, were less responsible, with one third of the teachers having taken up nonteaching jobs as well. Although they spent more time at school, part of this time was used to further their own interests. During this study, none of the teachers were away on study leave as this was not encouraged by the headmasters and teachers had no such aspirations in any case. The teachers at Huay Haeng school were quite well-off economically, but this did not encourage them to be any more devoted to their teaching careers.

With respect to the teaching–learning process, Sra Kaew school was slightly better off. Although there was essentially no difference in the parents–students factor between the two schools, good relationships between community leaders and the headmaster at Huay Haeng school helped create better parent–school relations. Huay Haeng school was also better off in terms of the community factor because it received good cooperation from community leaders. All of these factors may account for the higher students' achievement scores at Sra Kaew school.

The study design called for two pairs of rural schools that were comparable in size (small) and with respect to the number of students, and equal or similar in terms of budgets, personnel, and school equipment. The social context was also to be similar. The criteria were adopted to ensure that school quality would not be influenced by extraneous variables, but would result from internal differences characteristic of the schools. The Ministry of Education's "Standard Classification of Primary Schools" was used to select the schools and was used to estimate school quality in 1979. In the Ministry of Education assessment, Nong Bua school scored higher than Rung Pithaya school and Huay Haeng school scored higher than Sra Kaew school. Eight years later, however, our findings are the reverse of the Ministry of Education assessment, i.e., Rung Pithaya is a better school than Nong Bua and Sra Kaew is a better school than Huay Haeng. The following factors may explain this difference in quality several years later:

(1) The Ministry of Education used the number and type of buildings as one criteria in its assessment, and at the time Nong Bua and Huay Haeng schools had better facilities because they were older schools than their counterparts.

(2) The Ministry of Education survey took place at the time when Huay Haeng and Nong Bua schools were at the peak of their development, whereas Rung Pithaya and Sra Kaew schools were still in their infancy, with limited staff and teaching equipment.

(3) This present study was conducted in 1980 when Nong Bua school was 46 years old, Huay Haeng school was 43, Rung Pithaya school was 38, and Sra Kaew school was only 25. Thus, one may say that by then, Nong Bua and Huay Haeng schools had passed the zenith of their development, whereas Rung Pithaya and Sra Kaew schools were now realizing their potential.

This explanation deserves some consideration as it reveals the

dynamism and impermanence of school development. A long-term study of a school, its history, and all of the factors involved will show that a school, like an animate being, can grow, develop, flourish, and then deteriorate. That this change is part and parcel of all social events had been suggested. In the long term, this dynamism can affect the quality of a school and if educational administrators bear this in mind, they may be able to avert the foreboding deterioration of their schools. It can also help in planning ways to accelerate the development of a new school, which is a problem that all educational administrators face.

In this study of the two paired schools, six factors were taken into account, namely the administrative system, headmasters, teachers, the teaching–learning process and evaluation, parent–student relations, and school–community relations. With the exception of the administrative system, which was the superstructure for all of the schools, these factors characterized the schools.

Some of the variables under the administrative system, such as curriculum, supervision, and delivery of teaching materials, were services that all schools could benefit from equally and that would not result in differences in quality among the schools. However, the administrative system also included specific variables that were characteristic of the school, such as curriculum implementation, use of nongovernment funds, and appropriateness of the teaching materials supplied. In addition, the social context of the schools studied differed insofar as the first pair was situated in rural surroundings, whereas the second pair was situated in more urban surroundings with better economic conditions. The comparison was made within the pairs, however, and our findings have shown that the six factors had different effects on the schools in each pair. The variable nature of these effects was helpful in explaining differences in students' achievement scores in each pair of schools and the variation in the social context between the pairs helped explain the differences between them.

Many of the variables used in this study were phenomenological variables. The researchers' approach was a qualitative or humanistic approach in which the investigators stayed with the people being studied over a long period of time, building up a good rapport with them. These people included headmasters, teachers, parents, and students. Observations were made and interviews were conducted only after a good relationship had been established, which enabled us to obtain a better understanding of these phenomena as well as more reliable information. Cross-checking was also employed to ensure the reliability of the data obtained. We were quite certain that using participant observation could provide greater insights into school phenomena than other, more obtrusive measures (Supang 1981).

CHAPTER 11

RELEVANCE OF RURAL PRIMARY EDUCATION

Another important finding in this study was the quality of primary education expected by the people in the community. This finding is important because it indicates the expectations of the users of this basic educational service. Quality in education can also be judged from another perspective, the degree of relevancy or discrepancy between the services available and the expectations of the users of the services.

Community expectations

Most of the people in the four villages studied wanted their children to go to school. This was partly because the school, as an institution, had long been in existence and the people had accepted it as one of the basic rites of passage and because they could pass the care of their children onto the school. People did not object to their children attending school as long as the school made no financial demands upon the parents and as long as the children did not spend too many years in school.

The people indicated that the present system of 6 years of compulsory primary education was far too long. They expected the education system to last only 4 years because by the time children were 10 years old, they could serve as extra hands on the farm. This dissatisfaction resulted in a high dropout rate at the end of grade 4 on a national scale. On the other hand, parents wished that the school system would accept children before they were 6 years of age because this would relieve them of having to provide infant care, thereby allowing mothers to devote themselves more fully to their occupations. Another reason for this attitude was that children of this age group were too young to be of any help to parents in their work.

Most rural parents knew little about the school's curriculum. In fact, only a few community leaders with more than 4 years of education could give any opinion on this subject. Most parents did not even know what was being taught. The changes to the curriculum affected them only insofar as they were no longer able to help their children with their homework and that they now had the extra financial burden of purchasing new sets of textbooks.

Parents were unanimous in their desire for the school to teach their children arithmetic, manners, and some basic working skills as well as

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ensuring that they became literate. They objected to the teaching of farming on the grounds that the teachers were not qualified. Their idea of basic working skills included housework and some vocational skills. Parents' priorities for their children were reading and arithmetic skills, manners and moral teaching, and, finally, vocational skills. Their reasons were that a Thai must know how to read and write the Thai language, and that even though developing children's habits requires a joint effort on the part of the school and the parents, because children tend to listen to teachers more than they listen to their parents, this responsibility should be left predominantly with the school.

Other subject areas, such as the concepts of the nation, country, neighbouring countries, or energy, were beyond the parents' comprehension and were not of immediate relevance to them. Thus, parents' expectations of curricular content would only be sufficient if graduates remained in the same agricultural surroundings where there were no social or economic changes, which will not be the case with the coming generation.

Parents' expectations with respect to the teaching–learning process were in accordance with their expectations of the subject contents, i.e., teachers were expected to teach reading, writing, arithmetic, moral principles and habits, and some skills that would help lessen the parents' burden, such as housework and vocational skills. Teachers were also expected to be devoted, to have good human relationships with parents, to be responsible, and to have high moral standards. Parents expected the school to minimize financial burdens on them as they could barely afford the cost of school uniforms, supplies, and lunches. Thus, it was too much to expect parents to supply children with paint, materials to make dresses, or ingredients so that they could learn to cook. In the opinion of the parents, the school should not impose upon them in this way.

In terms of evaluation, parents had little idea of their children's learning achievement. All they cared about was whether their children passed or failed. That teachers helped children pass examinations was not their concern and the teachers, obviously, were not open about this practice. Parents never saw their children's school reports, thinking that this was the school's concern. They also felt, being poorly educated themselves, that they had no right to interfere. Parents only become interested in their children's achievement when it came to applying the knowledge they were supposed to have acquired at school. They wanted their children to be able to count the change when they were sent to buy something, to be able to read newspapers to them, and to be able to read the instructions on fertilizer bags.

Parents also expected children leaving school to be obedient, respectful, and religious and to have good moral standards. In addition to the expectations already mentioned, they wanted the children to help with the housework. On the whole, the providers and receivers of primary educational services have common goals, i.e., to become literate and to acquire arithmetic skills.

Moral teaching in school

Moral and religious teaching was provided in four ways: during orientation in the morning, during regular classroom teaching, by giving rewards or punishment, and by laying down rules that everyone was expected to follow.

Orientation in the morning was usually given by the headmaster or the teacher on duty. After the national flag had been flown, the students prayed. This was followed by a loyalty oath, which read "I swear to be good, to respect and uphold the nation, the religion and the King. I'll respect and obey my parents and teachers." No particular ministry dictated such a ceremony, which the provinces initiated. The school had been practicing it until it became an integral part of the flag-flying ceremony and was in itself a ritual for the students and teachers. The children did not understand what the swearing meant and even the teachers could not remember the actual words of the oath.

After this ceremony, the headmaster would conduct orientation for 3–5 min. The topic was left to the teacher's discretion. Often, it concerned manners, cleanliness, instructions for taking care of school property, or, if it was near examination time, suggestions to revise notebooks. Children were usually inattentive. None of the schools had loudspeakers and the teacher's voice was inaudible to the students who talked or played with one another. These orientations were not regular at the beginning of the academic year, but would become more frequent as the year progressed.

Under the old curriculum, moral and religious teaching was a separate subject. As such, citizens' rights and obligations, and moral and religious teaching were covered in lectures and memory played a large part in the evaluation process. Under the new curriculum, there were no separate textbooks for the subject, only teachers' manuals, as it was supposed to be integrated with three other subjects.This may have been a mistake because teachers who refused to use the manuals and lesson plans ran the risk of omitting the subject entirely from their teaching.

It is suspected that there was less moral and religious teaching under the new curriculum than under the old curriculum. In schools where this subject was taught, observations revealed that teachers tended to talk abstractly about the concept, providing no concrete examples. In some instances, examples were used, but were not very effective.

Moral teaching actually took place more often than indicated by the classroom time devoted to this topic. In fact, it took place continually while students were at schools. The lessons came in the form of punishment, however, rather than praise or rewards, i.e., students were punished or scolded whenever they made too much noise, teased one another, stole something, or neglected to do their homework. Thus, moral teaching was taught through the teachers' reactions to their students' behaviour and, thus, depended a great deal on the teachers' personal criteria.

Observing rules is another way of developing a moral code. This is what Dreeben (1968) called "the hidden curriculum." Certain rules were never uttered, but have been obeyed by generations of students, such as never speaking rudely to teachers. In the schools studied, these unwritten and unspoken rules were hidden inside and outside the classrooms. New students soon learned what they were allowed to do and what was forbidden. These habits, which were never taught but were always emphasized and were strictly observed, were obedience, diligence, and attentiveness to study, as well as good manners.

This method of teaching was much more effective than the loyalty oath repeated during the flag-flying ceremony. The purpose of the ceremony was to instill nationalism and good citizenship, but the method was superficial and naive. Upon reading essays about good citizenship to students, it was found that they had no idea what this really meant. For them, to be a good citizen was to become a soldier or a police officer. Their essays also revealed their social values in terms of future job preferences. Students seemed to prefer government jobs as they had learned that farming was hard work. There was no mention of self-employed careers in their essays. The existing curriculum and educational system may have contained a great deal of this hidden value. On closer evaluation, the hidden curriculum had more civic than religious teaching. It also reflected individual as opposed to group interests.

Primary education and parental expectations

Clearly, there was a discrepancy between the quality of education as outlined in the curriculum and that expected by the parents. This discrepancy was analyzed by looking at the following dimensions of educational quality:

- Curricular content and objectives are in accordance with the country's needs, which, in turn, are based on social needs.

- Curricular content and objectives are realistic.

- The curriculum has definite instructions and devices to meet its objectives, including monitoring to ensure that its implementation is appropriate.

- Graduates of the educational system have the desirable qualities specified in the objectives.

The results of the analysis are presented in Table 38.

The first dimension considered is the curriculum and educational system. This consists of the duration of compulsory education and the content of the curriculum. Table 38 shows the contrast between the 6 years required by the Ministry of Education, the researchers' findings that actual teaching time amounted only to about 5 years (see Table 33), and the parents' wishes for only 4 years of compulsory education and the addition of an extra year at the preschool level.

Table 38. Discrepancies between the expected and actual quality of rural schooling.

Dimension of quality	Expected quality (Ministry of Education)	Actual quality	Parent's expectations
Curriculum and educational system	Duration of compulsory education (6 years)	Actual teaching, 5 years	Four years only with one more year at the preschool level
	Emphasis on four blocks of experience: skill, life experience, habit formation, and work orientation	Four blocks but with different ratio of emphasis	Three blocks only: skills, habit formation, and work orientation
Teaching–learning and evaluation process	Ratio of contents: skills > habit formation > life experience > work orientation	Ratio of contents: skill > life experience > habit formation = work orientation	Ratio of contents: skill (reading, writing, and arithmetic) > moral and religious teaching (habit) > work orientation
	Teacher's quality: ability to comply with official and pedagogical rules	Ability to comply with official rules only	Teaching efficiency, human relationships, and good moral standards
	Students' learning through prescribed activities	Lectures with few activities, to reduce burden on teachers and parents	No extra financial burden related to students' activities
	Emphasis on student's cognitive and noncognitive learning achievement	Emphasis on final achievement scores	Emphasis on the application of acquired knowledge
Quality in educational output	Desired qualities: diligent, hard working, honest, economical, and self-disciplined	Obedient, diligent, attentive, and possessing good manners	Obedient, diligent, religious, and possessing good manners
	Good member of the community and the country	Good family member and good member of the community	Good family member
	Having achieved all the objectives of the curriculum	No expectations of all objectives being achieved	Levels and nature of achievement are vague and diverse

Although the curriculum consists of four blocks of experience, namely the skill block, life experience block, habit formation block, and work orientation block, coverage of the material at the four schools studied was not extensive. Parents, on the other hand, felt that only three blocks were necessary and did not see the importance of the life experience block as they thought that this was something children would acquire naturally outside the school as they matured.

The second dimension is the teaching–learning and evaluation process. This consists of the time allocated to various subjects, the quality of the teachers, and learning and evaluation.

The curriculum was designed so that the various blocks of experience would be taught in the following ratio: 35% for the skill block, 25% for the habit formation block, 20% for the life experience block, and 20% for the work orientation block. Schools, on the other hand, have placed different emphasis on the subjects, i.e., 70–80% for the skill block, some time for the life experience block, and little time for the habit formation and work orientation blocks. Parents also placed the most emphasis on the skill block and almost as much on the habit formation block, whereas they placed little importance on the work orientation block and none on the life experience block.

The most desirable quality of teachers as specified in the "Manual for Primary School Administrators" (Provincial Primary Education Office 1982) was the ability to comply with official regulations and pedagogical instructions. The findings of this study indicated that at both the supervisory unit level and the school level, emphasis was placed on teachers' ability to conform to official regulations. Parents, on the other hand, felt that teachers must first be good at their jobs and be devoted. They also felt that teachers should have good human relationships and high ethical standards. Thus, parents wanted teachers who were morally good and would set an example for students.

The curriculum demanded that teaching and learning were to be carried out through the use of activities, with little learning by rote (MOE 1978a). In the schools studied, examples of schools were found that had tried to arrange diverse learning activities as well as schools that had ignored this part of the curriculum because of the work involved in developing such activities. Parents were not interested in any activities that would impose a financial burden upon them and wanted the school to minimize such activities.

Discrepancies were also found in the evaluation process. Even though the curriculum prescribed evaluating its contents, which would have been useful to students' everyday life, teachers preferred to evaluate only the cognitive skills. Moreover, at the school level, the lack of readiness on the part of the teachers and the poor quality of teaching made it impossible to evaluate many aspects. Thus, the schools were only interested in passing all of the students at the end of the year. Parents were not concerned with evaluations either, but were more interested in students' ability to apply their knowledge in their daily life, i.e., to be able to read, write, and do simple arithmetic so they could

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help with crop sales or read instructions on fertilizer bags. For parents, learning achievement was measured in terms of students' ability to apply knowledge, not in terms of achievement scores.

The third dimension was the quality of primary school graduates. All parties concerned agreed that graduates should be able to read, write, and do simple arithmetic. There was disagreement, however, on the affective domain of learning achievement and on the nature of the desirable qualities in this area.

The curriculum prescribed that students should be hard working, honest, economical, and self-disciplined (MOE 1978a). Observations indicated that students were taught to be obedient, diligent, and attentive to their studies and to have good manners. Thus, there was some consistency between ministerial expectations and actual practice. Parents' expectations were similar to those of the school, with some slight differences, i.e., they expected their children to be obedient and diligent and to have good manners, and they also wanted their children to be religious and have strong moral beliefs. Diligence is the only common quality expected by the three parties in this case, but closer investigation indicates that a different aspect of diligence was emphasized by each party. The school expected diligence in learning only. Obedience and good manners were expected by both the school and the parents., but this was not an objective to which the primary education curriculum had given much emphasis. On the other hand, other qualities expected by the curriculum, such as diligence, honesty, thrift, and self-discipline, received little attention from the school or the parents. It was noticeable that only parents expected religion to be a desirable output of primary education.

Who should benefit from these desirable qualities was another area in which the three parties disagreed. Obviously, the students should benefit. But to what end? Those who developed the curriculum expected that these qualities should help make the student a good citizen and a good member of society. The school, however, expected only that students would be good family and community members. The parents' only desire was for students to be good family members. They did not consider the benefits accruing to the community or to the nation.

Although all parties agreed on the need for proficiency in cognitive skills, their criteria for assessing proficiency were different. According to the grade 6 curriculum, graduates were expected to be able to "read prose and poetry; write correspondence; participate in discussions and debates; give lectures; calculate areas of triangles, quadrangles, and circles; calculate sums involving fractions and decimal points; and work out percentages" (MOE 1978a). These criteria are definite and detailed. In reality, none of the schools studied expected students to be able to demonstrate competency in all of these areas. This is clearly reflected in their evaluation practices. Interviews with parents who had more than 4 years of education showed them to have vague and various criteria for assessing proficiency ranging from the ability to read newspapers to reciting and memorizing pieces from Thai literature or from working out

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simple arithmetic problems to calculating the interest on loans obtained from the Farmers and Cooperative Bank.

Conclusions

Comparing the expected quality of rural primary education with the actual quality revealed that discrepancies existed in syllabus and subject contents, the duration of compulsory education, the teaching–learning and evaluation process, and the quality of the output, i.e., the graduates. Some correspondence between the expectations of the schools and those of the Ministry of Education were also found. The schools tried to implement the curriculum, but they were not ready or equipped to do so. Also, there was no social pressure from the local community. A lack of regular and efficient supervision also weakened the schools' good intentions to reinforce the new curriculum. A wider gap was found between the quality of education expected by the community and that expected by the Ministry of Education. The people, for instance, confined their expectations of the quality of education to its practical usefulness. From these observations, it is apparent that one way of increasing the quality of education would be to reduce the discrepancies between the expected and actual quality.

CHAPTER 12

CONCLUSIONS AND RECOMMENDATIONS

This study was originally intended to present detailed, in-depth, empirical data that might help explain the lack of quality in education and might confirm or refute vague speculations on the quality of rural education held by educational administrators. The following is a short summary of our approach and findings:

(1) In this study, the quality of education was studied in terms of its causal factors and its output. The quality of education was classified by various dimensions, such as curriculum (objectives and content), the teaching–learning process and evaluation methods, and the quality of rural primary school graduates.

(2) The quality of primary schooling is normally viewed solely in terms of students' cognitive achievement. However, six factors were found in this study, namely the educational administrative system, headmasters, teachers, the teaching–learning process and evaluation methods, parents–students, and local communities, that contributed to a lack of quality in education resulting from numerous inefficiencies in these key dimensions of primary schooling.

(3) Because empirical data could only cover certain dimensions of education, researchers compared the expectations of all of the people involved in the educational process to see if there were any discrepancies among their expectations. Results showed some inconsistencies in the quality of education expected by the Ministry of Education, which designed the curriculum; the schools, which implemented the curriculum; and the parents of children receiving the education.

As the empirical data for this study were obtained from only four schools, it is not possible to make generalizations that would apply to all rural schools in Thailand. Thus, the following discussion applies only to the four schools studied. The researchers feel, however, that they may also apply to other rural schools and, therefore, that they might give future researchers concerned with the status of rural schools in Thailand something to think about.

Discussion

Among teachers, administrators, and community members, there appeared to be a consensus that teaching children to become literate is

one of primary schools' basic responsibilities. A question still facing educators, however, is whether it is really essential that one be literate to live in Thailand's rural society. Findings from earlier studies as well as from this study have indicated that many of Thailand's rural dwellers do not think there is any major economic benefit to be gained from being literate. It does not appear to have helped improve their economic conditions or their agricultural work. Schooling for them is just another rite of passage. Thus, when extra labour was needed on the family farm, parents discontinued their children's education, as indicated by the high dropout rate after grade 4, by which time most children are old enough that they can work as regular labourers on the farm.

It could also be argued that being literate is redundant with respect to their way of living as communication with the outside world could still be made via other media, such as transistors, television, movies, or other forms of folk media. Literacy or book learning had been nonexistent for a long time and even modern rural society found little use for it. Before definitive conclusions can be drawn, however, more research needs to be carried out (Varaporn 1982; Chou and Lau 1987).

The next aspect to be considered is the duration of compulsory education. This question can be answered by examining the actual time used to teach all of the curriculum content, the possible careers graduates will take, the age at which graduates are ready to take up their careers, and the physical, intellectual, and mental readiness of graduates for their careers.

An analysis of the 1978 primary education curriculum revealed that it contained so much subject matter that it was questionable whether 6 years of compulsory education would be sufficient. If educators do not wish to reduce the syllabus content, they should at least guide teachers with respect to what is vitally important and what is of less significance. However, this issue will not be discussed further here. Instead, we will compare the people's expectations with those of the state. Only time can tell which expectations are more feasible and more practical.

Two points need to be made regarding the duration of compulsory education. First, the idea of extending compulsory education to lower secondary education should be reconsidered as this would only widen the existing gap between the expectations of the people and those of the state. Second, the state should look into the possibility of complying with the people's request for preschool education, which they clearly want and need. In fact, there are strong arguments for choosing this second alternative as a way of increasing the number of years of compulsory education. Curle (1969) was of this opinion when he commented "If we jump from the discovery that education is a factor in development to the conclusion that it is an incontrovertibly good thing, and the more of it the better, we are making a dangerous error."

What benefits, therefore, other than literacy can a school give to children? Our findings showed that rural people were not interested in subjects dealing with life experiences as their world was confined to

their villages or those nearby. Any life experiences they needed to know about were derived directly from their own environment. Therefore, schooling in this area was not required.

Rural people, on the other hand, emphasized that the school should help form their children's habits and character. This aspect, therefore, deserves greater attention from curriculum designers. At present, character formation is taught through the hidden curriculum and it is the school that has created this subtle form of socialization. The school's values and prohibitions filter through to the children and form their subsequent character. There has been no planning nor discrimination in the implementation of the hidden curriculum and it would not be surprising to find that some of the values implanted by the school do not coincide with national educational policy.

In a rural society like Thailand, where economic status largely depends on farming, the people may not perceive a need for knowledge other than that which has been passed down through generations as the cultural heritage. Thus, rural people feel there is no need to learn anything apart from becoming literate (an urban value that is widespread and has now taken a firm root among rural people) and apart from character formation. They do not see the point of teaching any skills other than farming. In fact, it seems that economic change must occur first and then the educational system can prepare the people for such changes. Any attempt to teach students other skills will remain a thankless task until a greater variety of occupations exists in rural society. Thus, the Ministry of Education's selection of subject matter for the work orientation block should take into account the social and economic contexts of the rural society of Thailand.

It was observed that certain parts of the syllabus did not correspond with rural life in Thailand. This resulted from a lack of a local curriculum, which could serve as a link between the national curriculum and local needs and which would make education more meaningful to rural people. To remedy the situation, either the existing curriculum could be revised or the use of two curricula could be adopted, one for the urban society and the other for the rural society as has been suggested by Bennett (1978). Such an approach, however, might not coincide with national educational policy.

Analysis of the curriculum revealed another area where revisions were needed. Half of the teaching time is allocated to the skills block in the lower primary grades (grades 1 and 2), whereas the habit formation block is allocated only one quarter of the time. Both child psychologists and educators have confirmed that the most formative years are the early years of childhood. In addition, parents expect moral teaching from the school. It is unfortunate, therefore, that habit and character formation are not given more emphasis in the early part of schooling. Again, revisions to the curriculum are necessary.

An increase in the time allocated to teaching the habit and character formation block would also mean decreasing the time allocated to teaching the skills block, which would reduce cramming at the early

stage. It would also create a more positive attitude toward school among children who naturally prefer storytelling and taking part in practical activities to the work involved in learning to read and write.

The teaching–learning process and evaluation will not be discussed in detail here as it is self-evident that any improvement in the teaching–learning process and evaluation will enhance the quality of rural education. What is more important is the fact that, among the six factors that influence students' learning achievement, the teaching–learning process and evaluation has the most direct and the greatest effect on students' achievement. The teaching–learning process and evaluation, in turn, is influenced by other factors first. Therefore, they are intervening variables, whereas variables such as the educational administrative system, headmasters, teachers, parents–students, and the school–community are factors that indirectly explain students' achievement.

Empirical findings indicate that curriculum implementation and school monitoring link these six factors together. To improve the quality of education, therefore, it would be necessary to improve curriculum implementation and school monitoring first. (This is based on the assumption that the curriculum is suitable and corresponds to the country's needs.) Implementation here involves other factors, such as supplies and use of teaching equipment, in-service teacher-training programs, the teachers' understanding of the curriculum, and teachers' actual teaching time. Monitoring involves variables such as school supervision and checking on headmasters' and teachers' administrative or teaching operations.

Thus, the real key to improving the quality of education lies in curriculum implementation and school monitoring, and the target group should not be confined to teachers, but should include supervisors as well. In actual fact, supervisors should be the primary target as they are responsible for explaining the curriculum to teachers. It is also their job to give advice and to monitor the teachers. Curriculum developers and supervisors should have been working closely together from the start.

In a way, it is impossible to have genuine educational reform without appropriate changes in the educational infrastructure and the social structure. In Thailand, educational reform occurred in 1976 (NEC 1974). The new education system was proclaimed in 1977 and the new curriculum was implemented in 1978. Our data indicate that little preparation had been made with respect to the need to revise budget allocations, train personnel, and revise the previous administrative structure. The Office of the National Primary Education Commission (ONPEC) was not formed until after the implementation of the new curriculum. Thus, it is still too early to expect any substantial changes as a result of implementing the new curriculum as the educational structure is not yet ready. Regarding changes to the social structure, it could be argued that this is even more difficult to change, but we feel that changing the educational system without changing the larger economic, social, and political systems cannot achieve the results desired by educators. Children should not be taught professional skills if

there is no work for them once they leave school. We cannot train our children to be self-disciplined and open-minded in school if society has no regard for these concepts.

With regard to the quality of graduates, the question of what children get from going to school could be asked. The answer is that they play with friends. In grade 6 students' essays on their feelings on leaving school for good, most children mentioned that they felt sad to have to leave their friends. It is such relationships that are meaningful to children, whereas adults are more concerned with students' grades. It appears that we are more anxious to produce "clever individuals" than "good ones." Adults also differ in their idea of a good student. Adults within the Ministry of Education want students to be diligent, hard working, honest, thrifty, and self-disciplined. The adults who are their teachers want them to be obedient, diligent, and attentive in their school work. Parents want students to be obedient, diligent, moralistic, and religious. These qualities serve different functions and have different target groups. The discrepancies in expectations among the Ministry of Education, the schools, and the parents reveal a lack of common educational goals. The Ministry of Education's expectations are useful and essential to someone living in a socially and economically dynamic world and should be encouraged and fulfilled. If teachers lack these qualities, however, how can they be expected to instill them in their pupils? Thus, it is not enough to state desirable qualities in curriculum objectives. It is necessary to create a thorough and efficient design, taking into consideration every relevant factor and process. One of the first steps would be to educate teachers and parents about the Ministry of Education's concept of "good students."

Life in a rural society does not correspond with the Ministry of Education's expected quality of students. Therefore, achieving the curriculum's goal of giving students work experience depends largely on the teachers' ability to change the social environment and to impress upon rural parents that they need to be aware of what goes on outside of their little village if they hope to improve their standard of living.

Another point worth mentioning here is the role of education in rural development. Recently, rural schools have taken on additional roles, but we feel that schools should have only one role, i.e., human resource development. At present, headmasters are involved in village council work, teachers help with rural job promotion or nonformal education, and students help with village development activities. Although these activities have less priority, it has been observed that schools have trouble trying to do one job well.

In the past, educators have focused their attention on quantitative variables in education and now there is a trend toward looking at qualitative variables as well. It is our hope that this new interest will not confine itself to the materialistic quality of education at the expense of the humanistic quality, which should be the ultimate goal of education.

Conclusions

Methodological conclusions

Major differences between the two studies

Apart from the basic qualitative–quantitative distinction, these two studies differ in a number of important respects. First, the quantitative study is basically cross-sectional, looking at primary education in Thailand at a single point in time. In contrast, the qualitative study is more dynamic, evaluating primary schooling in Thailand over a period of 18 months. Second, the quantitative study focuses on the multiple outcomes of primary schooling, whereas in the qualitative study the emphasis is on the processes of primary schooling. Third, the quantitative study is based on a national representative probability sample covering all regions of the country. The qualitative study, however, is based on a small purposive sample in only two regions of the country. Thus, its generalizability is severely limited. Fourth, in the quantitative study, the unit of analysis is the school. In the qualitative study, on the other hand, there are multiple units of analysis as various phenomena are observed over time. Finally, methods of data collection for the quantitative study are necessarily much more obtrusive in nature.

Qualitative findings that help explain quantitative results

In the quantitative study, it was found that teachers' qualifications had little relationship with students' achievement. Obviously, teachers' qualifications are a poor substitute for teaching ability. From the qualitative study, it is clear that the quality of teaching is of fundamental importance and that it is not necessarily related to prior educational credentials. Some individuals have a gift for teaching and demonstrate impressive commitment and responsibility to their profession. Why some individuals exhibit such characteristics appears to be largely unexplainable, although our qualitative study indicates that a key factor is whether an individual explicitly sought teaching as a career. Our qualitative study also indicated that many teachers chose their profession solely because it provided an avenue for obtaining a postsecondary degree or diploma (Fry 1981).

In several of the quantitative models, the number of years as headmaster was found to have a positive effect on educational outcomes. Yet, the qualitative study indicated that older headmasters often suffered from "burn-out" and tended to be both inert and dictatorial. These results suggest that headmasters' experience is not a simple linear variable. It may be that experience is positive up to a certain point (e.g., 10–15 years), after which it becomes a negative factor. Thus, this variable should be treated as a spline variable (Jencks 1979).

Although the northeast generally has poorer schooling than the rest of Thailand (NEC 1977; Kamol et al. 1978), our quantitative study indicated that schools in this region were the most efficient in terms of

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low educational wastage. This anomaly is clearly explained by our qualitative study. A number of headmasters had students automatically promoted, regardless of their actual achievement. Such actions made their efficiency appear to be high, but the quality of the students is another matter entirely. Also, economic opportunities in the northeast are more limited; thus, the opportunity cost of primary schooling is less in this region.

Qualitative findings that add to quantitative results

In three of the four quantitative models tested, the error variance was greater than 63%. This implies that there were many variables not being taken into consideration by these models. The qualitative study complemented the quantitative study greatly by illuminating other less tangible variables that contributed to error variance in the quantitative models.

An example of such variables is the anomie found in the qualitative field studies. The existence of significant anomie in certain small remote rural schools adversely affects school quality. Another critically important variable is the extent to which the new curriculum is actually being implemented. This significant process variable is ignored in our quantitative models. "Time on task" is an important schooling variable emphasized in Cummings' (1980) qualitative study on equality in Japanese education. Our qualitative study provided much information related to "time on task" in primary schools in Thailand, which was alarmingly less than expected. Even if there were no gap between actual teaching time and that specified in governmental regulations, Thai students would still receive much less teaching time than their counterparts in other Asian countries, such as Japan and Korea. The qualitative study also revealed that supervision and monitoring of educational performance was inadequate. And when it was undertaken, only routine and clerical work was supervised, whereas technical work was overlooked.

Other benefits of the complementary qualitative study

our qualitative study helped us understand that primary schools in thailand cannot be viewed in isolation from the surrounding economic, social, cultural, and bureaucratic contexts that condition life and work in rural areas of thailand. A clear example is the economic hardship of teachers who are expected to pay many "social taxes" because of the prestige of their position in rural areas. The potential physical danger to young females living alone in remote areas explained why they sometimes refused to live in teachers' housing or sought transfers to more urbanized areas. Also, in-depth knowledge of the bureaucratic structure and its reward system explained teachers' behaviour and commitment to nonteaching activities.

The qualitative study also facilitated our understanding of the limitations of some of the data collected in our quantitative study. It is clear that a number of quantitative variables, such as teachers' and headmasters' qualifications and educational wastage, are poor

substitutes for more fundamental phenomena illuminated during our qualitative study.

Our qualitative study also represented participatory research in that a serious attempt was made to listen to the voices of villagers and to understand their views and concepts of the role of primary schooling. This was the most ethnographic dimension of our study.

Merging quantitative and qualitative methods

The trite expression "the whole is greater than the sum of its parts" (a nonlinear relationship) appears to apply to the results of having used qualitative and quantitative approaches in tandem. Conducted alone, each of these two studies would have left serious gaps in our understanding of primary school efficiency and quality in Thailand. Combined, however, they provide an in-depth and comprehensive analytical description of primary schooling in Thailand, which should be useful to educational policymakers and decision-makers. The inclusion of the qualitative study also enhances our critical consciousness concerning primary schooling in Thailand. This research dimension is currently being emphasized by prominent European social scientists such as Habermas (1973). In our quantitative study, which involved testing various statistical models, the critical dimension is somewhat lacking. We tended to "let the figures speak for themselves." The integration of the two approaches in this case contributed to our study having both a strong analytical–empirical dimension as well as a critical dimension. In this sense, the study was responsive to both the logical–positivist research paradigm and the currently fashionable normative orientations.

Substantive conclusions

Difference in substantive focus

Each of these two studies differed in focus. The quantitative study focused on the efficiency of primary schooling, whereas the qualitative study's major concern was the quality of rural schooling. The latter study was also narrower in focus in considering only rural schooling, whereas the former study included all types of primary schools. A fascinating question relates to the extent to which efficiency and quality are correlated. A priori it would seem that efficiency as broadly defined in the first study is a necessary, although not sufficient, condition for quality. Low educational wastage, good school–community relations, and open access do not necessarily ensure quality schooling.

Changes in educational efficiency and quality, 1973–1980

In 1973, the National Education Commission assessed in a national representative sample (n = 25 555 grade 3 students) cognitive achievement in both arithmetic and the Thai language. In 1980, the same test was administered to another national probability sample of grade 3 students (n = 11 442) (NEC 1981). The samples are comparable,

the only major difference being that the 1973 students had the advantage of having had a pretest 7 months earlier. This could have contributed to having somewhat higher scores than without a pretest. Also, these were two totally different groups of students, possibly with different life-styles and educational experiences. Nevertheless, this empirical comparison provided an unusual opportunity to assess changes in the efficiency and quality of primary schooling over time. The results of this comparison are presented in Table 39.

The data indicate dramatic improvements in cognitive achievement and a reduced level of disparities (a decrease in the coefficient of variation of 26%). Table 40 also indicates significant reductions in regional disparities. In 1973, Bangkok students had scores that were roughly double those of students from the poorer northeast. In 1980, Bangkok students were still superior, but their scores were only about 30% higher than their northeastern counterparts (Fig. 17). Students in the central, southern, and northern regions made impressive gains in reducing the gap between them and their counterparts in Bangkok. It is also impressive that the coefficient of variation, an important indicator of inequality, was lower in 1980 within all regions of Thailand (Fig. 17). These results should be particularly gratifying to the many individuals who devoted themselves during the past decade to improving the quality and equity of education in Thailand (Ekavidya 1973; NEC 1976; Fy and Rung 1982).

Given that this comparison involved two entirely different groups of students, it is impossible to state definitely the reasons for such impressive educational improvements. The period from 1973 to 1980 was one of considerable change within Thai society, including the "student revolution" of 1973 and the educational reform work of 1974–1976. During this period, communication systems spread rapidly throughout Thailand. In 1979, 79% of households in Thailand had radios and 17% had television receivers (NSO 1982). Thus, it seems reasonable that a combination of schooling and increased

Table 39. Distribution of grade 3 students' cognitive achievement scores in 1973 and 1980.

	1973	1980
Average	55.32	81.64
	(34.58)	(51.03)
Standard deviation	25.57	28.05
Coefficient of variation	46.22	34.36
Skewness	0.85	0.05
Number of students	23 555	11 442
Adjusted mean	50.95	77.04
	(31.84)	(48.15)
Index number	100	151
Increased average	26.09	
	(16.31)	
Annual rate of increase	6.08	

Note: Figures in parentheses are averages in percent.

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Table 40. Changes in students' cognitive achievement scores by geographic region.

Geographic region	1973 cognitive achievement			1980 cognitive achievement			Change	
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}^a$	CV^b
Bangkok	83.74 (52.34)[c]	27.51	32.85	96.52 (60.33)	27.04	28.01	12.78 (7.99)	4.84
Central	55.74 (34.84)	22.59	40.53	88.73 (55.46)	24.13	27.19	32.99 (20.62)	13.34
Northern	50.42 (31.51)	19.66	38.99	76.53 (47.83)	25.19	32.92	26.11 (16.32)	6.07
Northeastern	42.60 (26.63)	18.60	43.66	66.55 (41.59)	26.93	40.47	23.95 (14.97)	3.19
Southern	55.14 (34.46)	21.32	38.67	80.68 (50.43)	24.21	30.01	25.54 (15.96)	8.66
Total	50.95 (31.84)			77.04 (48.15)				
Gini index		0.12			0.07			
Rank correlation (ρ)			1.00					

[a] Increased change.
[b] Decreased change.
[c] Figures in parentheses are averages in percent.

communication factors contributed to the impressive gains in cognitive achievement in Thailand during the 1973–1980 period.

Despite these gains in cognitive achievement, it should be noted that absolute scores for many students remained far below ideal expectations. In the 1973 test, for example, the average of correctly answered items was only 31.8%. In 1980, the average score increased to 48.2%, but was still below 50%. These quantitative findings are completely consistent with educational phenomena observed in our qualitative study, particularly the relatively low teaching time and poor teacher morale.

Consistent major findings in the two studies

As determined in earlier studies (NEC 1977), these two studies also revealed the powerful influence of socioeconomic status on educational outcomes. In the quantitative model of students' achievement, socioeconomic status is clearly the variable with the most explanatory power, followed by geographic region, which primarily reflects regional socioeconomic differences. The qualitative study indicated that the two schools in the poorer northeastern region had the lowest achievement scores and the most serious problems related to quality. This finding confirms the importance of general improvements in community development and welfare as a means to improve educational quality. Without general economic improvements, educational changes and reforms may have relatively little impact. The qualitative study also revealed that although primary education is free, parents still had to purchase some learning materials and uniforms for their children. Also, when the need arose for additional farm labour, economic conditions
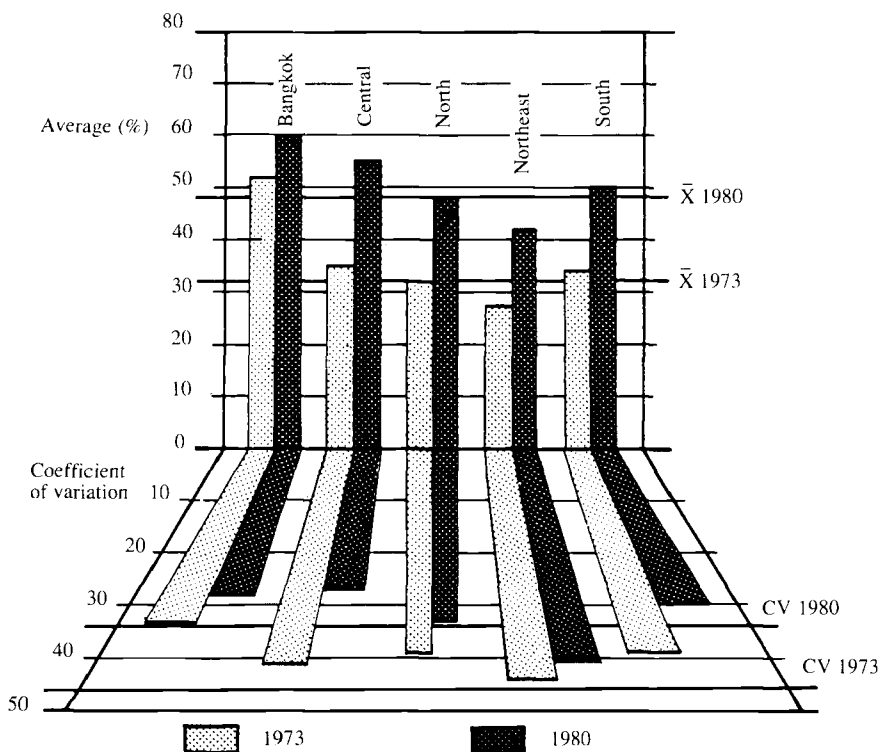
Fig. 17. Students' cognitive achievement scores in 1973 and 1980
by geographic region.

became a powerful determinant of students' achievement. It was found
that the poorer northeastern region, despite having the largest
population of Thailand's five major regions, continued to lag behind the
rest of the country in terms of the quality of education available.

Both studies indicated the importance of school size as a factor
affecting primary school efficiency and quality. Thailand has many
small remote schools that lack adequate economies of scale. Even when
controlling for socioeconomic status, students from larger schools
performed better. In larger schools, it is more feasible to have various
supplementary learning materials and equipment. Also, in large schools
with many teachers, the absence of one or two teachers has much less of
an impact than in a small school with only three or four teachers.

Both studies also revealed the significance of learning materials and
educational equipment. The most efficient schools identified in our
quantitative study all had vastly superior supplementary learning
resources. Similarly, the qualitative study showed that the lack of
adequate learning materials had an adverse effect on the
implementation of the new curriculum and the introduction of
innovative teaching methods.

Several years ago, a prominent Indonesian educator visited rural
primary schools in remote areas of Thailand's northeast. He was

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surprised to find the impressive construction of rural schools in or near almost all villages. He found the physical quality of the schools to be excellent, but he was dismayed by the lack of learning materials within the schools. He compared these remote rural schools lacking in learning materials to hospitals lacking instruments and equipment. Although his analogy may exaggerate the nature of the problem, nevertheless the problem persists and adversely affects primary school efficiency and quality.

In both studies, it was found that teachers living within the communities generally had a positive effect on school processes and outcomes. Teachers that lived in he community had more opportunities to interact informally with students after school because they did not have to rush to catch transportation to their homes. By living in the same community, they also became aware of family problems that might be affecting students' performances.

Despite the emphasis on obtaining a degree, neither study indicated that educational credentials significantly affected school outcomes. Of much greater importance were personality traits and commitments to the teaching profession.

Substantive findings from the qualitative study that complement the quantitative study

In three of the four quantitative models tested, the unexplained error variance was 63% or higher. This implies that there were important variables affecting school efficiency that could not be ascertained by our quantitative variables as defined.

The qualitative study suggested the existence of a number of variables that could have considerable substantive importance, but that were difficult to measure quantitatively. Anomie and burn-out, for example, which affected older teachers and principals in particular, appeared to be an important factor influencing school quality and efficiency. This anomie may be partially explained by the nature of the teaching profession in Thailand, which attracts numerous individuals primarily because teachers' colleges provide an avenue to higher education. The "boredom" and hardships of life in remote rural areas also contribute to the "anomie." Teacher-training institutions did not appear to have prepared individuals adequately for the difficult and challenging situations faced by rural school teachers.

Levy (1966) made an important distinction between ideal and actual behaviour. Our qualitative study showed that implementation of major curriculum reform is difficult to accomplish. Qualitative variables indicating the actual degree of implementation are essential to any comprehensive assessment of educational innovations. The existence of some learning materials that have little or no perceived relevance to the local community has also adversely affected curriculum implementation.

Our qualitative study revealed many of the complexities associated with the administration of a highly centralized primary school system in the process of becoming decentralized. Changes in administrative

systems can lead to delays in the delivery of educational materials, such as new teachers' manuals. Such short-term problems are to be expected in an educational system undergoing major reforms.

The elimination of standardized national end-of-year examinations certainly contributed to decentralization, but may have had adverse effects on quality. The increase in learning achievement between 1973 and 1980 might have been even greater if national examinations had been retained. The results of our qualitative study suggest that the lack of rigorous standardized testing led to a decrease in quality. Thus, the qualitative study revealed the complex tensions between centralization and decentralization and their rather uncertain and ambiguous effects on school quality.

The qualitative study indicated that gaps between rewards and responsibilities among rural school teachers were a serious problem. The net income of teachers (after numerous "social taxes") appeared to be rather low relative to the demands and hardships of the job. This is particularly true for teachers serving in remote rural areas.

The leadership role of the principal also appeared to be a critically important variable. Primarily, the principal establishes the school's learning and working environment. Without committed and inspired leadership, teachers quickly loose their enthusiasm and morale.

Another important variable derived from the qualitative study was the differing perceptions of the role of schooling among rural dwellers, teachers, and the government. The aspirations of rural dwellers were much more basic and limited than those of the government, focusing mainly on a desire to become literate and to be able to do simple arithmetic calculations.

In our quantitative models, nonschool factors, such as socioeconomic status, were found to have the most important effects. Our qualitative study suggested, however, that many less tangible factors were of fundamental importance even though they were difficult to measure quantitatively.

Policy implications

These two studies have a number of important policy implications. It should be noted, however, that a number of variables highlighted in our qualitative study are not easily manipulated by public policy. The leadership of principals and the professional commitment and charisma of excellent teachers are cases in point.

The first policy implication relates to our findings concerning the student–teacher ratio and the lack of learning materials and equipment. Our quantitative models indicated that student–teacher ratios could be allowed to drift upward with no adverse effects on students' achievement. Given that teachers' salaries constitute such a large portion of the primary school budget, such a policy could lead to considerable financial savings that could be used to increase the amount of learning materials and equipment in remote schools. It was estimated

that an increase in the student–teacher ratio from 20:1 to 24:1 could save the government THB 2.96 billion, equivalent to 19.5% of the primary education budget for 1981.

The second policy suggestion relates to the reward structure of primary schools. To attract quality individuals to a profession requires an appropriate reward system. Also, rewards must be related to performance. Otherwise, as suggested by our qualitative study, morale and professional commitment suffer. If the student–teacher ratio was allowed to increase, some of the resulting financial savings could be utilized to improve the salaries of rural primary school teachers, particularly those teaching in remote areas.

A third policy implication relates to the bureaucratic structure of primary education in Thailand. Saneh (1983) has carefully documented the traditional overcentralized nature of Thailand's Ministry of Education. In 1980, the structure of the administration of rural primary schools changed dramatically. The Office of the National Primary Education Commission (ONPEC) was created within the Ministry of Education to take responsibility for rural schooling, which was previously controlled by the Ministry of Interior. This change was too recent to be reflected in the results of our study. Our 1980, national testing of primary students will provide excellent baseline data as this is the year of the change in the educational structure. ONPEC is now undertaking a number of reforms oriented toward solving the type of administrative problems highlighted by our qualitative study.

A fourth policy suggestion relates to "time on task." Ways must be found to increase the "time on task" of Thai students in rural primary schools. Otherwise, the educational gap between Thailand and other Asian countries, such as Japan an Korea, will continue to widen. Improving "time on task" is also directly related to the reward structure, which must be modified to encourage greater teaching and learning time.

Another important policy implication relates to preschool education, which is currently supported by the private sector for the most part and is found mainly in the more urbanized areas of Thailand (Nittaya 1979). We found that preschool experience strongly influenced later learning outcomes. Because preschool education is available mainly to children with better socioeconomic backgrounds (Fry 1983), this is a major source of inequality. Thailand's dramatic success in reducing fertility will reduce financial pressures related to expanding primary schooling. Thus, there may be potential budgetary funds available to support preschool education in remote rural areas. Such a policy would help to eliminate a major source of educational inequality in Thailand. In addition, preschool education could absorb some of the excess of graduates from teachers' colleges.

A final policy implication relates to school size and educational economies of scale. ONPEC's favourable attitude toward school consolidation should be encouraged. A number of provinces are now experimenting with bicycle projects to solve transportation problems

associated with school consolidation and costly new construction. Based on our findings, such consolidation could contribute significantly to improvements in school efficiency and quality. Small rural primary schools that would no longer be needed could be converted to preschools with minimal additional costs to the government.

Although the policy changes suggested here should lead to significant improvements in the efficiency and quality of rural primary schooling in Thailand, educational changes per se are not enough. Given the powerful influence of socioeconomic factors on educational outcomes, it is vitally important that economic and educational changes occur in tandem. In this sense, the government's program to place the highest priority on channeling rural development funds to the poorest geographic areas is most commendable.

Thailand's economic and political future will be largely dependent upon the quality of its population. It is our hope that the policy changes suggested here will contribute significantly to strengthening Thailand's most basic resource, its rural population.

PART III

APPENDICES

1. RESEARCH VARIABLES

Variable	Code	Unit of measurement
General data		
School district	C2	Amphoe Muang = 1
		Others = 2
Geographic region	C5	Bangkok = 1
		Central = 2
		Northern = 3
		Northeastern = 4
		Southern = 5
School data		
Type of school	C6	MOE = 1
		PRV = 2 (private)
		CAO = 3 (provincial)
		Municipal = 4
		Bangkok = 5
Area	C8	waa^2 (0.0004 ha)
Number of classrooms, 1980	C9[a]	Number
Enrollment, 1980	C10	Number
Landowner	C11	4 types
Disturbances in surrounding area	C14	1,0
Number of buildings	C15	Number
Average classroom area	C17	m^2
Buildings' structure	C19	Scale of 1–5
Buildings' condition	C20	Scale of 1–5
Classrooms' condition	C12	Scale of 1–5
Number of teachers, 1979	C155	Number
Income, 1979	C171	THB
Expenditures, 1979	C178	THB
Headmaster's years of government service	C182	Number of years
Headmaster's experience	C183[a]	Number of years
Headmaster's qualifications	C184	Scale of 1–6
Headmaster's responsibility	C185	Scale of 1–5
Headmaster's job satisfaction	C186	Scale of 1–3
Proportion of headmasters living in community	C187	Proportion
Number of teachers residing in community	C188[a]	Number
Percentage of primary school graduates who go on to secondary school	C191	Percentage
Percentage of students in grade 6 who graduate	C192[a]	Percentage
Proportion of schools receiving hardship allowance	C194	1,0
Distance from village to school	C195	km
Distance from school to main road	C196	km
Distance from school to highway	C197	km
Distance from school to district office	C198[a]	km
Distance from school to province	C199	km

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Variable	Code	Unit of measurement
Days of using postal services	C200	Number of days
Means of transportation to school (students)	C209[a]	Number
Time spent traveling to school (students)	C210	Minutes
Correspondence of curriculum and activities	C251	1,0
Community cooperation with school's extracurricular activities	C252[a]	1,0
Amount of school–community cooperation	C259[a]	Scale of 1–4
Wastage ratio	C350[b]	Number
Student–classroom ratio, 1980	C351[a]	Number
Availability of facilities and teaching materials	C353[a]	1,0
Enrollment, 1979	C360	Number
Student–teacher ratio, 1979	C361[a]	Number
Expenditures per student, 1979	C362[a]	THB

Student data

Variable	Code	Unit of measurement
Age	DD4[a]	Years
Preschool education	DD8[a]	1,0
Repetition (not repeating)	DD10[a]	1,0
Existence of a living father	DD12[a]	1,0
Father's profession (agriculture)	DD20	1,0
Mother's profession (agriculture)	DD22	1,0
Parents' cohabitation	DD24	1,0
Number of people in household	DD28	Number
Regularity of having pocket money for school	DD30[a] (SES)	Scale of 1–3
Students doing homework	DD32	1,0
Students' assistance with homework	DD34	1,0
Close friends	DD36	Number
Regularity of preschool breakfast	DD38	Scale of 1–3
Regularity of having lunch	DD40[a]	Scale of 1–3
Days of absence	DD42[a]	Number
Number of school uniforms	DD44	Number
Availability of facilities at home	DD46	Total of 21 items
Noncognitive achievement: habits	DD50	Score (7)
Noncognitive achievement: pastimes	DD52	Score (1)
Noncognitive achievement: self-study	DD54	Score (5)
Noncognitive achievement: problem solving	DD56	Score (8)
Noncognitive achievement: value and attitude toward career	DD58	Score (6)
Noncognitive achievement: value and attitude toward self and others	DD60	Score (17)
Readiness and attitude toward school	DD62[a]	Score (8)
Noncognitive achievement: general knowledge	DD64	Score (17)
Cognitive achievement: arithmetic	DD66	Score (40)
Cognitive achievement: Thai language	DD68	Score (4,0)
Cognitive achievement: total	DD70	Score (120)
Noncognitive achievement: total	DD74	Score (61)
Total achievement	DD78[b]	Score (181)

Teacher data

Variable	Code	Unit of measurement
Teacher's qualifications	EE6[a]	Four categories
Teaching experience	EE8[a]	Years
Number involved with in-service training	EE10	Number

(continued)

Variable	Code	Unit of measurement
Teaching load	EE12	Number of periods per week
Time spent planning lessons	EE14	Hours
Time spent correcting homework	EE16[a]	Hours
Amount of homework	EE18	Amount per week
Consultation with parents	EE22	1,0
Attitude toward teaching career	EE26	Scale of 1–5
Attitude toward students	EE28	Score
Teachers' morale	EE32	Scale of 1–5
Teachers' job satisfaction	EE34	Scale of 1–5

Local community data

Variable	Code	Unit of measurement
Number of households	C276	Number
Proportion of landowner farmers	C291	1,0
Average income	C293[a]	THB per year
Community living conditions	C294	Scale of 1–4
Proportion of population with electrical supply	C307[a]	1,0
Proportion of communities with a medical centre	C309	1,0
Population in subdistrict	C333	Number
Number immigrating to district	C334	Number
Number emigrating from district	C335[a]	Number
Giving assistance to school	C365	Total of six items
Taking part in school decision-making	C366	Total of five items
Participation in services offered	C367	Total of nine items
Community-school relations scores	C368[b]	Score (20)
Opportunity of access to grade 1, 1979	C372	Number
Opportunity of access to primary education, 1979	C373[b]	Number
Immigration rate, 1980	C374	Number
Emigration rate, 1980	C375	Number
Proportion of community's profession (agriculture)	FF8	1,0
Number of years residing in community	FF10	Years
Attitude toward school's assistance	FF16	Scale of 1–3
Community's attitude toward school activities and community's needs	FF18	Scale of 1–3
Community's attitude toward school concerning community people	FF20	Scale of 1–3
Community's attitude toward school's facilities for students	FF22	Scale of 1–3
Community's attitude toward teaching	FF24	Scale of 1–3
Community's attitude toward school concerning student's conduct	FF26	Scale of 1–3
Community's attitude toward teachers	FF28	Scale of 1–3
Community's attitude toward physical condition	FF30	Scale of 1–3
Community's attitude toward school concerning student's problem	FF32	Scale of 1–3
Total scores of community's attitude toward school	FF34[a]	Score (30)

Primary school efficiency data

Variable	Code	Unit of measurement
Composite efficiency index	NY[b]	Score with $\bar{X} = 50$ SD = 10

[a] Major independent variable.
[b] Dependent variable.

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2. DESCRIPTIVE STATISTICS OF MAJOR VARIABLES

	Type of measurement	Mean	Standard deviation
Dependent variables			
Students' achievement	Continuous	103.50	12.89
Opportunity of access to primary school	Continuous	0.05	0.11
Index of primary educational wastage	Continuous	1.31	0.34
School–community relations	Continuous	9.64	4.22
Key independent variables			
Number of classrooms	Continuous	15.34	12.31
Experience of headmaster (in years)	Continuous	18.80	12.89
Number of resident teachers	Continuous	10.79	14.62
Percentage of grade 6 students graduating	Continuous	85.82	50.44
Distance from school to district office (km)	Continuous	7.92	8.13
Means of transportation to school	Nominal (six categories)	—	—
Community cooperation in school's extracurricular activities	Dummy	0.65	0.47
Extent of school–community cooperation	Continuous	2.90	0.74
Average income of population (THB)	Continuous	14 212.00	11 700.00
Proportion of population with electricity	Dummy	0.71	0.45
Extent of district emigration	Continuous	1 705.00	6 345.00
Student–classroom ratio	Continuous	30.59	10.83
Availability of teaching facilities	Continuous	13.20	5.07
Expenditures per student (THB)	Continuous	2 051.00	4 387.00
Age of grade 3 students	Continuous	9.11	0.55
Access to preschool education	Dummy	0.37	0.32
Students' repetition (not repeating)	Dummy	0.76	0.15
Proportion of students with living fathers	Dummy	0.94	0.07
Regularity of having pocket money for school	Continuous	2.76	0.18
Regularity of having lunch	Continuous	2.76	0.18
Number of days of absence (students)	Continuous	3.73	1.18
Students' attitude toward school	Continuous	7.38	0.48
Teachers' qualifications	Continuous	1.56	0.64
Teaching experience	Continuous	9.60	8.34
Time spent correcting homework	Continuous	6.38	4.34
Community's attitude toward school	Continuous	22.38	3.03

3. SAMPLING FORMULA USED

The formula used was

$$n_p = \frac{K^2NP\ (1 - P)}{K^2P\ (1 - P) + NE^2}$$

where
N = population size
n_p = the required sample size to achieve the minimum standard error specified
P = arbitrary sampling fraction
E = standard error in estimating P by p
K = statistical value for the desired range of confidence interval

Here,
N = 31 648
K = 1.96
E = 0.04 (4%)
P = 0.20
$1 - P$ = 0.80

Thus, $n_p = \dfrac{(1.96)^2\ (31\ 648)\ (0.2)\ (0.8)}{(1.96)^2\ (0.2)\ (0.8) + 31\ 648\ (0.04)^2}$

$= 379.55$

Thus, the sample size needed is 400 schools.

4. Sampling strategy used

Multistage unequal probability sampling was used with the following steps:

Step 1: Selection of provinces

Provinces from different geographic regions (Bangkok, central, northern, northeastern, and southern) were stratified into three groups, each containing three strata of provinces. These strata were classified according to the number of primary schools in each province, namely stratum 1, provinces with 903–1 315 schools; stratum 2, provinces with 489–902 schools; and stratum 3, provinces with 75–488 schools.

Random sampling of provinces in each group in each region was used so that only 18 of Thailand's 71 provinces were chosen as samples.

Step 2: Selection of types of schools

All schools were chosen according to their type and location (rural versus urban) and whether they were within or outside major urban districts.

The number of schools sampled was estimated according to population proportions to ensure that they were representative.

Step 3: Selection of schools

Simple random sampling was used to determine the schools to be used as units of analysis in each province, and for each type and location. A total of 399 primary schools were chosen from the 18 provinces. They included private, provincial, municipal, and those schools under the authority of the Department of General Education (MOE).

Table A4-1. Total number of schools in provinces sampled.

| | Type of school | | | | | | | |
| Province | MOE | | Private | | Provincial | | Municipal | |
	Major district	Other district	Major district	Other district	Major district	Other district	Major district	Other district
Bangkok	32	—	598	—	—	—	386	—
Central								
Rayon	1	—	14	3	45	141	3	—
Nakhorn Prathom	2	—	10	12	50	203	4	—
Samut Sakhorn	2	—	7	3	55	51	6	2
Ayutthaya	2	—	14	26	30	395	7	3
Chonburi	1	—	28	44	41	269	5	7
Saraburi	1	—	7	14	49	322	8	7
Northern								
Chiengmai	2	—	29	14	33	934	12	—
Taak	3	—	2	4	56	142	4	4
Pisanuloke	1	—	13	4	72	375	4	—
Phrae	2	—	3	2	62	257	6	—
Northeastern								
Khon Kaen	1	—	23	14	122	841	10	3
Roi Et	1	—	5	9	104	652	6	—
Nakhorn Rajasima	3	—	19	22	67	1 199	4	5
Mahasarakham	2	—	2	8	85	492	5	—
Southern								
Songkhla	2	—	12	35	54	414	4	3
Phang Nga	1	—	2	3	22	147	1	2
Phuket	2	—	11	2	18	38	4	—

Table A4-2. Actual number of schools in sample by type and province.

Province	MOE Major district	MOE Other district	Private Major district	Private Other district	Provincial Major district	Provincial Other district	Municipal Major district	Municipal Other district	Total Major district	Total Other district
Bangkok	11	—	38	—	—	—	23	—	72	—
Central	9	—	16	21	7	43	7	4	39	68
Rayon	1	—	1	2	2	11	1	—	5	13
Nakhorn Prathom	2	—	3	2	1	6	1	—	7	8
Samut Sakhorn	2	—	1	1	1	1	1	1	5	3
Ayutthaya	2	—	4	5	1	10	1	1	8	16
Chonburi	1	—	6	8	1	7	1	1	9	16
Saraburi	1	—	1	3	1	8	2	1	5	12
Northern	8	—	6	3	5	41	4	1	23	45
Chiengmai	2	—	2	1	1	22	1	—	6	23
Taak	3	—	1	1	1	4	1	1	6	6
Pisanuloke	1	—	2	1	2	9	1	—	6	10
Phrae	2	—	1	—	1	6	1	—	5	6
Northeastern	7	—	7	8	9	73	3	1	26	82
Khon Kaen	1	—	3	2	3	20	1	—	8	22
Roi Et	1	—	1	1	2	15	1	—	5	16
Nakhorn Rajasima	3	—	2	4	2	26	—	1	7	31
Mahasarakham	2	—	1	1	2	12	1	—	6	13
Southern	5	—	5	8	4	18	3	2	17	28
Songkhla	2	—	2	6	2	12	1	1	7	19
Phang Nga	1	—	1	1	1	5	1	1	4	7
Phuket	2	—	2	1	1	1	1	—	6	2
Total	40	—	72	40	25	175	40	8	177	223

5. DISAGGREGATED DATA ON MAJOR DEPENDENT VARIABLES

Table A5-1. Opportunity of access to primary education.

	Mean (%)	SD	CV
District			
Major	6.30	0.14	2.22
Others	3.31	0.07	2.11
Geographic region			
Bangkok	5.55	0.05	0.90
Central	3.05	0.03	0.98
North	3.91	0.12	3.06
Northeast	6.45	0.17	2.63
South	3.80	0.04	1.05
School type			
MOE	12.85	0.23	1.78
Private	3.13	0.03	0.95
Provincial	3.12	0.08	2.56
Municipal	6.88	0.13	1.88
Bangkok	6.50	0.07	1.07
Educational region			
1 (central)	4.82	0.05	1.03
3 (south)	3.06	0.03	0.98
4 (south)	4.82	0.05	1.03
6 (central)	4.04	0.04	0.99
7 (north)	5.81	0.18	3.09
8 (north)	2.63	0.02	0.76
9 (northeast)	1.77	0.01	0.56
10 (northeast)	10.60	0.25	2.35
11 (northeast)	5.56	0.13	2.33
12 (east)	2.20	0.02	0.91
Average	4.62	0.11	2.38

Note: SD, standard deviation; CV, coefficient of variation.

Table A5-2. Educational wastage index in primary schools.

	Mean (%)	SD	CV
District			
Major	1.32	0.35	26.58
Others	1.31	0.35	26.72
Geographic region			
Bangkok	1.38	0.47	34.06
Central	1.32	0.39	29.50
North	1.33	0.31	23.33
Northeast	1.24	0.29	23.42
South	1.34	0.27	20.13
School type			
MOE	1.19	0.42	35.35
Private	1.45	0.35	24.19
Rural	1.26	0.24	19.06
Municipal	1.31	0.27	20.62
Bangkok	1.39	0.68	49.03
Educational region			
1 (central)	1.39	0.49	35.28
3 (south)	1.35	0.26	19.23
4 (south)	1.33	0.28	21.10
6 (central)	1.30	0.27	20.77
7 (north)	1.32	0.22	16.70
8 (north)	1.35	0.37	27.43
9 (northeast)	1.26	0.27	21.51
10 (northeast)	1.12	0.11	9.79
11 (northeast)	1.34	0.38	28.44
12 (east)	1.29	0.25	19.41
Average	1.31	0.35	26.66

Note: SD, standard deviation; CV, coefficient of variation.

Table 5-3. School–community relations scores.

	Mean (%)	SD	CV
District			
Major	43.55	4.55	10.44
Others	51.80	3.81	7.35
Geographic region			
Bangkok	36.80	4.72	12.82
Central	45.35	4.01	8.84
North	54.95	3.56	6.47
Northeast	53.45	3.95	7.39
South	49.80	3.95	7.93
School type			
MOE	53.15	4.08	7.67
Private	32.70	4.22	12.90
Provincial	54.30	3.50	6.44
Municipal	53.25	3.60	6.76
Bangkok	53.15	3.76	7.07

Table 5-3. Concluded.

	Mean (%)	SD	CV
Educational region			
1 (central)	39.45	4.58	11.60
3 (south)	54.05	3.82	7.06
4 (south)	43.95	3.92	8.91
6 (central)	49.75	4.11	8.26
7 (north)	54.10	3.72	6.87
8 (north)	55.50	3.54	6.37
9 (northeast)	55.00	3.43	6.23
10 (northeast)	52.25	4.56	8.72
11 (northeast)	53.55	3.65	6.81
12 (east)	40.45	3.84	9.49
Average	48.20	4.22	8.75

Note: SD, standard deviation; CV, coefficient of variation.

6. FACTOR ANALYSIS OF MAJOR DEPENDENT VARIABLES

Table A6-1. Factor loadings after application of the varimax rotation.

Variable	Factor			
	1	2	3	4
Arithmetic achievement	0.94[a]	− 0.07	0.14	0.05
Thai achievement	0.98[a]	− 0.14	0.09	0.00
Noncognitive achievement	0.69[a]	− 0.14	0.02	0.00
Wastage ratio	− 0.02	− 0.08	− 0.04	− 0.42[a]
Opportunity of access to grade 1	0.08	0.02	0.59[a]	− 0.04
Opportunity of access to primary education	0.05	0.08	0.59[a]	0.15
Education assistance to school	− 0.06	0.62[a]	0.13	0.22
Participation in school decision-making	− 0.26	0.73[a]	0.03	0.21
Participation in services offered	− 0.06	0.64[a]	0.02	− 0.05

[a]Factor loading of variables that are greater than 0.40.

Table A6-2. Factor score coefficients after application of the varimax rotation.

Variable	Factor			
	1	2	3	4
Arithmetic achievement	0.1859[a]	0.1306	0.1523	0.2515
Thai achievement	0.7938[a]	− 0.0293	− 0.1343	− 0.2234
Noncognitive achievement	0.0637[a]	0.0254	− 0.0374	− 0.0581
Wastage ratio	0.0024	0.0410	0.0084	− 0.3651[a]
Opportunity of access to grade 1	− 0.0390	− 0.0187	0.4323[a]	− 0.1057
Opportunity of access to primary education	− 0.0518	− 0.0277	0.4420[a]	0.1169
Education assistance to school	0.0279	0.2643[a]	0.0426	0.1261
Participation in school decision-making	0.0321	0.4765[a]	− 0.0421	0.1853
Participation in services offered	0.0732	0.3502	− 0.0172	− 0.1950

[a]Factor score coefficients used in the calculation of the composite efficiency index.

7. DISPARITIES IN PRIMARY SCHOOL DATA

Table A7-1. National disparity (total sample of 399 schools).

Variable code[a]	$\bar{X}$	SD	CV	Skewness
School data				
C8	4 437.52	6 808.15	153.42	7.21
C9	15.34	12.31	80.24	1.75
C10	495.99	470.48	94.85	1.78
C11	1.73	1.04	60.11	1.25
C14	0.31	0.46	148.38	0.82
C15	2.48	1.37	55.24	1.26
C17	50.80	11.67	22.97	− 0.54
C19	3.58	0.72	20.11	− 0.21
C20	3.79	0.71	18.73	− 0.32
C21	3.69	0.70	18.97	− 0.35
C155	22.43	21.54	96.03	2.47
C171	135 919.75	464 483.58	341.73	6.28
C178	892 433.68	2 401 029.00	269.04	13.13
C182	18.80	12.89	68.56	− 0.15
C183	12.52	9.85	78.67	0.94
C185	1.57	0.76	48.40	0.90
C186	2.34	0.48	20.51	0.54
C187	0.55	0.49	89.09	− 0.21
C188	10.77	14.62	135.75	2.67
C191	52.91	35.55	67.18	− 0.18
C192	85.81	50.44	58.78	7.27
C194	0.03	0.19	633.33	4.88
C195	1.44	6.13	425.69	12.08
C196	4.80	12.29	256.04	5.43
C197	6.70	13.02	194.32	4.10
C198	7.96	8.12	102.01	1.51
C199	32.22	28.69	89.04	0.79
C200	3.82	3.59	93.97	4.04
C209	2.36	1.99	84.32	1.10
C210	21.69	12.20	56.24	1.88
C251	0.78	0.41	52.56	− 1.37
C252	0.65	0.47	72.30	− 0.63
C259	2.90	0.74	25.51	− 0.81
C350	1.31	0.35	26.66	3.81
C351	30.59	10.83	35.40	1.26
C353	13.20	5.07	38.40	− 0.39
C360	416.65	381.76	91.62	1.85
C361	20.51	8.31	40.51	1.22
C362	2 050.68	4 387.38	213.94	16.73

(continued)

Variable code[a]	$\bar{X}$	SD	CV	Skewness
Student data				
DD4	9.11	0.55	6.03	0.63
DD8	0.37	0.32	86.48	0.47
DD10	0.76	0.15	19.73	− 0.90
DD12	0.94	0.07	7.45	− 1.73
DD20	0.45	0.38	84.44	0.22
DD22	0.38	0.37	97.36	0.39
DD24	0.85	0.09	10.58	− 1.06
DD28	7.04	1.04	14.77	0.83
DD30	2.59	0.39	15.05	0.92
DD32	0.96	0.09	9.37	− 4.55
DD34	0.59	0.18	30.50	− 0.63
DD36	5.63	2.46	43.69	2.05
DD38	2.81	0.16	5.69	− 1.22
DD40	2.76	0.18	6.52	− 1.39
DD42	3.73	1.75	46.91	1.07
DD44	5.40	1.12	20.74	0.01
DD46	5.83	1.64	28.13	0.34
DD50	5.18	0.58	11.19	− 0.62
DD52	0.63	0.19	30.15	− 0.55
DD54	4.33	0.39	9.00	− 1.25
DD56	6.18	0.55	8.89	− 0.46
DD58	3.93	0.53	13.48	0.10
DD60	13.82	1.05	7.59	− 0.03
DD62	7.38	0.48	6.50	− 0.24
DD64	9.31	1.30	13.96	0.91
DD66	19.77	4.69	23.72	− 0.22
DD68	40.28	9.48	23.48	− 0.13
DD70	50.05	13.97	23.26	− 0.18
DD74	71.16	3.23	7.45	0.06
DD78	57.16	16.32	15.77	− 0.20
Teacher data				
EE6	1.56	0.64	41.23	− 0.53
EE8	9.60	8.34	86.87	1.57
EE10	1.65	0.99	60.00	1.81
EE12	64.81	16.85	25.99	− 1.29
EE14	8.47	7.51	88.66	3.26
EE16	6.38	4.34	68.02	1.97
EE18	5.17	2.10	40.61	3.39
EE22	0.96	0.15	15.62	− 5.02
EE26	2.96	2.10	70.94	0.60
EE28	3.48	4.72	135.63	0.14
EE32	3.22	9.08	281.98	− 0.40
EE34	3.89	3.68	94.60	− 0.70
Local community data				
C276	657.72	1 124.70	170.99	5.09
C291	0.92	0.48	52.17	− 0.19
C293	14 212.40	11 699.86	82.32	2.22
C294	2.70	0.62	22.96	− 1.09
C307	0.71	0.45	63.38	− 0.93
C309	0.68	0.46	67.64	− 0.82
C333	24 527.19	29 372.76	119.75	2.87
C334	831.95	1 570.06	188.72	4.10
C335	1 705.25	6 345.35	372.10	8.43

(continued)

Variable code[a]	$\bar{X}$	SD	CV	Skewness
C365	47.83	1.76	61.32	− 0.14
C366	61.80	1.43	46.28	− 0.46
C367	40.67	2.13	58.20	0.44
C368	48.20	4.22	43.78	− 0.11
C372	0.04	0.10	250.00	9.55
C373	0.05	0.11	220.00	7.52
C374	0.02	0.02	100.00	1.10
C375	0.04	0.07	175.00	8.47
FF8	0.42	0.39	92.85	0.26
FF10	26.18	10.10	38.57	0.13
FF14	2.24	0.47	20.98	− 0.60
FF16	2.26	0.53	23.45	− 0.68
FF18	1.96	0.51	26.02	− 0.37
FF20	1.62	0.45	27.77	0.56
FF22	2.32	0.41	17.67	− 0.45
FF24	2.51	0.32	12.74	− 0.53
FF26	2.42	0.33	13.63	− 0.20
FF28	2.58	0.32	12.40	− 0.62
FF30	2.25	0.40	17.77	− 0.16
FF32	2.18	0.51	23.39	− 0.50
FF34	22.38	3.03	13.53	− 0.30
Primary school efficiency data				
NY	50.00	10.00	20.00	1.17

Note: SD, standard deviation; CV, coefficient of variation.
[a]Refer to Appendix 1 for explanation of variable codes.

Table A7-2. Disparity between major and other districts.

Variable code[a]	Major district			Other districts		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
School data						
C8	3 307.19	5 224.04	157.96	5 320.60	7 723.02	145.15
C9	21.12	13.77	65.20	10.83	8.72	80.52
C10	718.90	538.84	74.95	321.85	314.73	97.79
C11	2.00	1.12	56.00	1.53	0.93	60.78
C14	0.37	0.49	132.43	0.26	0.44	169.23
C15	2.90	1.50	51.72	2.17	1.17	53.92
C17	49.83	9.80	19.67	51.56	12.92	25.06
C19	3.75	0.69	18.40	3.46	0.72	20.81
C20	3.88	0.68	17.53	3.73	0.74	19.84
C21	3.85	0.66	17.14	3.57	0.73	20.45
C155	33.69	25.60	75.99	13.65	11.86	86.89
C182	16.93	13.70	80.92	20.28	12.05	59.42
C183	13.05	9.90	75.86	12.12	9.82	81.02
C185	1.45	0.66	45.52	1.67	0.82	49.10
C186	2.35	0.48	20.43	2.34	0.49	20.94
C187	0.55	0.50	90.91	0.55	0.50	90.91
C188	14.95	18.15	121.40	7.50	10.01	133.47
C191	64.25	34.29	53.37	44.06	34.05	77.28
C192	89.69	26.94	30.04	82.80	62.88	75.94
C194	0.00	0.00	—	0.07	0.25	357.14
C195	1.79	8.38	468.16	1.18	3.49	295.76
C196	2.23	4.55	204.04	6.81	15.63	229.52
C197	3.09	5.69	184.14	9.53	16.11	169.05
C198	4.78	5.20	108.79	10.45	9.09	86.99
C199	11.33	13.57	119.77	48.55	26.74	55.08
C200	2.64	2.09	79.17	4.75	4.20	88.42
C209	2.62	1.96	74.81	2.16	2.00	92.59
C210	22.41	13.86	61.85	21.15	10.73	50.73
C251	0.74	0.44	59.46	0.81	0.39	48.15
C252	0.58	0.50	86.21	0.71	0.46	64.79
C259	2.81	0.76	27.05	2.97	0.72	24.24
C350	1.32	0.35	26.52	1.31	0.35	26.72
C351	32.52	10.27	31.58	29.09	11.04	37.95
C353	15.71	3.90	24.82	11.25	5.04	44.80
C360	596.59	463.32	77.66	276.08	217.62	78.83
C361	18.34	7.12	38.82	22.22	8.79	39.56
C362	2 559.29	6 449.48	252.00	1 653.34	1 239.96	75.00
Student data						
DD4	8.94	0.53	5.93	9.25	0.55	5.95
DD8	0.49	0.30	61.22	0.28	0.31	110.71
DD10	0.81	0.13	16.05	0.74	0.17	22.97
DD12	0.94	0.05	5.32	0.93	0.07	7.53
DD20	0.18	0.24	133.33	0.67	0.34	50.75
DD22	0.12	0.23	191.67	0.59	0.34	57.63
DD24	0.84	0.10	11.90	0.87	0.10	11.49
DD28	7.28	1.11	15.25	6.85	0.94	13.72
DD30	2.80	0.24	8.57	2.43	0.42	17.28
DD32	0.98	0.04	4.08	0.95	0.11	11.58
DD34	0.61	0.17	27.87	0.58	0.20	34.48
DD36	5.98	2.20	36.79	5.36	2.63	49.07
DD38	2.82	0.15	5.32	2.81	0.17	6.05
DD40	2.79	0.18	6.45	2.74	0.19	6.93
DD42	3.57	1.49	41.74	3.87	1.93	49.87
DD44	5.92	0.96	16.22	5.01	1.09	21.76

(continued)

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Variable code[a]	Major district			Other districts		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
DD46	6.59	1.47	22.31	5.25	1.53	29.14
DD50	5.38	0.46	8.55	5.03	0.62	12.33
DD52	0.59	0.19	32.20	0.67	0.20	29.85
DD54	4.40	0.35	7.95	4.29	0.42	9.79
DD56	6.34	0.45	7.10	6.07	0.60	9.88
DD58	4.05	0.45	11.11	3.84	0.58	15.10
DD60	14.12	0.93	6.59	13.59	1.08	7.95
DD62	7.36	0.45	6.11	7.40	0.52	7.03
DD64	9.52	1.10	11.55	9.14	1.43	15.65
DD66	21.95	4.25	19.36	18.08	4.32	23.89
DD68	45.01	8.44	18.75	36.59	8.55	23.37
DD72	74.08	13.84	18.68	60.63	14.07	23.21
DD74	72.79	4.33	5.95	69.89	4.92	7.04
DD78	61.52	23.15	37.63	53.76	8.38	15.59
Teacher data						
EE6	1.70	0.58	34.34	1.44	0.66	45.93
EE8	10.53	7.26	68.95	8.88	9.05	101.91
EE10	1.68	1.05	62.50	1.64	0.96	58.54
EE12	61.46	15.95	25.95	67.43	17.11	25.37
EE14	8.10	7.74	95.56	8.77	7.34	83.69
EE16	6.61	3.65	55.22	6.21	4.81	77.46
EE18	5.23	2.16	41.30	5.13	2.06	40.16
EE22	0.97	0.09	9.28	0.96	0.19	19.79
EE26	14.47	1.94	13.41	15.11	2.18	14.43
EE28	41.13	4.00	9.73	42.36	5.16	12.18
EE32	64.01	9.21	14.39	66.69	8.84	13.26
EE34	30.48	3.31	10.86	31.71	3.88	12.24
Local community data						
C276	885.33	1420.49	160.45	479.91	781.54	162.85
C291	1.04	0.58	55.77	0.84	0.37	44.05
C293	15 477.12	11 533.42	74.52	13 224.34	11 759.34	88.92
C294	2.90	0.50	17.24	2.55	0.66	25.88
C307	0.94	0.23	24.47	0.53	0.50	94.34
C309	0.85	0.36	42.35	0.56	0.50	89.29
C333	—	—	—	—	—	—
C334	1 484.78	2 094.08	141.04	321.94	618.28	192.05
C335	3 332.57	9 284.38	278.60	433.91	948.56	218.61
C365	44.17	33.33	75.46	50.83	25.67	50.50
C366	52.63	30.40	57.79	69.20	25.00	36.13
C367	38.22	24.11	63.08	42.67	23.33	54.68
C368	43.55	22.75	52.24	51.80	19.05	36.78
C372	0.05	0.12	240.00	0.04	0.09	225.00
C373	0.06	0.14	233.33	0.03	0.07	233.33
C374	0.04	0.02	50.00	0.02	0.02	100.00
C375	0.06	0.11	183.33	0.02	0.03	150.00
FF8	0.17	0.28	163.71	0.62	0.35	56.45
FF10	22.33	9.00	40.30	29.20	9.91	33.94
FF14	2.17	0.44	20.28	2.30	0.49	21.30
FF16	2.20	0.51	23.18	2.32	0.54	23.28
FF18	1.99	0.48	24.12	1.93	0.54	27.98
FF20	1.53	0.40	26.14	1.70	0.49	28.82
FF22	2.32	0.39	16.81	2.34	0.44	18.80
FF24	2.51	0.31	12.35	2.52	0.34	13.49
FF26	2.42	0.32	13.22	2.43	0.34	13.99
FF28	2.55	0.30	11.76	2.62	0.33	12.60

(continued)

Variable code[a]	Major district			Other districts		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
FF30	2.28	0.38	16.67	2.23	0.41	18.39
FF32	2.21	0.47	21.27	2.16	0.55	23.46
FF34	22.16	2.86	12.91	22.56	3.16	14.01
Primary school efficiency data						
NY	52.45	10.74	20.48	48.09	8.96	18.63

Note: SD, standard deviation; CV, coefficient of variation.
[a]Refer to Appendix 1 for explanation of variable codes.

Table A7-3. Disparity among geographic regions.

Variable code[a]	Bangkok			Central			Northern			Northeastern			Southern		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
School data															
C8	1 521.00	1 342.14	88.24	4 581.34	9 906.86	216.24	4 351.04	5 304.72	121.92	6 445.77	5 922.87	91.89	3 960.07	4 774.12	120.56
C9	22.99	13.97	60.77	16.20	12.35	76.23	11.91	10.35	86.90	11.92	10.15	85.15	14.87	11.85	79.69
C10	831.01	544.35	65.50	472.99	479.96	101.47	356.64	371.16	104.07	408.07	367.26	90.00	459.33	459.40	100.02
C11	2.10	1.17	55.71	1.95	1.05	53.85	1.49	0.95	63.76	1.39	0.85	61.15	1.84	1.11	60.33
C14	0.48	0.50	104.17	0.35	0.48	137.14	0.19	0.39	205.26	0.23	0.42	182.61	0.36	0.48	133.33
C15	2.70	1.29	47.78	2.59	1.59	61.39	2.39	1.22	51.05	2.13	1.21	56.81	2.89	1.37	47.40
C17	48.60	6.37	13.11	49.80	12.47	25.04	51.37	12.94	25.19	52.87	12.30	23.26	50.92	11.97	23.51
C19	3.85	0.65	16.88	3.76	0.67	17.82	3.30	0.82	24.85	3.38	0.69	20.41	3.66	0.61	16.67
C20	3.94	0.68	17.26	3.93	0.63	16.03	3.63	0.77	21.21	3.69	0.76	20.60	3.78	0.69	18.25
C21	3.91	0.67	17.14	3.83	0.71	18.54	3.47	0.72	20.75	3.56	0.70	19.66	3.68	0.64	17.39
C155	39.16	23.72	60.57	20.92	17.17	82.07	18.30	25.99	142.02	15.70	15.54	98.98	22.73	19.97	87.86
C182	14.59	13.95	95.61	18.36	13.55	73.80	20.48	12.33	60.21	21.27	11.43	53.74	18.00	12.36	68.67
C183	13.26	10.29	77.60	14.10	10.93	77.52	10.77	9.00	83.57	12.20	9.48	77.70	11.04	8.02	72.64
C185	1.44	0.61	42.36	1.40	0.64	45.71	1.68	0.83	49.40	1.74	0.87	50.00	1.64	0.80	48.78
C186	2.35	0.48	20.43	2.32	0.47	20.26	2.33	0.53	22.75	2.34	0.48	20.51	2.40	0.50	20.83
C187	0.41	0.50	121.95	0.59	0.49	83.05	0.58	0.50	86.21	0.57	0.50	87.72	0.62	0.49	79.03
C188	9.81	9.42	96.02	11.48	15.07	131.27	10.48	16.83	160.59	9.29	13.60	146.39	14.42	18.29	126.84
C191	68.19	30.49	44.71	60.53	33.56	55.44	43.16	37.51	86.91	39.98	33.76	84.44	53.33	35.21	66.02
C192	89.45	25.81	28.85	88.54	29.40	33.21	85.64	99.47	116.15	81.84	37.43	45.74	83.24	33.54	40.29
C194	0.00	0.00	—	0.00	0.00	—	0.15	0.36	240.00	0.05	0.21	420.00	0.00	0.00	—
C195	1.13	3.59	317.70	2.08	10.15	487.98	1.05	1.38	131.43	1.49	4.95	332.21	0.93	1.28	137.63
C196	2.08	2.46	118.27	3.23	6.56	203.10	9.83	21.15	215.16	6.27	14.19	226.32	1.63	2.47	151.53
C197	4.23	7.91	187.00	4.49	7.63	169.93	10.63	20.74	195.11	9.68	14.84	153.31	2.93	4.71	160.75
C198	5.31	4.94	93.03	5.85	6.37	108.89	10.36	11.07	106.85	10.54	8.37	79.41	7.43	7.42	99.87
C199	17.39	14.22	81.77	21.06	18.55	88.08	44.48	39.01	87.70	43.67	27.90	63.89	36.50	29.06	79.62
C200	1.80	1.15	63.89	3.17	3.05	96.21	4.86	4.68	96.30	4.30	2.53	58.84	5.80	5.36	92.41
C209	2.00	1.23	—	3.44	2.38	—	2.19	1.94	—	1.92	1.80	—	1.60	1.37	—
C210	25.45	13.97	54.89	23.41	12.51	53.44	21.20	13.73	64.76	18.36	10.29	56.05	20.40	7.44	36.47
C251	0.67	0.48	71.64	0.71	0.46	64.79	0.88	0.32	36.36	0.87	0.34	39.08	0.78	0.42	53.85
C252	0.48	0.50	104.17	0.62	0.49	79.03	0.74	0.44	59.46	0.75	0.44	58.67	0.64	0.48	75.00
C259	2.68	0.76	28.36	3.03	0.66	21.78	3.06	0.77	25.16	2.84	0.79	27.82	2.82	0.65	23.05
C350	1.38	0.47	34.06	1.32	0.35	26.52	1.33	0.31	23.31	1.24	0.29	23.39	1.34	0.27	20.15
C351	36.29	12.45	34.31	26.36	8.79	33.35	27.49	10.07	36.63	34.58	10.76	31.12	27.54	6.24	22.66
C353	15.96	3.35	20.99	14.62	4.39	30.03	11.97	5.06	42.27	10.70	5.37	50.19	13.36	5.03	37.69

(continued)

Variable code[a]	Bangkok			Central			Northern			Northeastern			Southern		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
C360	706.16	459.12	65.02	365.29	336.03	91.99	321.97	326.49	101.40	356.88	336.77	94.37	384.31	340.07	88.49
C361	18.34	4.66	25.41	17.82	6.38	35.80	19.40	9.17	47.27	25.86	8.56	33.10	19.60	9.44	48.16
C362	3 281.30	1 0051.31	306.32	1 934.55	1 688.79	87.30	1 757.05	1 007.06	57.32	1 503.41	1 137.45	75.66	2 187.03	1 725.49	78.90
Student data															
DD4	8.92	0.55	6.17	9.02	0.51	5.65	9.35	0.70	7.49	9.09	0.37	4.07	9.32	0.64	6.87
DD8	0.52	0.28	53.85	0.43	0.36	83.72	0.36	0.33	91.67	0.26	0.28	107.69	0.32	0.29	90.63
DD10	0.80	0.14	17.50	0.79	0.15	18.99	0.68	0.21	30.88	0.80	0.13	16.25	0.73	0.14	19.18
DD12	0.96	0.04	4.17	0.95	0.06	6.32	0.93	0.07	7.53	0.92	0.07	7.61	0.92	0.08	8.70
DD20	0.09	0.12	133.33	0.35	0.29	82.86	0.65	0.39	60.00	0.73	0.33	45.21	0.37	0.32	86.49
DD22	0.03	0.11	366.67	0.29	0.31	106.90	0.54	0.38	70.37	0.65	0.33	50.77	0.29	0.35	120.69
DD24	0.83	0.10	12.05	0.85	0.10	11.76	0.87	0.09	10.34	0.87	0.10	11.49	0.88	0.07	7.95
DD28	7.71	1.17	15.18	7.10	1.12	15.77	6.39	0.88	13.77	7.00	0.78	11.14	6.94	0.72	10.37
DD30	2.89	0.09	3.11	2.82	0.19	6.74	2.38	0.39	16.39	2.23	0.38	17.04	2.79	0.18	6.45
DD32	0.98	0.03	3.06	0.99	0.02	2.02	0.97	0.06	8.19	0.90	0.15	16.67	0.97	0.05	5.15
DD34	0.64	0.15	23.44	0.54	0.22	40.74	0.62	0.18	29.03	0.61	0.18	29.51	0.60	0.16	26.67
DD36	6.99	2.40	34.33	5.60	1.95	34.82	5.37	2.49	46.37	5.13	2.96	57.70	5.23	1.57	30.02
DD38	2.79	0.17	6.09	2.89	0.10	3.46	2.89	0.10	3.46	2.74	0.18	6.57	2.71	0.18	6.64
DD40	2.80	0.20	7.14	2.77	0.19	6.86	2.82	0.15	5.32	2.70	0.20	7.41	2.78	0.15	5.40
DD42	3.91	1.44	36.83	4.17	1.58	37.89	3.50	1.72	49.14	3.19	1.89	59.25	4.06	2.00	49.26
DD44	6.23	0.75	12.04	5.63	0.84	14.92	5.74	1.19	20.73	4.50	0.96	21.33	5.24	1.05	20.04
DD46	7.04	1.20	17.05	6.47	1.52	23.49	5.15	1.53	29.71	4.90	1.36	27.76	5.72	1.53	26.75
DD50	5.53	0.39	7.05	5.41	0.47	8.69	4.70	0.69	14.68	5.02	0.50	9.96	5.20	0.44	8.46
DD52	0.56	0.20	35.71	0.61	0.23	37.70	0.66	0.21	31.82	0.70	0.14	20.00	0.62	0.19	30.65
DD54	4.49	0.28	6.24	4.45	0.31	6.94	4.27	0.54	12.65	4.18	0.39	9.33	4.32	0.31	7.18
DD56	6.40	0.30	4.69	6.47	0.45	6.96	6.06	0.59	9.74	5.84	0.58	9.93	6.21	0.45	7.25
DD58	4.07	0.46	11.30	4.03	0.55	13.65	3.94	0.57	14.47	3.79	0.53	13.98	3.81	0.49	12.86
DD60	14.35	0.84	5.85	14.26	1.03	7.22	13.70	1.05	7.66	13.15	0.92	7.00	13.72	0.73	5.32
DD62	7.36	0.44	5.98	7.54	0.49	6.50	7.44	0.51	6.85	7.15	0.46	6.43	7.48	0.39	5.21
DD64	9.61	0.81	8.43	10.12	1.60	15.81	8.96	0.84	9.38	8.55	1.15	13.45	9.21	0.72	7.82
DD66	23.47	3.91	16.66	21.66	3.33	15.37	18.51	4.17	22.53	16.09	4.36	27.10	20.12	3.25	16.15
DD68	48.38	8.19	16.93	44.31	6.68	15.08	36.80	8.14	22.12	33.28	8.46	25.42	39.85	6.46	16.21
DD72	79.44	13.08	16.47	73.02	10.71	14.67	61.51	13.48	21.92	54.56	14.13	25.90	66.75	10.40	15.58
DD74	73.80	3.49	4.73	74.33	5.05	6.79	69.33	4.38	6.32	67.56	4.93	7.30	70.62	3.41	4.83
DD78	64.57	7.12	11.03	61.50	6.18	10.05	53.92	7.82	14.50	50.05	29.63	59.20	56.94	6.01	10.55

Variable code[a]	Bangkok			Central			Northern			Northeastern			Southern		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
Teacher data															
EE6	1.77	0.62	35.23	1.58	0.68	43.04	1.48	0.60	40.54	1.47	0.63	42.86	1.49	0.59	39.60
EE8	9.82	5.37	54.68	8.95	7.29	81.45	8.86	8.75	98.76	10.24	10.42	101.76	10.54	8.51	80.74
EE10	2.02	1.26	62.38	1.60	1.01	63.13	1.38	0.82	59.42	1.61	0.85	52.80	1.76	0.95	53.98
EE12	60.81	11.87	19.52	64.26	16.49	25.66	58.69	22.73	38.73	70.14	14.46	20.62	69.14	14.46	20.91
EE14	6.89	5.13	74.46	7.95	6.33	79.62	7.65	6.31	82.48	9.89	10.26	102.81	9.95	6.67	67.04
EE16	7.09	3.94	55.57	6.57	4.10	62.40	5.68	5.10	89.79	5.59	3.86	69.05	7.81	4.86	62.23
EE18	5.28	1.48	28.03	5.64	2.42	42.91	4.52	2.19	48.45	5.05	2.06	40.79	5.12	1.83	35.74
EE22	0.95	0.12	12.63	0.94	0.23	24.47	1.00	0.04	4.00	0.96	0.14	14.58	0.99	0.04	4.04
EE26	13.98	1.91	13.66	14.83	2.21	14.90	15.24	2.11	13.85	15.30	2.18	14.25	14.37	1.40	9.74
EE28	40.40	4.39	10.87	42.02	4.57	10.88	43.42	4.92	11.33	41.36	4.91	11.87	42.12	4.15	9.85
EE32	61.56	8.76	14.23	66.02	9.28	14.06	66.86	8.99	13.45	67.42	8.35	12.39	63.77	9.18	14.40
EE34	29.54	3.18	10.77	31.09	3.92	12.61	31.84	4.26	13.38	31.62	3.42	10.82	31.79	2.74	8.62
Local community data															
C276	689.57	441.29	63.99	969.46	1 629.44	168.08	499.44	645.37	129.22	453.17	1 118.02	246.71	571.40	738.17	129.19
C291	1.06	0.42	39.62	0.82	0.53	64.63	0.94	0.51	54.26	0.94	0.36	38.30	0.93	0.62	66.67
C293	13 478.61	11 877.41	36.19	18 177.09	11 647.25	64.08	11 030.03	11 351.06	102.91	9 743.62	11 366.40	116.65	21 052.18	14 351.46	68.17
C294	2.93	0.31	10.58	2.75	0.68	24.73	2.74	0.68	24.82	2.51	0.62	24.70	2.67	0.60	22.47
C307	1.00	0.00	0.00	0.86	0.35	40.70	0.65	0.48	73.85	0.46	0.50	108.70	0.58	0.50	86.21
C309	0.99	0.12	12.12	0.78	0.42	53.85	0.59	0.50	84.75	0.45	0.50	111.11	0.71	0.46	64.79
C333	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C334	1 694.54	1 533.54	90.50	577.11	930.20	161.18	242.68	279.67	115.24	913.75	2 311.65	252.98	843.18	1 325.61	157.22
C335	2 210.25	2 282.67	103.28	1 135.20	2 321.59	204.51	405.67	624.82	154.02	3 192.28	11 775.40	368.87	814.29	1 140.57	140.07
C365	41.23	36.83	88.05	45.50	28.83	63.36	58.00	26.33	45.40	48.33	26.83	55.51	46.67	25.83	55.35
C366	40.00	27.60	69.00	56.80	29.00	51.06	74.60	23.00	30.83	73.00	23.60	32.33	63.00	23.00	36.39
C367	31.78	23.00	72.37	39.00	21.78	55.85	42.00	23.67	56.36	46.00	24.78	53.87	44.44	23.56	53.02
C368	36.80	23.65	64.27	43.35	20.05	44.21	54.95	17.80	32.39	53.45	19.75	36.99	49.80	19.75	39.66
C372	0.05	0.04	80.00	0.04	0.04	100.00	0.08	0.23	287.50	0.02	0.01	50.00	0.04	0.03	75.00
C373	0.06	0.05	83.33	0.03	0.03	100.00	0.04	0.12	300.00	0.06	0.17	283.33	0.04	0.04	100.00
C374	0.04	0.02	50.00	0.03	0.02	66.67	0.01	0.01	100.00	0.02	0.02	100.00	0.03	0.02	66.67
C375	0.05	0.03	60.00	0.04	0.05	125.00	0.02	0.03	150.00	0.05	0.14	280.00	0.03	0.02	66.67
FF8	0.11	0.24	218.18	0.29	0.32	110.34	0.55	0.39	70.91	0.66	0.36	54.55	0.45	0.37	82.22
FF10	18.54	6.37	34.36	25.57	9.43	36.88	29.33	8.74	29.80	29.65	11.06	37.30	26.42	9.66	36.36
FF14	2.19	0.26	11.87	2.14	0.54	25.23	2.30	0.49	21.30	2.36	0.48	20.34	2.24	0.49	21.88

(continued)

Table A7-3. Concluded.

Variable code[a]	Bangkok			Central			Northern			Northeastern			Southern		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
FF16	2.27	0.34	14.98	2.17	0.60	27.65	2.24	0.56	25.00	2.38	0.52	21.85	2.24	0.57	25.33
FF18	2.20	0.28	12.73	1.93	0.57	29.53	1.98	0.45	22.73	1.96	0.55	28.06	1.62	0.45	27.78
FF20	1.52	0.31	20.39	1.56	0.43	27.56	1.70	0.52	30.59	1.72	0.49	28.49	1.62	0.48	29.63
FF22	2.30	0.30	13.04	2.42	0.41	16.94	2.22	0.48	21.62	2.28	0.44	19.29	2.43	0.38	15.64
FF24	2.52	0.27	10.71	2.51	0.32	12.75	2.57	0.33	12.84	2.53	0.36	14.23	2.40	0.34	14.17
FF26	2.43	0.27	11.11	2.39	0.34	14.23	2.48	0.30	12.10	2.45	0.37	15.10	2.33	0.33	14.16
FF28	2.56	0.27	10.55	2.53	0.34	13.44	2.69	0.28	10.41	2.62	0.33	12.59	2.54	0.35	13.78
FF30	2.20	0.36	16.36	2.31	0.37	16.02	2.26	0.44	19.47	2.27	0.42	18.50	2.14	0.40	18.69
FF32	2.37	0.29	12.24	2.04	0.57	27.94	2.01	0.54	26.87	2.31	0.47	20.34	2.19	0.54	24.66
FF34	22.57	1.95	8.64	22.00	3.35	15.23	22.45	2.86	12.74	22.89	3.21	14.02	21.77	3.30	15.16
Primary school efficiency data															
NY	52.01	8.34	16.04	51.37	8.13	15.83	50.44	13.10	25.97	47.08	10.95	23.26	49.77	7.07	14.21

Note: SD, standard deviation; CV, coefficient of variation.
[a]Refer to Appendix 1 for explanation of variable codes.

Table A7-4. Disparity among types of schools.

Variable code[a]	MOE			Private			Provincial			Municipal			Bangkok		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
School data															
C8	3 905.88	3 036.88	77.75	4 463.39	10 517.83	235.65	5 119.18	5 336.21	104.24	3 197.73	2 645.47	82.73	993.13	658.92	66.35
C9	30.12	15.50	51.46	20.20	13.21	65.40	8.85	6.29	71.07	17.08	7.69	45.02	18.67	8.64	46.28
C10	1 066.72	547.05	51.28	675.52	546.70	80.93	252.09	206.13	81.77	506.58	282.66	55.80	666.33	373.90	56.11
C11	2.37	1.18	49.79	1.88	1.21	64.36	1.48	0.86	58.11	1.81	0.98	54.14	2.00	0.78	39.00
C14	0.70	0.47	67.14	0.25	0.44	176.00	0.21	0.41	195.24	0.50	0.51	102.00	0.54	0.51	94.44
C15	3.70	1.60	43.24	2.85	1.44	50.53	2.02	1.80	53.47	2.39	1.24	51.88	2.63	1.21	46.01
C17	52.77	8.44	15.99	46.66	11.30	24.22	52.51	12.15	23.14	53.96	13.58	25.17	48.47	6.20	12.79
C19	3.44	0.59	17.55	3.92	0.65	16.58	3.36	0.73	21.73	3.86	0.57	14.77	3.85	0.64	16.62
C20	3.61	0.60	16.57	4.15	0.63	15.18	3.65	0.73	20.00	3.83	0.65	16.97	3.77	0.68	18.04
C21	3.56	0.59	16.57	4.07	0.64	15.72	3.50	0.70	20.00	3.75	0.63	16.80	3.79	0.68	17.94
C155	50.28	22.23	44.21	29.28	24.51	83.71	10.52	7.85	74.62	23.65	11.33	47.91	38.83	22.24	77.28
C182	26.79	7.43	27.73	4.27	8.78	205.62	23.41	10.00	42.72	24.19	10.88	44.98	26.13	6.91	26.44
C183	14.47	10.34	71.46	11.97	9.95	83.12	12.16	9.59	78.87	12.73	11.01	86.49	14.42	9.52	66.02
C185	1.67	0.75	44.91	1.34	0.64	47.76	1.70	0.82	48.24	1.42	0.64	45.07	1.54	0.66	42.86
C186	2.33	0.47	20.17	2.37	0.49	20.68	2.32	0.49	21.12	2.39	0.50	20.92	2.33	0.48	20.60
C187	0.61	0.50	81.97	0.75	0.44	58.67	0.47	0.50	106.38	0.54	0.51	94.44	0.33	0.48	145.45
C188	26.56	22.46	84.56	15.67	17.26	110.15	5.01	6.12	122.16	12.08	12.21	101.08	6.58	5.14	78.12
C191	82.67	22.68	27.43	63.81	38.05	59.63	35.91	28.89	80.45	67.77	33.70	49.73	74.79	19.26	25.75
C192	95.35	15.40	16.15	86.73	32.47	37.44	81.47	66.08	81.11	91.08	27.00	29.64	94.79	6.49	6.85
C194	0.00	0.00	—	0.01	0.10	1 000.00	0.07	0.26	371.45	0.00	0.00	—	0.00	0.00	—
C195	0.56	0.53	94.64	2.13	10.52	493.90	1.23	3.04	247.15	1.44	3.81	264.58	1.83	6.03	329.51
C196	1.60	2.09	130.63	3.71	11.16	300.81	6.76	14.98	221.60	2.47	4.88	197.57	1.83	2.41	131.69
C197	1.89	2.56	135.45	3.63	10.43	287.33	9.57	15.15	158.31	6.11	11.41	186.74	6.23	12.31	197.59
C198	2.59	3.27	126.25	3.69	4.75	128.73	12.36	8.66	70.06	2.34	2.36	100.85	6.63	5.13	77.38
C199	9.44	16.53	175.11	21.87	23.43	107.13	44.54	28.77	63.18	22.49	25.33	112.63	20.33	12.25	60.26
C200	2.42	1.20	49.59	2.75	2.34	85.09	5.06	4.38	86.56	2.92	1.52	52.05	1.92	1.06	55.21
C210	22.33	14.64	65.56	23.14	13.68	59.12	20.98	10.46	49.86	17.50	7.91	45.20	24.58	16.28	66.23
C251	0.79	0.41	51.90	0.71	0.45	63.38	0.84	0.36	42.86	0.73	0.45	61.64	0.63	0.50	79.37
C252	0.54	0.51	94.44	0.53	0.50	94.34	0.73	0.44	60.27	0.73	0.45	61.64	0.67	0.48	71.64
C259	2.95	0.72	24.41	2.72	0.80	29.41	2.98	0.74	24.83	2.96	0.60	20.27	2.92	0.58	19.86
C350	1.19	0.42	35.29	1.45	0.36	24.83	1.26	0.24	19.05	1.31	0.27	20.61	1.39	0.68	48.92
C351	35.41	10.72	30.27	31.78	8.96	28.19	28.61	11.14	38.94	27.80	7.58	27.27	35.98	14.11	39.22
C353	18.26	1.76	9.64	16.16	3.23	19.99	9.85	4.42	44.87	16.42	3.44	20.08	15.08	3.37	22.35

(continued)

Table A7-4. Continued.

Variable code[a]	MOE			Private			Provincial			Municipal			Bangkok		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
C360	991.74	546.74	55.13	415.17	291.53	70.22	243.61	187.77	77.08	491.35	286.25	58.26	739.71	445.37	60.21
C361	18.82	4.81	25.56	15.57	6.68	42.90	23.85	8.88	37.23	19.80	6.30	31.82	19.14	3.37	17.21
C362	2 207.59	1 099.14	49.79	3 036.03	8 187.51	269.68	518.18	1 008.55	66.43	2 012.00	1 475.60	73.34	1 770.57	904.96	51.11
Student data															
DD4	8.87	0.52	5.86	8.71	0.41	4.71	9.34	0.52	5.57	9.23	0.36	3.90	9.33	0.50	5.36
DD8	0.55	0.23	41.82	0.71	0.23	32.39	0.18	0.22	122.22	0.30	0.24	80.00	0.28	0.22	75.00
DD10	0.86	0.12	12.79	0.82	0.13	15.85	0.72	0.18	25.00	0.78	0.12	15.38	0.75	0.12	16.00
DD12	0.95	0.05	5.26	0.96	0.04	4.17	0.92	0.08	8.70	0.92	0.06	6.52	0.94	0.04	4.26
DD20	0.10	0.09	90.00	0.14	0.19	135.71	0.77	0.26	33.77	0.26	0.33	88.46	0.15	0.18	120.00
DD22	0.03	0.05	166.67	0.09	0.16	177.78	0.68	0.28	41.18	0.19	0.27	142.11	0.08	0.17	212.50
DD24	0.84	0.07	8.33	0.86	0.09	10.47	0.87	0.10	11.49	0.81	0.08	9.88	0.79	0.10	12.66
DD28	7.31	1.12	15.32	7.26	1.17	16.12	6.79	0.87	12.81	7.05	0.99	14.04	7.64	1.06	13.87
DD30	2.88	0.12	4.17	2.86	0.18	6.29	2.33	0.39	16.74	2.81	0.18	6.41	2.83	0.12	4.24
DD32	0.99	0.03	3.03	0.99	0.03	3.03	0.94	0.12	12.77	0.98	0.04	4.08	0.99	0.02	2.02
DD34	0.64	0.16	25.00	0.62	0.19	30.65	0.58	0.21	36.21	0.59	0.14	23.73	0.62	0.12	19.35
DD36	5.77	2.57	44.54	6.50	2.28	35.08	5.15	2.62	50.87	5.30	0.25	4.72	5.84	1.76	30.14
DD38	2.83	0.12	4.24	2.85	0.13	4.56	2.80	0.17	6.07	2.81	0.17	6.05	2.70	0.20	7.41
DD40	2.84	0.12	4.23	2.84	0.12	4.23	2.72	0.21	7.72	2.79	0.14	5.02	2.65	0.24	9.06
DD42	3.35	1.18	35.22	3.52	1.39	39.49	3.86	2.05	83.11	3.54	1.22	34.46	4.58	1.72	37.55
DD44	6.38	0.86	13.48	6.09	0.85	13.96	4.75	0.99	20.84	5.68	0.74	13.03	5.73	0.63	10.99
DD46	6.97	1.17	16.79	7.37	1.35	18.32	4.71	1.03	21.87	5.71	1.10	19.26	6.35	0.91	14.33
DD50	5.50	0.36	6.55	5.52	0.41	7.43	4.92	0.62	12.60	5.16	0.43	8.33	5.24	0.29	5.53
DD52	0.59	0.19	32.20	0.59	0.20	33.90	0.67	0.21	31.34	0.68	0.18	26.47	0.58	0.15	25.86
DD54	4.49	0.25	5.57	4.47	0.31	6.94	4.21	0.45	10.69	4.43	0.33	7.45	4.44	0.25	5.63
DD56	6.55	0.26	3.97	6.39	0.45	7.04	5.97	0.59	9.88	6.31	0.51	8.08	6.30	0.27	4.29
DD58	4.13	0.34	8.23	4.12	0.52	12.62	3.79	0.56	14.78	3.98	0.51	12.81	3.84	0.36	9.38
DD60	14.32	0.67	4.68	14.38	0.98	6.82	13.39	1.02	7.62	13.91	0.96	6.90	13.90	0.59	4.24
DD62	7.35	0.31	4.22	7.46	0.52	6.97	7.35	0.52	7.07	7.45	0.42	5.64	7.30	0.38	5.21
DD64	9.48	0.72	7.59	9.91	1.26	12.71	8.92	1.33	14.91	9.63	1.53	15.89	9.22	0.59	6.40
DD66	23.52	3.00	12.76	22.61	4.25	18.81	17.13	3.88	22.65	20.14	3.26	16.19	21.75	3.57	16.41
DD68	46.72	5.44	11.64	46.97	8.84	18.82	34.69	7.46	21.50	41.20	6.37	15.46	43.81	6.37	14.54
DD72	78.13	9.16	11.72	76.81	14.18	18.46	57.46	12.40	21.58	67.90	18.57	27.35	72.75	10.94	15.04
DD74	73.85	2.13	2.88	74.39	4.61	6.20	68.64	5.16	7.52	72.28	5.15	7.13	71.34	1.87	2.62
DD78	63.70	4.61	7.24	63.51	23.00	36.21	51.76	7.35	14.20	58.25	6.29	10.80	60.26	5.29	8.78

Table A7-4. Continued.

Variable code[a]	MOE			Private			Provincial			Municipal			Bangkok		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
Teacher data															
EE6	2.02	0.46	22.80	1.29	0.66	51.07	1.51	0.63	41.44	1.72	0.42	24.25	2.09	0.30	14.21
EE8	13.50	5.92	43.85	6.41	4.68	73.01	10.23	10.20	99.71	10.59	5.62	53.07	10.78	5.56	51.58
EE10	1.65	0.80	48.48	1.58	1.04	65.82	1.60	0.90	56.25	1.82	0.97	53.30	2.26	1.61	71.24
EE12	58.07	12.32	21.22	62.64	17.63	28.14	68.12	17.73	26.03	67.39	11.93	17.70	56.61	8.20	14.49
EE14	7.43	3.34	44.95	8.84	6.84	77.38	9.06	8.99	99.23	6.58	4.41	67.02	5.97	3.00	50.25
EE16	7.23	2.91	40.25	6.63	4.14	62.44	6.05	4.76	78.68	5.56	3.50	62.95	7.44	4.40	59.14
EE18	4.84	0.97	20.04	5.23	1.64	31.36	5.15	2.51	48.74	4.88	1.16	23.77	5.99	2.43	40.57
EE22	0.97	0.80	8.25	0.97	0.15	15.46	0.96	0.17	17.71	0.97	0.08	8.25	0.93	0.14	15.05
EE26	14.54	1.71	11.76	14.88	2.25	15.12	15.08	2.14	14.19	14.04	1.67	11.89	13.84	1.76	12.72
EE28	41.21	3.23	7.84	42.93	3.70	8.62	41.95	5.42	12.92	40.96	3.01	7.35	37.77	4.05	10.72
EE32	64.61	7.03	10.88	66.03	9.25	14.01	66.53	9.13	13.72	63.28	9.08	12.77	58.81	9.58	16.29
EE34	30.06	2.30	7.65	31.41	3.69	11.75	31.70	3.91	12.33	30.91	2.65	8.57	27.95	2.77	9.91
Local community data															
C276	1 033.63	1 660.81	160.68	1 115.56	1 522.99	136.52	261.89	313.26	119.62	1 088.89	1 390.59	127.71	722.50	554.43	76.74
C291	1.09	0.68	62.39	0.94	0.57	60.64	0.86	0.34	39.53	1.04	0.60	57.69	1.00	0.42	42.00
C293	17 880.37	14 211.21	79.48	17 723.44	13 230.37	74.65	11 549.66	10 086.64	87.33	16 129.69	11 038.58	68.44	11 731.50	5 204.42	44.36
C294	2.91	0.57	19.59	2.93	0.49	16.72	2.51	0.67	26.69	2.85	0.54	18.95	2.83	0.38	13.43
C307	1.00	0.00	0.00	1.00	0.00	0.00	0.43	0.50	116.28	0.92	0.27	29.35	1.00	0.00	0.00
C309	0.98	0.15	15.31	0.92	0.28	30.43	0.47	0.50	106.38	0.77	0.43	55.84	0.92	0.28	30.45
C333	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
C334	2 113.21	2 939.54	139.10	1 238.79	1 700.11	137.24	211.27	336.09	159.08	1 142.42	1 373.89	120.26	1 489.96	1 639.79	110.06
C335	6 809.84	15 402.00	226.17	2 043.50	6 041.78	295.66	401.40	1 508.98	375.93	1 912.31	2 647.34	138.44	1 569.83	1 628.76	103.75
C365	63.17	29.00	45.91	24.50	27.17	110.90	53.00	23.83	44.96	66.00	20.83	31.56	63.83	29.33	45.95
C366	60.00	28.00	46.67	40.60	30.00	73.89	74.20	21.20	28.57	60.80	28.00	46.05	61.60	22.00	35.71
C367	42.67	23.56	55.21	33.78	24.22	71.70	44.11	23.56	53.41	40.56	22.89	56.43	41.22	23.56	57.16
C368	53.15	20.40	38.38	32.70	21.10	65.53	54.30	17.55	32.32	53.25	18.00	33.80	53.15	18.80	35.37
C372	0.08	0.16	200.00	0.05	0.11	220.00	0.03	0.09	300.00	0.05	0.05	100.00	0.05	0.03	60.00
C373	0.13	0.23	176.92	0.03	0.03	100.00	0.03	0.08	266.67	0.07	0.14	200.00	0.07	0.07	100.00
C374	0.04	0.03	75.00	0.03	0.02	66.67	0.02	0.02	100.00	0.04	0.02	50.00	0.05	0.02	40.00
C375	0.09	0.12	133.33	0.05	0.06	120.00	0.03	0.08	266.67	0.06	0.05	83.33	0.05	0.03	60.00
FF8	0.06	0.16	266.67	0.13	0.20	153.85	0.73	0.29	39.73	0.19	0.25	131.58	0.18	0.27	150.00
FF10	22.57	7.17	31.77	20.14	9.05	44.94	30.82	9.08	29.46	27.60	9.99	36.20	20.09	7.35	36.59
FF14	2.22	0.32	14.41	2.03	0.49	24.14	2.38	0.46	19.33	2.23	0.54	24.22	2.18	0.38	17.43

(continued)

Table A7-4. Concluded.

Variable code[a]	MOE			Private			Provincial			Municipal			Bangkok		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
FF16	2.16	0.49	22.69	2.07	0.54	26.09	2.39	0.53	22.18	2.29	0.48	20.96	2.30	0.44	19.13
FF18	2.03	0.45	22.17	1.90	0.51	26.84	1.96	0.54	27.55	1.86	0.42	22.58	2.19	0.44	20.09
FF20	1.55	0.39	25.16	1.42	0.36	25.35	1.76	0.49	27.84	1.61	0.43	26.71	1.57	0.36	22.93
FF22	2.35	0.39	16.60	2.34	0.39	16.67	2.32	0.45	19.40	2.37	0.35	14.77	2.27	0.39	17.18
FF24	2.58	0.28	10.85	2.46	0.32	13.01	2.53	0.35	13.83	2.50	0.28	11.20	2.54	0.29	11.42
FF26	2.47	0.31	12.55	2.42	0.34	14.05	2.43	0.34	13.99	2.39	0.33	13.81	2.34	0.23	9.83
FF28	2.58	0.30	11.63	2.50	0.32	12.80	2.64	0.33	12.50	2.61	0.30	11.49	2.51	0.28	11.16
FF30	2.39	0.31	12.97	2.18	0.40	18.35	2.25	0.42	18.67	2.41	0.31	12.86	2.17	0.33	15.21
FF32	2.26	0.47	20.80	2.12	0.52	24.53	2.19	0.55	25.11	2.12	0.41	19.34	2.28	0.38	16.67
FF34	22.58	2.61	11.56	21.45	3.07	14.31	22.86	3.10	13.56	22.38	2.62	11.71	22.36	2.62	11.72
Primary school efficiency data															
NY	59.46	13.80	23.21	49.26	8.67	17.60	47.63	8.72	18.31	52.30	8.45	16.16	53.49	8.18	15.29

Note: SD, standard deviation; CV, coefficient of variation.

[a]Refer to Appendix 1 for explanation of variable codes.

Table A7-5. Disparity between small and large primary schools.

Variable code[a]	Small school[b]			Large school[c]		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
C8	4 326.18	3 186.89	73.67	4 341.67	7 088.15	163.26
C9	3.94	0.89	22.59	18.94	12.40	65.47
C10	111.16	65.37	58.81	622.21	484.76	77.91
C11	1.30	0.74	56.92	1.87	1.09	58.29
C14	0.24	0.43	179.17	0.37	0.48	129.73
C15	1.18	0.39	33.05	2.86	1.38	48.25
C17	53.21	9.70	18.23	50.27	10.89	21.66
C19	3.19	0.90	28.21	3.69	0.66	17.89
C20	3.57	0.83	23.25	3.89	0.67	17.22
C21	3.52	0.80	22.73	3.77	0.68	18.04
C155	5.12	2.99	58.40	28.12	22.29	79.27
C171	13 526.50	37 228.50	275.23	178 999.38	532 396.53	297.43
C178	145 186.06	87 541.03	60.30	—	—	—
C182	20.96	10.63	50.72	17.95	13.37	74.48
C183	10.42	9.33	89.54	13.11	9.88	75.36
C185	1.80	0.88	48.89	1.53	0.74	48.37
C186	2.40	0.50	20.83	2.33	0.48	20.60
C187	0.34	0.48	141.18	0.60	0.49	81.67
C188	2.14	2.42	113.08	13.58	15.99	117.75
C191	20.60	25.48	123.69	61.83	33.59	54.33
C192	43.20	47.52	110.00	91.99	23.65	25.71
C194	0.10	0.30	300.00	0.01	0.10	1 000.00
C195	1.17	1.53	130.77	1.40	6.70	478.57
C196	6.69	14.49	216.59	3.78	10.61	280.69
C197	13.13	19.36	147.45	5.06	10.83	214.03
C198	13.09	8.64	66.00	6.32	7.01	110.92
C199	47.58	25.96	54.56	27.62	27.41	99.24
C200	5.96	5.01	84.06	3.17	2.82	88.96
C209	1.66	1.62	97.59	2.60	2.05	78.85
C210	20.76	10.48	50.48	22.21	12.79	57.59
C251	0.86	0.35	40.70	0.76	0.43	56.58
C252	0.70	0.46	65.71	0.64	0.48	75.00
C259	3.04	0.70	23.03	2.90	0.74	25.52
C350	1.31	0.31	23.66	1.31	0.31	23.66
C351	28.64	14.76	51.54	31.80	9.59	30.16
C353	7.30	3.41	46.21	15.02	4.54	28.23
C360	114.66	68.45	59.70	514.84	396.90	77.09
C361	23.71	11.53	48.63	19.56	6.62	33.84
C362	1 533.89	966.21	62.99	2 175.82	5 038.02	231.55
DD4	9.38	0.69	7.36	9.02	0.51	5.65
DD8	0.13	0.19	146.15	0.46	0.32	69.57
DD10	0.70	0.22	31.43	0.79	0.14	17.72
DD12	0.92	0.10	10.87	0.94	0.05	5.32
DD20	0.82	0.27	32.93	0.34	0.35	102.94
DD22	0.71	0.29	40.85	0.27	0.34	125.93
DD24	0.87	0.20	22.99	0.86	0.09	10.47
DD28	6.75	1.02	15.11	7.14	1.04	14.57
DD30	2.17	0.41	18.99	2.71	0.32	11.81
DD32	0.91	0.16	17.58	0.97	0.06	6.19
DD34	0.57	0.24	42.11	0.60	0.17	28.33
DD36	4.59	2.70	58.82	5.85	2.24	38.29
DD38	2.80	0.19	6.79	2.82	0.16	5.67
DD40	2.71	0.25	9.23	2.79	0.16	5.73
DD42	4.13	2.49	60.29	3.63	1.51	41.60
DD44	4.61	0.99	21.48	5.69	1.03	18.10

(continued)

Variable code[a]	Small school[b]			Large school[c]		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
DD46	4.39	1.09	24.83	6.31	1.55	24.56
DD50	4.70	0.61	12.98	5.30	0.52	9.81
DD52	0.67	0.22	32.84	0.62	0.19	30.65
DD54	4.19	0.54	12.89	4.34	0.36	8.29
DD56	5.91	0.71	12.01	6.29	0.48	7.63
DD58	3.75	0.60	16.00	4.01	0.50	12.47
DD60	13.24	1.18	8.91	14.03	0.95	6.77
DD62	7.36	0.60	8.15	7.40	0.45	6.08
DD64	8.58	1.37	15.97	9.54	1.24	13.00
DD66	15.91	4.07	25.58	20.97	4.33	20.65
DD68	32.01	8.00	24.99	42.77	8.71	20.36
DD72	63.83	15.88	24.88	84.71	17.06	20.14
DD74	41.04	3.21	7.82	44.16	2.89	6.54
DD78	88.96	13.55	15.23	107.90	14.83	13.74
EE6	1.46	0.71	48.63	1.58	0.64	40.51
EE8	13.15	13.46	102.36	9.06	6.39	70.53
EE10	1.69	0.97	57.40	1.66	1.02	61.45
EE12	67.76	21.07	31.10	63.87	15.78	24.71
EE14	9.48	12.48	131.65	8.41	6.55	77.88
EE16	5.64	5.44	96.45	6.61	4.10	62.03
EE18	4.53	2.12	46.80	5.30	2.12	40.00
EE22	0.93	0.25	26.88	0.96	0.14	14.58
EE26	15.28	2.36	15.45	14.82	2.02	13.63
EE28	42.69	5.24	12.27	41.71	4.38	10.50
EE32	66.63	9.72	14.59	65.39	9.01	13.78
EE34	31.56	4.33	13.72	31.04	3.43	11.05
C276	126.02	111.52	88.49	820.34	1 254.81	152.96
C291	0.86	0.35	40.70	0.95	0.52	54.74
C293	9 842.24	7 564.35	76.86	15 344.69	12 277.59	80.01
C294	2.38	0.70	29.41	2.82	0.53	18.79
C307	0.24	0.43	179.17	0.87	0.34	39.08
C309	0.30	0.46	153.33	0.81	0.40	49.38
C333	11 348.92	8 214.66	72.38	29 340.69	32 470.44	110.67
C334	254.06	598.76	235.68	1 043.72	1 754.77	168.13
C335	781.28	2 969.52	380.08	2 121.56	7 219.69	340.30
C365	2.76	1.42	51.45	2.86	1.86	65.03
C366	3.28	1.20	36.59	2.99	1.52	50.84
C367	3.44	2.20	63.95	3.70	2.20	59.46
C368	9.48	3.50	36.92	9.54	4.48	46.96
C372	0.01	0.01	100.00	0.05	0.12	240.00
C373	0.02	0.04	200.00	0.06	0.12	200.00
C374	0.02	0.02	100.00	0.03	0.02	66.67
C375	0.04	0.16	400.00	0.05	0.06	120.00
FF8	0.84	0.21	25.00	0.28	0.35	125.00
FF10	29.03	8.67	29.87	24.63	10.06	40.84
FF14	2.25	0.49	21.78	2.22	0.47	21.27
FF16	2.26	0.55	24.34	2.25	0.53	23.56
FF18	1.89	0.48	25.40	1.96	0.50	25.51
FF20	1.64	0.51	31.10	1.60	0.43	26.88
FF22	2.17	0.48	22.12	2.36	0.39	16.53
FF24	2.52	0.37	14.68	2.51	0.31	12.35
FF26	2.44	0.40	16.39	2.42	0.32	13.22
FF28	2.64	0.33	12.50	2.57	0.32	12.45
FF30	2.12	0.41	19.34	2.29	0.38	16.59

(continued)

Variable code[a]	Small school[b]			Large school[c]		
	$\bar{X}$	SD	CV	$\bar{X}$	SD	CV
FF32	2.11	0.59	27.96	2.20	0.49	22.27
FF34	22.05	3.16	14.33	22.38	2.94	13.14
NY	32.80	7.10	16.59	52.09	9.97	19.14

Note: SD, standard deviation; CV, coefficient of variation.
[a]Refer to Appendix 1 for explanation of variable codes.
[b]Less than six classes.
[c]More than six classes.

8. Schools with high and low Primary school efficiency indices[4]

Table A8-1. Cognitive and noncognitive achievement.

Variable code[a]	High			Low		
	$\bar{X}$	SD	Skewness	$\bar{X}$	SD	Skewness
C9	23.38	13.56	1.03	8.11	4.86	1.26
C10	828.82	561.25	1.11	256.65	171.59	1.32
C14	0.45	0.50	0.18	0.21	0.41	1.41
C182	11.73	13.88	0.56	18.72	10.69	− 0.04
C188	15.55	17.37	2.02	4.67	5.17	1.93
C190	0.82	0.38	− 1.72	0.31	0.46	0.80
C191	65.53	37.12	− 0.80	33.38	30.64	0.61
C198	3.44	4.01	1.75	13.05	9.90	1.20
C209	3.41	2.06	0.16	1.50	1.36	2.84
C293	16 292.05	12 024.38	2.58	8 070.22	6 841.57	1.87
C351	33.99	7.35	0.10	32.01	12.91	1.37
C361	18.72	6.24	0.43	24.17	9.26	0.13
C364	6.15	1.59	− 0.27	3.41	2.09	0.99
DD8	0.69	0.25	− 0.83	0.17	0.21	1.64
DD10	0.85	0.10	− 0.83	0.73	0.19	− 1.15
DD12	0.96	0.03	− 1.29	0.90	0.08	− 1.64
DD16	2.46	0.33	0.35	2.00	0.28	0.11
DD18	2.28	0.29	0.80	1.90	0.29	− 0.38
DD20	0.09	0.11	2.90	0.85	0.25	− 2.25
DD22	0.40	0.10	4.47	0.74	0.29	− 1.45
DD30	2.89	0.10	− 2.07	2.11	0.34	0.58
DD32	0.98	0.02	− 3.81	0.88	0.15	− 2.03
DD34	0.56	0.20	− 0.63	0.63	0.18	− 0.50
DD40	2.85	0.13	− 2.28	2.66	0.25	− 1.04
DD42	3.61	1.37	1.02	3.45	1.98	0.90
DD44	6.30	0.85	0.69	4.40	0.88	0.66
DD46	7.66	1.20	− 0.06	4.42	1.02	0.91
DD62	7.50	0.56	− 0.23	7.13	0.51	0.17
EE6	1.61	0.69	− 0.68	1.48	0.67	− 0.30
EE8	8.79	5.48	0.67	10.42	11.59	1.48
EE16	7.51	4.12	1.79	5.66	4.55	3.13
FF14	2.10	0.48	− 0.74	2.32	0.45	− 0.57
FF16	2.08	0.54	− 0.46	2.32	0.50	− 0.64
FF20	1.48	0.36	0.38	1.71	0.49	0.29

Note: SD, standard deviation.
[a]Refer to Appendix 1 for explanation of variable codes.

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[4]High, 5th quintile; low, 1st quintile.

Table A8-2. Opportunity of access to primary education.

Variable code[a]	High			Low		
	$\bar{X}$	SD	Skewness	$\bar{X}$	SD	Skewness
C9	28.13	16.05	0.71	7.34	4.08	1.51
C10	985.94	621.70	0.51	183.12	147.05	1.88
C12	0.02	0.16	6.16	0.03	0.19	4.99
C14	0.49	0.50	0.02	0.17	0.38	1.76
C188	21.82	22.64	1.32	3.51	4.10	1.75
C191	69.46	32.11	− 0.94	38.18	38.33	0.43
C192	92.12	21.99	− 3.84	59.69	47.54	− 0.46
C198	6.42	8.27	2.36	8.74	7.91	0.88
C276	1 106.75	1 705.64	3.97	390.53	780.16	4.65
C307	0.88	0.32	− 2.47	0.55	0.50	− 0.22
C333	32 508.67	38 069.32	3.05	21 496.12	23 485.80	2.13
C334	1 517.24	2 449.90	2.93	524.37	882.50	3.00
C335	3 586.58	11 645.67	4.76	1 078.63	2 745.18	5.02
C353	16.37	4.13	− 1.39	10.08	4.99	0.38
C361	21.42	7.38	3.84	17.96	7.53	0.65
C362	1 941.65	1 972.50	4.80	1 907.34	1 155.75	1.53
C364	5.88	2.32	− 0.27	3.90	2.15	0.43
C374	0.03	0.02	0.41	0.02	0.01	1.26
C375	0.05	0.08	4.15	0.04	0.12	7.89
DD4	9.02	0.55	0.64	9.09	0.55	− 0.08
DD20	0.24	0.32	1.57	0.59	0.35	− 0.34
DD22	0.17	0.29	1.75	0.53	0.38	− 0.21

Note: SD, standard deviation.
[a]Refer to Appendix 1 for explanation of variable codes.

Table A8-3. Wastage ratio.

Variable code[a]	High			Low		
	$\bar{X}$	SD	Skewness	$\bar{X}$	SD	Skewness
C8	2 884.43	2 750.19	1.93	4 988.41	6 191.41	5.05
C182	12.08	12.72	0.66	22.47	12.18	− 0.62
C196	6.56	16.96	3.73	3.47	4.98	1.92
C200	3.75	4.09	3.99	3.20	2.04	1.30
C351	27.99	8.91	0.23	32.05	11.31	1.58
C360	324.00	281.69	2.35	528.65	492.56	1.48
C361	18.15	7.78	0.40	21.21	6.85	0.37
C362	2 734.17	9 233.51	8.81	1 914.73	1 508.39	2.79
C364	5.27	2.09	− 0.52	5.08	2.32	0.11
DD4	9.22	0.73	1.09	8.86	0.40	− 0.68
DD10	0.72	0.18	− 0.94	0.85	0.09	− 0.94
DD32	0.97	0.05	− 3.51	0.94	0.10	− 3.78
DD42	3.78	1.83	0.78	3.41	1.62	1.28
DD62	7.44	0.52	− 0.79	7.36	0.47	0.22
EE8	7.53	6.27	1.27	11.50	9.43	1.37
EE12	62.58	18.92	− 1.24	67.20	13.67	− 0.74
FF14	2.21	0.44	− 0.50	2.20	0.46	− 0.58
FF16	2.28	0.49	− 0.76	2.20	0.53	− 0.54
FF20	1.62	0.46	0.72	1.64	0.42	0.13
EE28	43.02	4.25	− 0.09	40.70	4.44	0.23

Note: SD, standard deviation.
[a]Refer to Appendix 1 for explanation of variable codes.

Table A8-4. School–community relations.

Variable code[a]	High			Low		
	$\bar{X}$	SD	Skewness	$\bar{X}$	SD	Skewness
C182	23.61	11.75	− 0.46	10.08	12.86	0.83
C191	57.48	34.14	− 0.35	49.62	37.34	− 0.14
C192	89.54	29.00	− 2.76	77.71	39.45	− 1.47
C200	4.26	3.72	3.71	2.82	1.88	1.76
C252	0.82	0.38	− 1.72	0.35	0.48	0.60
C259	3.10	0.76	− 1.21	2.55	0.86	− 0.53
C276	568.13	1 085.68	6.60	897.91	1 102.63	2.56
C286	1.63	0.95	1.31	2.25	1.15	0.94
C307	0.66	0.47	− 0.71	0.84	0.36	− 1.92
C309	0.68	0.46	− 0.80	0.80	0.40	− 1.53
C362	1 773.01	1 334.45	1.91	3 069.02	10 047.65	7.89
C363	3.42	1.58	− 0.12	2.88	1.66	0.43
C370	2.30	1.03	0.22	1.77	0.98	1.05
FF14	2.35	0.51	− 0.79	2.05	0.47	− 0.56
FF16	2.31	0.54	− 0.65	2.09	0.51	− 0.63
FF18	1.92	0.51	− 0.26	1.89	0.51	− 0.36
FF20	1.73	0.46	0.36	1.44	0.42	1.01
FF26	2.36	0.32	− 0.03	2.45	0.32	− 0.05
FF30	2.28	0.40	− 0.11	2.07	0.34	0.38
FF32	2.24	0.51	− 0.62	2.06	0.55	− 0.51
FF34	22.61	3.25	− 0.22	21.38	3.05	− 0.39

Note: SD, standard deviation.
[a]Refer to Appendix 1 for explanation of variable codes.

9. STATISTICAL ASSUMPTIONS
UNDERLYING PATH ANALYSIS

Like multiple-regression analysis, path analysis involves the usual statistical presuppositions and three additional assumptions, namely

(1) that all variables in the proposed model that precede dependent variables bear a logical relation with the dependent variables in accordance with the theory and existing empirical data;

(2) that the model be a closed system, i.e., that all possible variables related to dependent variables are included in the model; otherwise, specification error occurs (Wonnacott and Wonnacott 1970); and

(3) that effects from variables be recursive as shown by arrows that always start with independent variables and point toward dependent variables and that the double-arrowed curve be used only to relate two exogenous variables, which means that this type of arrow represents an unanalyzed correlation.

In this sample model, the structural equations are

$$X_1 = e_1$$
$$X_2 = e_2$$
$$X_3 = b_{13} X_1 + b_{23} X_2 + e_3$$
$$X_4 = B_{14} X_4 + b_{34} X_3 + e_4$$
$$X_5 = b_{25} X_2 + b_{35} X_3 + e_5$$
$$X_6 = b_{36} X_3 + b_{46} X_4 + b_{56} X_5 + e_6$$

where e_i is the random error and b_{ij} is the beta coefficient for independent variable x_i in a regression equation with x_j as the dependent variable.

From these equations, it is possible to calculate direct and indirect effects, and to calculate the correlation coefficients implied by the model using the formula

$$r_{31} = b_{13} r_{11} + b_{23} r_{21}$$
$$= b_{13} + b_{23} r_{21}$$

The validity of the proposed model can be tested by comparing the correlation coefficient between each pair of variables implied by the proposed model with that from existing empirical data. If there is a close correspondence between all the correlation coefficients, then we can assume that there is a close fit between the proposed model and the existing data

(Blalock 1964; Loether and McTavish 1974). However, because these equations are complicated and impossible to solve without the aid of special computational algorithms, Alwin and Hauser (1975) formulated an improved method of path analysis whereby it is possible to verify a model from the amount of variance in dependent variables, which can be accounted for by exogenous and intervening variables, i.e., there is the assumption that a close correspondence exists between the proposed model and the existing empirical data when variables in the model have high explanatory power and spurious effects are low. Having tested the validity of the model, path analysis can then be used to determine the impact of each variable on the dependent variable, both directly and indirectly, which enables us to understand the overall influence of that particular variable.

10. BASIC CORRELATION MATRIX

Variable code[a]	C9	C182	C188	C192	C198	C209	C252	C259
C9	1.000							
C182	− 0.057	1.000						
C188	0.727	− 0.082	1.000					
C192	0.175	0.009	0.125	1.000				
C198	− 0.354	0.008	− 0.275	0.044	1.000			
C209	0.198	− 0.115	0.233	0.033	− 0.256	1.000		
C252	− 0.081	0.154	− 0.018	0.019	0.004	0.069	1.000	
C259	0.020	0.103	0.093	− 0.117	− 0.027	0.081	0.200	1.000
C293	0.172	− 0.081	0.174	0.028	− 0.198	0.109	0.024	− 0.052
C307	0.449	− 0.164	0.310	0.111	− 0.527	0.282	− 0.070	0.019
C335	0.222	− 0.005	0.146	0.029	− 0.138	0.126	− 0.034	− 0.042
C351	0.200	0.010	0.193	0.048	0.006	0.026	0.021	− 0.087
C353	0.602	− 0.142	0.458	0.221	− 0.499	0.265	− 0.023	0.076
C361	− 0.183	0.215	− 0.123	− 0.135	0.287	− 0.202	0.056	0.028
C362	0.087	− 0.101	0.065	0.029	− 0.077	0.011	0.033	0.001
DD4	− 0.261	0.188	− 0.197	− 0.088	0.343	− 0.288	0.087	0.029
DD8	0.413	− 0.321	0.387	0.154	− 0.353	0.353	− 0.151	− 0.074
DD10	0.233	− 0.009	0.161	0.031	− 0.202	0.141	− 0.068	− 0.012
DD12	0.189	− 0.077	0.143	0.071	− 0.031	0.113	− 0.084	− 0.057
DD30	0.471	− 0.160	0.316	0.053	− 0.511	0.294	− 0.196	0.023
DD40	0.180	− 0.130	0.168	0.029	− 0.132	0.161	− 0.024	0.096
DD42	− 0.118	0.014	− 0.145	0.020	0.144	− 0.013	− 0.075	− 0.014
DD62	− 0.022	− 0.042	− 0.016	− 0.166	− 0.127	0.087	0.002	0.105
EE6	0.099	0.180	0.001	0.070	0.007	− 0.015	0.024	0.047
EE8	0.066	0.247	0.035	− 0.043	− 0.121	− 0.081	0.018	0.066
EE16	0.111	− 0.213	0.036	0.042	− 0.073	0.064	0.015	− 0.041
FF34	− 0.011	0.173	− 0.018	0.024	0.057	− 0.093	0.059	0.101
DD78	0.475	− 0.183	0.304	0.001	− 0.423	0.291	0.197	− 0.034
C350	− 0.111	− 0.219	− 0.087	0.029	0.016	− 0.061	− 0.094	− 0.117
C368	0.039	0.369	0.048	0.111	0.073	− 0.070	0.366	0.268
C373	0.310	0.078	0.259	0.079	− 0.069	0.022	− 0.021	0.049

Variable code[a]	C293	C307	C335	C351	C353	C361	C362	DD4
C293	1.000							
C307	0.245	1.000						
C335	0.098	0.127	1.000					
C351	− 0.029	0.110	0.030	1.000				
C353	0.210	0.618	0.179	0.051	1.000			
C361	− 0.174	− 0.281	− 0.042	0.261	− 0.387	1.000		
C362	0.019	0.070	0.009	0.029	0.080	− 0.138	1.000	
DD4	− 0.057	− 0.284	− 0.118	− 0.072	− 0.300	0.187	− 0.131	1.000
DD8	0.142	0.461	0.133	0.155	0.514	− 0.295	0.053	− 0.431
DD10	0.073	0.146	0.108	0.147	0.244	− 0.057	− 0.057	− 0.537
DD12	0.133	0.212	0.012	0.056	0.252	− 0.199	0.041	− 0.209
DD30	0.354	0.613	0.033	− 0.015	0.618	− 0.365	0.083	− 0.302
DD40	0.115	0.257	0.100	− 0.020	0.240	− 0.179	0.009	− 0.096
DD42	0.091	− 0.089	− 0.078	− 0.114	− 0.080	− 0.027	0.008	0.165
DD62	0.133	0.083	− 0.007	− 0.165	0.100	− 0.105	0.050	− 0.015
EE6	− 0.039	0.105	0.047	0.036	0.109	− 0.081	0.015	0.088
EE8	− 0.020	− 0.045	0.080	0.065	− 0.045	0.131	− 0.019	0.052
EE16	0.077	0.045	0.045	0.071	0.108	− 0.008	− 0.006	0.002
FF34	0.012	− 0.053	0.047	0.054	− 0.005	0.171	− 0.050	0.039
DD78	− 0.260	0.537	0.118	0.034	0.557	− 0.302	− 0.025	0.337
C350	0.124	0.078	0.089	− 0.088	0.015	− 0.087	0.060	0.145
C368	− 0.135	− 0.116	0.074	− 0.019	0.035	0.108	− 0.062	0.214
C373	− 0.001	0.145	0.290	0.113	0.207	0.089	− 0.019	− 0.056

(continued)

Appendix 10. Concluded.

Variable code[a]	DD8	DD10	DD12	DD30	DD40	DD42	DD62	EE4
DD8	1.000							
DD10	0.257	1.000						
DD12	0.290	0.112	1.000					
DD30	0.453	0.251	0.265	1.000				
DD40	0.258	0.087	0.163	0.299	1.000			
DD42	−0.107	−0.173	−0.007	0.105	−0.080	1.000		
DD62	0.039	0.079	0.192	0.244	0.238	−0.057	1.000	
EE6	−0.043	0.006	−0.090	0.099	−0.014	0.051	−0.131	1.000
EE8	−0.096	0.028	−0.019	0.023	0.028	0.001	−0.036	−0.417
EE16	0.017	0.028	0.061	0.120	0.052	−0.022	0.033	0.054
FF34	−0.127	−0.017	−0.082	−0.062	0.024	0.109	−0.096	−0.098
DD78	0.525	0.277	0.297	0.276	0.369	0.020	0.303	0.173
C350	0.089	−0.175	0.092	0.087	0.092	0.123	0.067	0.097
C368	−0.276	−0.147	−0.126	−0.207	−0.109	−0.057	−0.055	−0.098
C373	0.084	0.083	0.012	0.055	0.058	−0.065	−0.063	0.053

Variable code[a]	EE8	EE16	FF34	DD78	C350	C368	C373
EE8	1.000						
EE16	−0.026	1.000					
FF34	0.111	0.051	1.000				
DD78	−0.038	0.133	0.001	1.000			
C350	−0.124	−0.016	0.013	−0.019	1.000		
C368	0.126	−0.020	0.140	−0.236	−0.127	1.000	
C373	0.061	0.070	−0.014	0.102	−0.100	0.125	1.000

[a] Refer to Appendix 1 for explanation of variable codes.

11. ANALYSIS OF COGNITIVE AND NONCOGNITIVE ACHIEVEMENTS[5]

Variable code[a]	Cognitive achievement			Noncognitive achievement		
		Beta	R^2		Beta	R^2
C9	(3)	0.14	0.58		—	—
C307		—	—	(4)	0.13	0.55
DD8	(2)	0.21	0.56	(3)	0.14	0.54
DD10		—	—	(5)	0.11	0.56
DD30	(1)	0.49	0.51	(2)	0.28	0.34
DD40	(4)	0.10	0.57		—	—
DD62	(5)	0.09	0.59	(1)	0.42	0.50
EE8		—	—	(6)	− 0.11	0.57
FF34	(6)	0.09	0.60		—	—
R^2			0.60			0.57

Note: Figures in parentheses signify order of importance of variable.
[a]Refer to Appendix 1 for explanation of variable codes.

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[5]Multiple-regression analysis for grade 3 students.

12. CURRICULAR IDEALS

Recommendations for a primary school curriculum related to agriculture

(1) Build an inventory of technical concepts that can be derived from extension and other specialized training.

(2) Create familiarity with sources of technical information.

(3) Introduce accurate information about agricultural professions, being careful to present an attractive and realistic image for each.

(4) Explain scientifically what is happening in the government's development projects in the local community.

(5) Train students in the use of cost-benefit analysis applied to agricultural enterprises in the context of farm management.

(6) Provide knowledge of record keeping and computation.

(7) Introduce students to the world of small-machine technology.

(8) Give students firsthand experience in the management of money and labour.

(9) Introduce the idea of alternate uses of land.

(10) Make students aware of symptoms and treatment of major rural plant and animal diseases.

Source: Sheffield (1966)

Characteristics of desirable teaching and learning

(1) Building the curriculum from the experiences of the pupils (in contrast to the tendency to stay close to the prescribed syllabus).

(2) Encouraging curiosity and the exploration of local social, economic, and natural phenomena and history (rather than the tendency to learn only from textbooks).

(3) Encouraging explanations and solutions to phenomena and problems (rather than the tendency simply to provide information for memorization).

(4) Fostering reliance on careful reasoning (rather than on learning facts and formulae by heart).

(5) Fostering original thinking and creative expression (rather than the tendency to seek standardized responses).

(6) Devising practical projects to apply mathematical and scientific principles and knowledge.

(7) Showing a willingness to digress from the strict curriculum to solve a local query.

(8) Directing adequate attention to all aspects of the curriculum (rather than emphasizing those parts that are important for qualifications).

(9) Encouraging cooperative learning (rather than focusing attention on individual achievement).

(10) Paying attention to all students and providing additional help for weaker students (rather than paying excessive attention to the more able students and those likely to achieve high qualifications).

Source: Brook and Oxenham (1980)

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